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MINISTRY OF HEALTH SPECIAL EDUCATION & SOCIAL WELFARE HEALTH DIVISION GOVERNMENT OF PAKISTAN

BOOK-

PRIMARY HEALTH CARE PROJECT HEALTH TECHNICIANS TRAINING PROGRAM

PN-AEW-414

HEALTH DIVISION
GOVERNMENT OF PAKISTAN

PRIMARY HEALTH CARE PROJECT

HEALTH TECHNICIANS TRAINING GUIDE

BOOK I
(Revised)

The National Basic Health Services Cell
Health Division, Government of Pakistan
In Collaboration with the
Health Departments of
Baluchistan, Punjab, NWFP
and Sind Provinces

1990

PREFACE

This revised curriculum has been prepared for the training of health technicians who are very important members of the health team in the rural health services.

Known as **"TASK ORIENTED TRAINING"** the revision is based on:

(i) Needs of the community related to health improvement and reduction of maternal and infant mortality;

(ii) Training objectives related directly to the tasks;

(iii) Tasks required to meet the health needs of the population served;

(iv) Learning activities that will enable the students to perform the tasks in terms of the objectives, and;

(v) Evaluation of the students's training.

The training material is presented in three books containing a total of twenty chapters and is developed by a Pakistani Consultant, Prof. Mohammad Iliyas and the Federal Training Advisor for the Primary Health Care Project, Dr. Tara S. Upreti.

In developing the chapters, six modules previously prepared with the assistance from University of Hawaii Medical School during 1977 - 1980 have been used with variations to suit new requirements where appropriate. Besides these volumes, additional material has been obtained from the following sources:

- Werner, D: **Where There is no Doctor.** Palo Alto, The Hesperian Foundation, 1985.

- World Health Organization: **Immunization in Practice - A guide for health workers who give vaccines.** Module 1 - 7, Geneva, WHO, 1984.

- World Health Organization: **The Primary Health Worker.** Geneva, WHO, 1980.

The final product of the chapters is based on extensive discussions and inputs by Federal Health officials, Dr. Mushtaq Ahmad Chaudhry, Dr. M. Zafar Ahmed, and Mr. Abdul Sattar Chaudhry as well as Provincial Health officials especially including the Directors of Health Services from all four provinces. The guide represents a consensus of all concerned in training and supervising Health Technicians.

The revised curriculum has also taken the guidelines from the following documents:

- The Alma Ata Declaration of Health For All by the Year 2000.
- The Prime Minister's Five-Point Socio-economic Development Plan.
- The Sixth and Seventh Five-Year Plans for Pakistan (Health Components).
- Consultants' reports on curriculum requirements from 1982 onward.

The entire revised curriculum aims at strengthening the role of Health Technicians as a vital link between the community and the health facilities. As such the manual focuses mainly on preventive and promotive health technology applied to communities.

The revised portions of the chapters were completed during the workshop held in the four provinces where the participants were the Project Directors, Provincial Basic Health Services Cell, Senior District Health Officers, Programme Training Officers, Tutors, Medical Technicians, Health Inspectresses, and Principals of Schools of Public Health. Their names are shown separately on the attached sheets following the acknowledgement.

Considerable contributions have been made by the Advisory Committee members, the composition of which is shown on the list that follows. Rural Health Centre staff, health educators, and health administrators from the provinces also contributed to the curriculum development.

Significant contributions have also been made by specialists in Paediatrics, Expanded Programme for Immunization, Malaria Control Obstetrics, Nutrition and Health Education. Their names are shown on the list of Subject Specialists.

In order to ensure that the curriculum remains up-to-date, action-oriented, and appropriate to the community's needs, the Federal Advisory Committee has developed a monitoring plan. All the components of the Health Technicians' Training Programme in the classroom, hospital and the community will be monitored by the Advisory Committees constituted at the provincial level, the Primary Health Care Project Training Specialists, and the Federal Primary Health Care Training Advisor. For one full training cycle, progress reports will be submitted by these provincial committees to the Directors of Health Services. Based on such reports, the materials in the various chapters may be updated by the authors in future. In this way, the training programme will continue to be pertinent in the provision of health services to the communities in the years to come.

It is our hope that all these efforts will prove to be a major step in assuring success in the Health System.

ACKNOWLEDGEMENT

The Ministry of Health gratefully acknowledges the help, advice, and constructive criticism of dozens of people in the preparation of the Health Technician Training Guide.

We are indebted to the Provincial Directors of Health Services and Project Directors of Basic Health Services for their invaluable contributions.

We are also most grateful to all those who attended the three Curriculum Workshops in each province. They include the Medical Superintendents, the District Health Officers, the Inspectresses of Health, the Medical Officers of Rural Health Centres, the Programme Training Officers, and the Tutors of Health Technician Training Schools. All of them read the chapters line by line and suggested improvements for simplicity of language, accuracy of material and applicability of the contents.

The untiring efforts of the Advisory Committee members are laudable. The committee was responsible to provide guidelines and direction on the format and content of the revised curriculum. The committee was mostly the first body to review the draft chapters. It also helped in identification of experts and materials available in the country which could be used in the revision of the curriculum.

Thanks are due to the Specialists from the fields of paediatrics, Health Education, Expanded Programme for Immunization, Malaria Control, Nutrition and Obstetrics. The comments of these experts have been very helpful in the improvement of the respective chapters.

We appreciate the helpful suggestions of many colleagues in the Ministry of Health and other departments. Particular mention is justified for the hard work done by Dr. Mushtaq Ahmed Chaudhry, Dr. M. Zafar Ahmed and Mr. Abdul Sattar Chaudhry - the three musketeers of Primary Health Care Project in the Basic Health Services Cell who developed the original curriculum and are responsible for this necessary revision. They identified the needs for the revision, initiated the revision, monitored the progress, provided needed guidance at every step, read the revised chapters, and in some cases, even wrote certain chapters themselves.

This revision of the Curriculum could not have been completed without the untiring and persistent hard work of months together by Professor Mohammad Iliyas and Dr. Tara S. Upreti. They have together woven into Health Technician Training Guide the work of a large and diverse group of people.

We acknowledge with thanks different ideas, materials and designs, borrowed and/or adapted from a vast body of available knowledge around the world, the source of which is not acknowledged by name.

We are indebted to the technical and financial assistance provided by the United States Agency for International Development without which the revision could not have been completed.

To everyone who worked as a team in completing the revised curriculum successfully, we again express our appreciation for their contribution to improved training of health workers who deliver essential health services and minimize suffering in rural Pakistan.

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INFORMATION ON HOW TO USE THE THREE BOOKS

This training guide is written for those students who are participating in Health Technician's Training Programme in Pakistan. It consists of three books. The first book has five chapters, the second book consists of chapters six through twelve and the third book contains chapters thirteen through twenty.

Each book has a Table of Contents for all three books to inform the reader of the location of other topics. In addition, a Tutor's Workplan is provided for each book following the contents. References for each book are provided at the end of the book. Chapters in the books are organized in the following order:

1. List of objectives.
2. Contents of the chapter.
3. Procedures related to the subject.
4. Glossary.
5. Suggested learning activities.
6. Review questions.
7. Record of learning activities.
8. Evaluation sheet.

TUTOR'S WORK PLAN
CHAPTER 1 THROUGH 5

Chapter/Topic	Time in hours							Venue of Experience	Person Responsible	Support and other material
	1st Sem		2nd Sem		3rd Sem		TOTAL			
	P	T	P	T	P	T				
1. Introduction to Primary Health Care.	20	50	28	12	30	10	150	RHC BHU School Home visit	PTO and Tutors Training Specialist.	Kit
2. The Problem Solving Approach.	12	20	30	12	34	12	120	Classroom Hostel Community	PTO and Tutor Training Specialist.	-
3. Health Education: Communication in Health Work.	10	20	18	12	18	12	90	Outpatient Department RHC/BHU Community	PTO and Tutor Health Technicians Training Specialist.	Health education material.
4. Anatomy and Physiology.	10	30	4	6	4	6	60	Classroom RHC/BHU	PTO and Tutor	-
5. Health of the Family.	10	25	35	12	36	12	130	Community Home visits	PTO and Tutor Health Technician Training Specialist Medical Officer	-
							550			

INTRODUCTION TO PRIMARY HEALTH CARE

Objectives: After completing this chapter you will be able to:

1. Define health.
2. Describe the "Health Scale" of Optimum Level of Functioning.
3. Define Primary Health.
4. State eight elements of Primary Health Care.
5. Describe what a health team is and how it should function.
6. Describe the Health Technician's role and responsibilities in preventive and curative areas.
7. Describe how the Health Technician works as a link between the community (people) and the government health institutions.
8. Describe what a community consists of.
9. Describe your own community's location and its characteristics.
10. Identify five occupational settings for Health Technicians.
11. Identify population characteristics.
12. Identify three types of leaders.
13. Define PTO and the role of Tutors in initiating first contact with the community.
12. Describe the Health Technician's role at a RHC.
13. Describe the Health Technician's role at a BHU.
14. Describe the Health Technician's role and responsibilities in Home Visiting.
15. Give ten reasons for Home Visiting.
16. Describe the procedure for Home Visiting.
17. Describe the Health Technician's role in school.
18. Describe the procedure for initiating School Health Services.
19. Describe the reason for having a Health Technician's kit.
20. List the contents of the kit.
21. Describe the use of each item in the kit.

CHAPTER 1

INTRODUCTION TO PRIMARY HEALTH CARE

According to the Sixth Five Year Plan, the Government of Pakistan (GOP) has planned to provide a systematic link between the village community and the infrastructure of the modern health care system. To achieve this link, the concept of an Integrated Rural Health Complex emerged. An Integrated Rural Health Complex (IRHC) is a concept in which the health services for the community are linked in a complex consisting of the community, Rural Health Centres (RHCs), Basic Health Units (BHUs), Sub Health Centres, Dispensaries and Maternal Child Health Centres (MCHs). The Rural Health Centre serves as a referral point for attached Basic Health Units and other health facilities. A Basic Health Unit serves a population of 5,000 to 10,000. Five to ten Basic Health Units are linked to a Rural Health Centre.

Two to three Health Technicians will be at the BHU or RHC to provide preventive and some curative health services. Some examples of these services include Maternal Child Care, Immunization, Diarrhoeal Disease Control, Malaria Control, Child Spacing, Mental Health and Home and School Health. In addition, Medical Officers will now be placed at each Basic Health Unit. Prior to the Sixth Five Year Plan only Medical Technicians were placed at Basic Health Units.

Under the IRHC concept, this change in staffing policy presents a challenge to the role of the Health Technician in that they are now the connecting link with the community. It also facilitates some of their tasks as well. For example, Medical Officers, who are used to working at a health facility and providing curative services, will now be located at the RHC or BHU and provide health services to people coming on their own or upon referral. This allows (frees) the Health Technician to perform other important tasks at the BHU or in the community.

Health Technicians are now to be trained mainly in community (outreach) activities and preventive services. There will be limited exposure to curative services. In this way, Health Technicians will provide the connecting link between the people (community) and the BHU. The BHU will not be able to meet all the health needs of the

community it serves. Therefore, without the outreach and preventive services of the Health Technicians, the link with the community would not be possible.

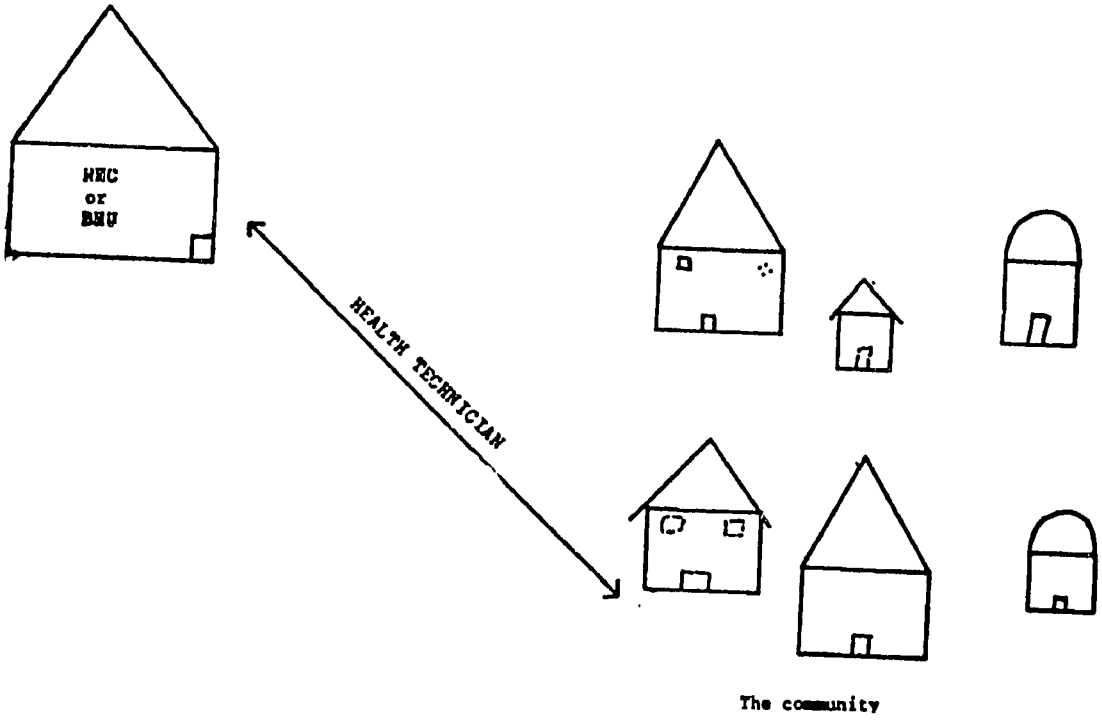


Fig. 1.1 The Health Technician as a Link.

Vital preventive health services have been grouped over the years under different titles, namely: Primary Health Care, Maternal and Child Health, Child Survival and the like. No matter what the heading, the following services are fundamental to good health:

1. Expanded Programme of Immunization (EPI).
2. Control of communicable and diarrhoeal diseases.
3. Growth monitoring and nutrition intervention.
4. Antenatal, natal, postnatal care and child spacing.
5. Health education.

Outreach activities to bring these essential services to villagers who normally do not seek modern (allopathic) care are necessary for disease prevention. You, as Health Technicians, are being trained to assume the responsibility of introducing these services to the villagers, and of helping them to use these services.

Those services listed above will be described specifically by the related tasks which the Health Technicians are to perform in the community. Through these activities, Health Technicians will bring about an interaction between the government health providers and the community, thereby helping the community to meet its health needs. This is the focus of this curriculum.

Attempts to revise the curriculum have been successful. The revised curriculum utilized the following documents as guides:

- The Government of Pakistan's Sixth and Seventh Five Year Plan.
- The Prime Minister's Five Point Mandate emphasizing rural development.
- The World Health Organization's Alma Ata Declaration of Health for All by the Year 2000.

This curriculum is prepared for Health Technicians working in the community providing mainly health promotive, illness preventive and some limited curative services. However, the same curriculum, in part or whole, could be utilized in training other workers in these areas.

The term Health Technicians (HTs) will be used in the text instead of Medical Technicians, because the former is the term preferred and approved by all four provinces.

1.1 THE CONCEPT OF HEALTH AND PRIMARY HEALTH CARE (PHC)

What is health? Health has historically been viewed or defined in a variety of ways over the years:

- In earlier days, and still today, health was viewed as an absence of illness.
- The World Health Organization (WHO) defines health as a "State of complete physical, mental and social well-being and not merely the absence of disease."
- A recent more popular definition of health among community health workers is called "OLOF" or Optimum Level of Functioning.

If WHO's definition is combined with Optimum Level of Functioning, then the revised definition of health would read:

> Health is a state of physical, mental and social well-being and ability to function, not merely the absence of illness and infirmity.

This change in the way health has been viewed over the years shows that as we gain more knowledge, our concept of health also changes. For example, during the eighteenth and nineteenth centuries, when great advances were made in discovering specific organisms as the cause of specific diseases, the absence of physical illness meant good health. As treatments for various bacterial diseases were discovered and applied, doctors realized that these treatments still left many unwell. Later they came to realize that physical, mental and social disease could not be treated independently because an individual has biological, psychological and sociological (bio-psycho-socio) components that are closely related.

Another point recently realized is that there is no such thing as complete well-being. Complete well-being refers to "perfect" and in health no perfect state has so far been identified or attained. This concept then gave way to the "Holistic" approach to health. According to this approach, an individual's abilities, resources and strengths are the focal points of attention, not their disabilities. The important thing is not to concentrate on the disabilities we have but what we do with or about them. We are all different and have much potential (strong points) as well as limitations (weak points).

1.2 AN OPTIMUM LEVEL OF FUNCTIONING

An Optimum Level of Functioning (OLOF) means good health. This definition takes into consideration that each individual has his or her own OLOF that he/she tries to attain and maintain. An individual's OLOF is influenced by many factors in the environment.

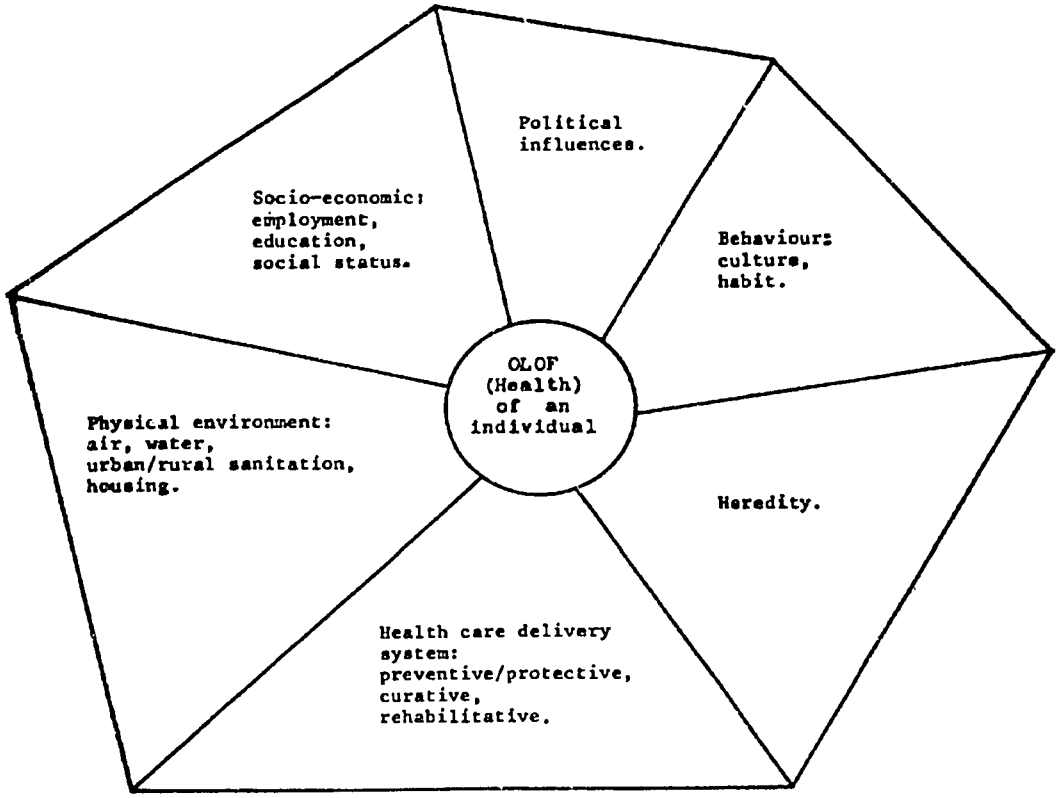


Fig. 1.2 Environmental factors influencing Optimum Level of Functioning.

Source: Adapted from "Eco-systems Influence on Optimum Level of Functioning (OLOF)" in Sarah Ellen Archer and Roth P. Fleshman, Community Health Nursing. Massachusetts, Duxbury Press, 1979.

This figure shows that an individual's health is influenced by many factors. In the past, we in the health services had only concentrated on the influence on health of heredity, physical environment and the delivery of health care services. The other areas, socio-economic, political and cultural were more or less ignored. However, it is now necessary to see how all factors influence our well-being/health. In order to understand how our environment influences our health/OLOF, let us discuss each of the factors separately.

Socio-economic influences. A person's status in the society means a special respected place in the group (society) which entitles him to certain privileges. Those privileges, along with income and education, affect an individual's Optimum Level of Functioning. A certain basic minimum of income and knowledge is required to meet the basic needs of an individual. Existing resources (income and education) need to be utilized to the maximum. Health Technicians have not, until recently, focused on this area. Factors in the environment do influence an individual's health either positively or negatively.

Physical environmental influences. Pakistan still does not have safe drinking water or adequate sanitation. Pollution from humans and animals affects water and sanitation. Dust, dirt and motor vehicle fumes pollute the air and affect respiration. Increases in traffic accidents have resulted in more injuries and disabilities.

Health care delivery system influences. Traditionally, the health care system has been disease oriented. However, with the emphasis on health promotion and illness prevention, it is now more OLOF/health oriented.

Hereditary influences. We cannot change what we are born with. But the knowledge gained from research has provided information on ways to reduce the likelihood of certain congenital abnormalities in offspring, for example, by avoiding cross-cousin marriages.

Cultural influences. Culture and behaviour shape our life style. What we eat, how we raise children and what we do to take care of ourselves are influenced by culture and habit. For example, the high protein content in a Pakistani diet, breast-feeding of babies and the closeness in families are all health promotive behaviours. However, putting cow dung on open wounds, drinking unboiled canal water or maintaining an inferior social position for females may negatively affect health status.

Political influences. In Pakistan, as in other countries of the world, health facilities are concentrated in the urban areas. However, the Fifth, Sixth and Seventh Five Year Plans have established and staffed RHCs and BHUs in rural areas. The Prime Minister's Five Point Mandate emphasized the development of BHUs in Union Councils close to the people. This has/will make it possible for people to seek health services for early diagnosis and treatment.

1.3 THE HEALTH/OLOF SCALE

The Health/OLOF Scale (see Table 1.1) has been developed as a guide to measure a person's level of well-being. An individual is placed on the health scale in terms of how well he/she functions, not only on the basis of suffering from a disease or not but also in terms of how well he/she adjusts to his/her condition.

According to this scale, if a person with a disease, for example diabetes, is making the necessary adjustment and is carrying out all of his normal activities, then he is said to be coping well and requires no outside help. This means that the individual, despite having a disease, is able to carry out his normal activities and is a contributing member of the society.

According to the Health/OLOF Scale, illness and wellness are part of a continuous balance. This scale looks at four factors that affect our level of functioning: disease, disability, usefulness and ability to cope. The first two factors deal with the person's physiological ability to adjust to the disease or disability. The scale also serves as a guide for Health Technicians to determine not only if help is needed, but how much help to provide, depending upon the physiological state and level of functioning and coping. For example:

- A person in the advanced stage of a disease will require a great deal of the Health Technician's help.
- A person with some symptoms of a disease or disability will require some help.
- A person suffering from few symptoms may require minimal help.
- A person who has no diagnosed illness or symptoms may require no outside help.

This scale helps us to identify the need of an individual by placing him/her on a point on the scale. However, the actual need to help can be determined only after finding out what resources are available to an individual to help him cope with the situation. The subject of resources is not dealt with in reference to the OLOF Scale but is discussed in Chapter 2. This scale can help you determine what level the individual is at and how well the individual is adjusting, but does not highlight the role of available resources in coping with problems or meeting identified needs. Therefore, all Health Technicians must be well informed and skilled at using the problem solving techniques in helping the individual, the family and the community attain their Optimum Level of Functioning.

TABLE 1.1 THE HEALTH/OLOF SCALE

Criteria	Severely Ill	Moderately Ill	Minimally Ill	Moderately Well	Extremely Well
Disease	Advanced stage of disease with one or more obvious incapacitating symptoms.	One or more obvious symptoms of the disease may be alarming.	One or more symptoms of a minimal nature indicating deviation from normal.	Disease is under control with sub-clinical symptoms.	No symptoms visible or invisible.
Disability	Mental or physical disability to the extent (stage) of crippling.	Visible disability but not to the extent of crippling.	Disability is present but not too obvious nor hindering.	No disability but needs periodic checks.	Not disabled, very active, full of vigour and vitality.
Usefulness	Not useful to the society totally dependent on others.	Able to carry out normal (personal) activities with a moderate amount of help.	Able to carry out normal activities but needs occasional assistance for short periods. Useful to the society depending upon the type of disability	Useful to the society as a normal person.	Most useful to the society.
Ability to cope	Uneble to cope with self-care.	Able to cope with self-care with some assistance.	Able to cope with self-care with some assistance.	Fully able to cope. Adjusting to the situation.	Not only coping well himself but helping others as well.

1.4 PRIMARY HEALTH CARE

According to the Alma Ata Declaration of 1978, "Primary Health Care is essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination. It forms an integral part both of the country's health system, of which it is the central function and main focus, and of the overall social and economic development of the community. It is the first level of contact of individuals, the family and community with the national health system bringing health care as close as possible to where people live and work, and constitutes the first element of the continuing health care process." (Alma Ata Declaration of 1978, PHC Report, International Conference on Primary Health Care, Alma Ata, USSR Sept. 1978).

To put it in simpler terms, Primary Health Care is the provision of necessary health services to everyone in the country. The services are not limited to cities only. They are available and accessible to all. Primary Health Care, therefore, is the first entry point into the national health system. It is also a part of the overall social and economic development and requires full participation of the community as well as coordination from other governmental sectors.

The essential elements of Primary Health Care according to the Alma Ata Declaration include:

1. Education concerning prevailing health problems and methods of preventing and controlling them.
2. Promotion of food supply and proper nutrition.
3. An adequate supply of safe water and basic sanitation.
4. Maternal and child health care including family planning.
5. Immunization against the major infectious diseases.
6. Prevention and control of locally endemic diseases.
7. Appropriate treatment of common diseases and injuries.
8. Provision of essential drugs.

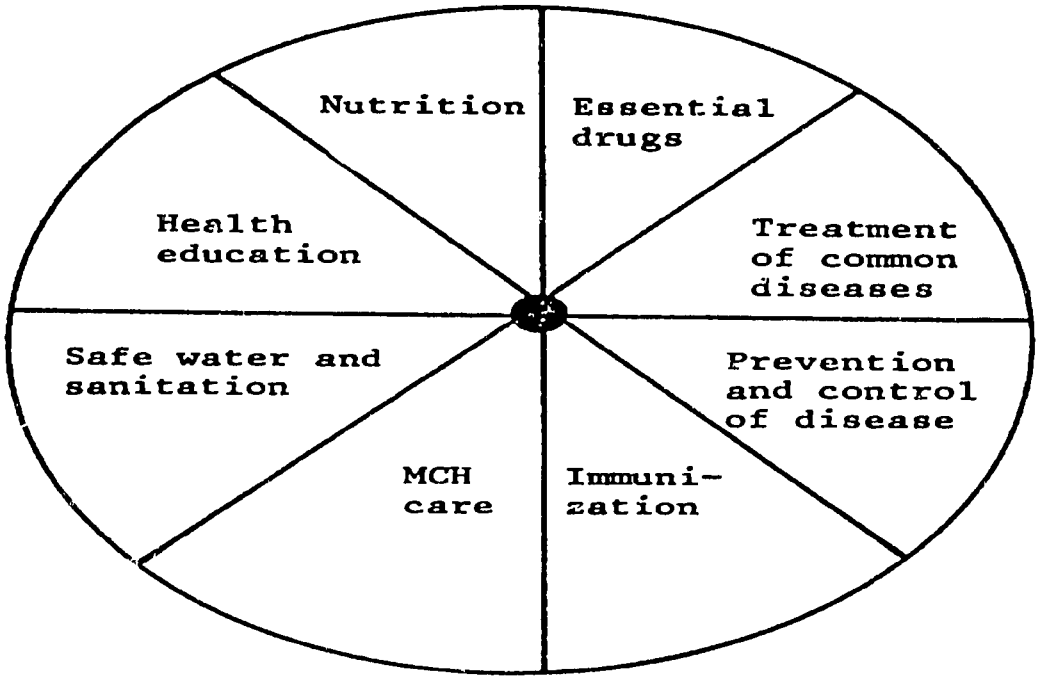


Fig. 1.3 Elements of Primary Health Care.

The principle of Primary Health Care is to provide essential health and related services to people where they live according to their needs and resources and to help them participate fully in their own care. The staff members from the health sector are also expected to coordinate their efforts with other governmental sectors such as the departments of agriculture, education, etc, in order to meet individual, family and community needs. This implies that health sector personnel should also be aware of existing resources and actively participate in utilizing them.

The concept of Optimum Level of Functioning and how members of the health team can assist individuals to obtain this level of functioning, will be explained in the content of this curriculum.

1.5 CONCEPT OF A HEALTH TEAM

Health Team. In order for a health facility to function properly, each member of the team must be involved in carrying out a variety of tasks. For example, the following staff may be working within the health facility:

- Medical Officer (MO)
- Nurses
- Lady Health Visitors (LHVs), Midwives
- Vaccinators
- Communicable Disease Supervisors
- Dispensers
- Health Technicians
- Trained Birth Attendants (TBAs)
- Chowkidars
- Sweepers
- Others

The objective of any health programme is to meet the health needs of the people who come to utilize the health services. For example, a patient with a cough of one month's duration needs to have the Medical Officer make a diagnosis before he/she can get a prescribed treatment. Let us see who is involved directly or indirectly in helping the patient get the needed treatment.

STAFF	NECESSARY ACTIVITIES
Dispenser/Health Technician	Patient registration.
Sweeper	Cleans BHU waiting room and doctor's room.
Medical Officer	Has necessary instruments and supplies.
Medical Officer/ Health Technician	Sends patient for lab investigation.
Health Technician/ Lab Technician	Tests blood, sputum, urinalysis.
X-ray Technician	Patient goes in for x-ray (RHC) if symptoms indicate.
Medical Officer	Patient told about diagnosis and medication prescribed.
Dispenser	Gets medication and gives it to patient.
Medical Officer/ Health Technician	Follow-up.

In order to help one person with even one complaint, many persons are involved. The patient's needs can be met only if each of the staff knows what his job is and carries it out.

If one person does not perform his job adequately, then the patient may not get the proper needed care. Therefore, all workers in a health facility must work together as members of a team to accomplish the objectives of the service, which is to meet the needs of the patient.

All types of activities are seen as being important and so is every category of staff. Therefore, one must take his job seriously and work in relation to the activities of others with the overall aim of providing service to people.

Let us now focus on the BHUs where most Health Technicians are placed. The staffing pattern of a BHU consists of:

STAFF	NECESSARY ACTIVITIES
Medical Officer	Diagnosis, treatment and referral. Coordinates activities of the team.
Health Technician	Link between community and BHU. Refers people with symptoms to MO. Assesses individual's needs and helps them to meet their needs.
LHV	Conducts antenatal care, delivery, postnatal care, infant care and training of TBA/Dai.
TBA/Dai	Conducts delivery and postnatal care.
Dispenser	Maintains pharmacy; Stock, dispense drugs with explanation.
Sweeper	Keeps place clean.
Chowkidar	Guards the premises.

In a BHU, the Medical Officer waits for patients to come to him/her. Patients either come on their own or are referred by the Health Technician from the community. For example, during a visit to the community, the Health Technician notices a man who is weak and having difficulty walking uphill. The Health Technician may talk with him and suggest he talk to the Medical Officer to see if anything can be done to relieve his problem. In this manner people with other types of needs may be referred to the Medical Officer.

The Medical Officer Incharge is the team leader. As a leader he/she is responsible for coordination of the team's activities. The Medical Officer should meet with the staff regularly and:

- Discuss problems identified by the staff and ways to solve them.
- Meet with higher authorities to discuss problems which may not be solved at the RHC and BHU level. For example, if the staff needs inservice training for performing specific tasks, then the MO should help plan and organize the training.
- Work out a schedule of leave so that services of the BHU/RHC continue with little interruption.

If the BHU is unclean, messy and unorganized, the people referred to it may consider it an undesirable place to go. The sweeper must perform his duties well to make the BHU more appealing. The staff at the BHU needs to be pleasant and concerned when dealing with the people so that they feel that staff members are interested in them individually.

All the staff must work under the same principle of doing their job properly and showing interest in meeting the needs of the people. No one person is more important than another. All members of the staff are equally important - be they Medical Officers or sweepers. The main point to remember is that each team member must help the others to be part of the team. If one does not do his job adequately, the performance of other team members is weakened. Team work is desirable because together you can achieve more work of better quality than you can alone. The concept of a health team, therefore, is that each and every member of the team makes a significant contribution in helping the team deliver critical and essential health services to the people of the community.

1.6 PRINCIPLES OF BEHAVIOUR FOR MALE AND FEMALE HEALTH TECHNICIANS

Health Technicians (male and female) are government employees, living and working in the community, helping to meet the health and health related needs of the people. Therefore, as government employees, you are expected to follow certain principles of behaviour in carrying out your responsibilities. These principles are:

1. Know your job responsibilities and limitations. Certain limitations will be evident in specific tasks or activities relating to each category of service. Offer only those services for which you are trained.
2. Establish and maintain a good relationship with other members of your team and cooperate with them.
3. Follow the rules and regulations of the health facility in which you are posted.
4. Have respect for the rights and dignity of all people. Serve them without regard for sex, age or social status.
5. Respect other people's customs and beliefs, and be polite and sympathetic.
6. Practice what you teach about health. Be a good example for the community.
7. Help people within your limits and show interest and concern for their general welfare.
8. Be fair and honest, since you are a government employee and are paid by the government for your service. Acceptance of any type of payment from the people is not only a breach of discipline, but will also lower your status in the community.
9. Keep your confidence, do not criticize, make judgements or gossip.
10. Be cheerful and enthusiastic, neat and clean in your appearance.
11. Listen and remain open to community reactions and responses to health programmes. Do not feel offended when they refuse to accept a new service or have many questions.
12. Evaluate the community's response to your programme's activities and determine other alternate approaches to be tried if necessary.
13. Be dutiful and loyal to the department/organization employing you and perform your duties accordingly.
14. Try and learn the language and behaviour of the community.

1.7 JOB DESCRIPTION OF HEALTH TECHNICIANS (MALE AND FEMALE)

Statement of work. As members of the health team of the RHC where the team leader is the Medical Officer, the Health Technicians, both male and female, provide mainly health promotive, illness preventive services and some curative services. Health Technicians are to provide the following services at the BHU or RHC, and through outreach activities in their assigned areas:

1. Family health services.
2. Maternal health services.
3. Child survival services.
4. Control of communicable diseases.
5. Health education.
6. Community participation and coordination.
7. Referral.
8. First-aid and treatment of common conditions.
9. Record keeping.
10. Training.

Family Health Services. When visiting a family you should determine the health condition of the family in terms of:

1. Condition of the home.
2. Availability of drinking water.
3. Type of nutrition, adequate or malnourished.
4. Immunization of children and females of childbearing age.
5. Environmental conditions in and around the home.
6. Physical and mental health of individual members of the family.

After determining the family health condition, you should then be able to:

1. Identify areas needing improvement or correction.
2. Work with family members in developing solutions and plan of action.
3. Refer the family to other health and related agencies as appropriate and necessary.
4. Keep records of family needs and your activities in helping them.

Maternal Health Services. The female Health Technician's main responsibilities in maternal health care will be:

1. Identifying, registering and examining pregnant women.
2. Providing counselling on immunization, nutrition, hygiene and self-care during pregnancy.
3. Planning for and preparing pregnant women for labour and delivery in the home or hospital.
4. Participating in labour and delivery when possible.
5. Making postpartum visits and providing necessary assistance.
6. Assisting families with providing adequate rest, nutrition and care to the new mother during the postpartum period.
7. Discussing child spacing.
8. Referring suspected high risk cases to the RHC or specialists.

Child survival services. These include:

1. Monitoring fetal, newborn and child growth and development.
2. Encouraging breast-feeding and providing nutrition counselling to mothers for the introduction of appropriate food for growth and development of their children.
3. Having children adequately immunized.
4. Teaching families to prepare oral rehydration solutions and keeping the infant well hydrated when suffering from diarrhoea.
5. Identifying malnourished children and knowing how to meet their needs.
6. Advising mothers on a safe environment and accident prevention.
7. Advising mothers and helping them to bring in infants and children periodically for medical checkups to detect abnormalities early.
8. Referring high risk or sick newborns, infants or children to the Medical Officer or other appropriate sources.
9. Registering or keeping records of all births and deaths of children in your area.

Identification and Control of Communicable Diseases. The main community diseases are:

1. Malaria.
2. Tuberculosis.
3. Diarrhoea and intestinal parasites.
4. Respiratory infections.
5. Childhood infectious diseases.

Health Education. In order to be responsible for health education, you as Health Technicians must:

1. Familiarize yourself with the local administrative structure.
2. Identify community leaders, including religious ones.
3. Assist in the establishment of a community health committee and arrange for periodic meetings to serve community priorities.
4. Learn about traditions, customs and habits relating to health behaviour.

Referral Services. These are of two types:

1. General: Identify individuals, groups or organizations in the community concerned with health and health related matters and help the community make appropriate use of them.
2. Clinical: Identify serious cases of acute or chronic illness, trauma, burns, etc., and refer to the Medical Officer or specialist when appropriate and necessary.

First Aid and Other Medical Care. Health Technicians should:

1. Provide treatment for minor ailments.
2. Provide immediate treatment for all accidents and injuries.
3. Refer major accidents and injuries to the Medical Officer at the BHU/RHC after providing immediate first aid services.

Record Keeping and Reports. These are important for:

1. Maintaining patient records.
2. Supplying drug registers.
3. Keeping other special records on:
   - Expanded Programme of Immunization (EPI).
   - Maternal and Child Health (MCH).
   - World Food Programme (WFP).
   - Family Health Record.
   - Malaria and other communicable diseases.
   - Health Technician's daily activity report.
   - Other programmes as prescribed by the government.
4. Writing a quarterly report on your activities for the Medical Officer.

Training of Other Health Workers. These include:

1. Community Health Worker (CHW).
2. Traditional Birth Attendants (TBA).
3. Dais.
4. Others as indicated.

Health Technicians need to have at least one year's experience after completing their own training before training the above workers.

Both male and female Health Technicians will be trained to provide basically the same services. However, due to location, preference of the people and staffing situations, some of the responsibilities will be divided between male and female Health Technicians. For example, in a centre where both male and female workers are available, MCH and Family Planning will be the female Health Technician's responsibility. The male Health Technician will concentrate more on environmental sanitation, community participation and coordination.

This division of tasks is not absolute. In some situations male Health Technicians may need to assist female Health Technicians in carrying out necessary activities. In this way the two Health Technicians work as a team rather than two separate workers.

In providing Primary Health Care services as Health Technicians, you will help individuals, families or the community to attain their Optimum Level of Functioning.

In order to provide adequate and appropriate help, Health Technicians must first determine a person's current level of functioning. In identifying the level of functioning, Health Technicians can determine the needs or problems the individual is facing, as well as services available to him. Once the needs/problems and resources have been identified, the Health Technician can then work out with the family ways to meet their needs or solve the problem. Identifying needs and problems and working out a plan to solve them with the individual is a technique utilizing the Problem Solving Approach. This approach is discussed in detail in Chapter 2.

1.8 OCCUPATIONAL SETTING OF THE HEALTH TECHNICIAN

Health Technicians (male and female) are posted at an RHC or BHU. However, only part of their working hours are spent there.

The RHC or BHU is the base of operation for the outreach work of the Health Technicians. "Outreach" refers to reaching out into the community to obtain support and participation in making health services more available to the individual, family and community. Health Technicians are assigned to a number of communities that the RHC or BHU serves and are expected to work in settings such as village communities, RHCs, BHUs, individual homes and schools. This section will cover the Health Technician's role in:

1. The community.
2. The home.
3. The RHC.
4. The BHU.
5. The school.

HEALTH TECHNICIAN'S ROLE IN THE COMMUNITY

Learning About and Working with the Community. A community is made up of individuals and groups of people living in one area. In order to be a successful Health Technician, you need to know and understand something about the community in which you are working.

No one can live alone because man is a social being. What this means is that an individual needs others to interact with, so groups and families are formed. A community is made up of one or more groups of people. Groups are classified as informal and formal. An informal group is one with a small and long lasting membership which interacts frequently. Examples of these groups are families, close friends or play groups. Each person in an informal group has a feeling of belonging and the group is bound together with strong ties of affection and loyalty. Children learn about the world through these informal groups and certain behaviours and habits are developed in these groups.

A formal group is a collection of individuals with a common goal. Membership in these groups is voluntary and may be small or large. The formal group functions according to its regulations. Where the membership is large there is less direct contact between members. With society becoming increasingly modernized, formal groups such as schools are taking over many of the activities of informal groups, such as educating and disciplining children.

Each individual member in a group is expected to behave in a certain way, to play a part. This part is called a "role" and with each role certain types and amounts of responsibility are given or prescribed. A person usually belongs to a number of different groups and will have a different role in each group. For example, a man may be a father and head of the household in his family but as a citizen of the community he may also have a special role in the mosque or other village groups.

Groups usually have rules and regulations for behaviour. In rural areas, groups may not have written rules, regulations, roles and responsibilities as do urban groups but these rules and roles still exist. Therefore, it is important to find out what are these rules and regulations in your community.

How to Initiate First Contact With the Community. Since outreach work has not yet been done in all communities, the Programme Training Officer and Tutor may first need to contact community authorities to explain the Health Technician Training Programme and arrange for a time and place for them to meet with the students. The community leaders should be requested to tell the students about community organizations and functions. If they have the time, they should be invited to speak at the Health Technician school. The leaders should be provided with transport for this purpose.

These authorities should also be told about the student's role in home visiting and be asked to identify families who could benefit from home visits. Those families should be visited first.

Role of Programme Training Officers and Tutors. The Tutor or Programme Training Officer needs to divide each class into groups of 2 to 6 persons and assign a village to each group. Each group is then responsible for the health activities in their own village. The following services may be provided in the home or community:

- Health education to groups on the control of certain diseases by immunization, oral rehydration therapy and proper nutrition.
- Counseling individuals or families during home visits on antenatal care, child growth and development and ways to keep oneself healthy.
- Participating in some of the ongoing community activities. This requires understanding the roles of certain individuals in the groups, such as the leaders and their rules and regulations. You should know what type of groups exist for men, women and children.

The government has administrative units (eg, the Union Council and Divisional and District Headquarters) in rural as well as urban communities. Find out where these units are located. Who are the senior administrators at these units? Are they Union Council Chairmen, Commissioners, District Superintendents of Police or District Health Officers? Try and learn the officer's names and know their location.

As Health Technicians you are also government employees. Since Health Technicians are new to the government system, you need to identify yourself not only to the community but also to the government officers so that they may facilitate your activities. You need to interact with them frequently and maintain a visible role in the community. In this way you not only become visible but also more acceptable to the group. In other words, you need to make yourself a part of the community in which you are working.

In order to become a part of the community in which you are working you need to know the following:

1. The location, size and resources of the community.
2. Who lives in it.
3. Who the leaders are.

In order to find answers to the above questions, you either have to collect information or use existing information. You will need to collect information in areas where existing information is insufficient or where none exists.

Location and Population of the Community. To become well informed and a part of the community you will need to gather existing information. The Union Council or the Rural Health Centre has a map of your community. Obtain a copy of this map and orient yourself to it. Then find out if maps for your other villages exist. If so obtain them; if not begin to make maps of every village in your assigned area. Maps and the information on them are valuable resources.

In making a new map, the RHC or BHU should be the focal point of reference. For example, village A is 2 miles northwest of the BHU and village C is 5 miles south of it.

- Date the map and locate all houses in each village or hamlet.
- Put the location of mosques, business areas, government or other offices on it.
- Locate schools.
- Locate sources of water.
- Locate industry or any other employment sources.
- Locate roads, rivers, ponds, canals, etc.

Population Information. It is important to know not only the physical characteristics of a village in terms of what type of facilities exist but also the characteristics of its population. General information on population may be obtained from the National Census which is taken every 10 years. However, you as Health Technicians must collect and maintain your own information periodically to have current information for your use. The following are the types of information you need to gather, record and use:

- Information on births, deaths, marriages and occupations.
- Number of elderly, adults and children. Break this information into intervals of 5 years for adults and yearly for children up to 5 years of age.
- Number of males/females.
- Number of pregnant women in the community. (A birth rate of 40/1000 means 4 births for every 100 persons in the community. So in a village of 3,000 people you can expect approximately 120 pregnant women per year).
- Number of those attending other clinics.
- Number of those attending postnatal clinics.
- Number of immunized children.
- Number of people coming to each RHC and BHU for treatment.
- Number of physically or mentally disabled children or adults.

How to Identify the Leaders in the Community. In any community three types of leaders can be identified. They are formal, informal and opinion leaders. There are two kinds of formal leaders. There are the official leaders, who are the persons employed by the government, like the Union Council Chairman, school teachers, policemen and army officers. The leadership role of these people goes with the post and can be temporary, because the individual leader may be transferred. Some leaders in this category are respected by the community and some are not. Other formal leaders include those individuals who are elected or appointed to be leaders of nongovernmental or religious organizations such as leaders among landlords (Chaudhary, Sardar), youth clubs and women's organizations.

The second type of leaders are the informal ones. In this group are the natural leaders. These individuals were born with leadership characteristics. The natural leaders may be from either the upper, middle or lower economic class. They possess a great many leadership qualities so that the community accepts their opinions and decisions. They have proven themselves to be leaders by having an influence on the village.

These leaders could be housewives, widows, dais or shopkeepers. In addition to the natural leaders, there is an informal category called status leaders. Status means a special respected place for an individual in the group. Status may be given to a person because of:

- Age.
- Occupation.
- Marriage.
- Wealth.
- Achievements.
- Family history.
- Education.

In the third category are opinion leaders. These individuals are respected by the community and their opinions are taken seriously. These individuals may also come from the first two categories. What is special about these leaders is that the community regards their opinion very highly and seeks their input in making decisions about individuals, families or the community. In other words, these leaders are very influential in getting others to adopt or reject new ideas, activities or programmes.

These opinion leaders should be identified in the community. They should be informed of the services of the RHC and BHU and the role of Health Technicians in outreach activities. You as a Health Technician should seek their assistance in identifying community needs and in finding ways to solve them.

These three types of community leaders need to be identified and a request should be made to each leader to participate as much as possible in planning, implementing and evaluating all health programmes. Their participation will facilitate your activities and will help encourage community participation, increasing the chances of success of the Health Technician's programme.

It is also important to be aware of formal and informal gatherings and celebrations in the community and to determine if some of the health activities could be facilitated through them.

How to Communicate With the People. Once you are in the community your methods of communication with people will become very important. How you talk and behave will greatly influence your success or failure. Various methods of approaching individuals or groups are dealt with in detail under Health Education in Chapter 3. Please read that chapter to learn about communication skills.

Success in whatever skill you use will be greatly influenced by your attitude. What do we mean by attitude? Attitude means a way of thinking or behaving towards a person or thing. Attitudes affect an individual's feeling about another person. Usually feelings are the internal experiences a person has and those feelings become obvious in our manner and moods. Our feelings may not be obvious from what we say but how we say it. For example, "I do not have time now," can be said in a variety of ways. Below are some of those ways:

- "Can't you see I am busy?"
- "Go away and stop bothering me."
- "I am busy now, could you come back tomorrow?"
- "Please forgive me for not seeing you but I cannot leave what I am doing now. Could you come back later this evening."

The first two statements indicate an angry or frustrated mood and may be directed to those who seem inferior in the community. The third and fourth statements are made to someone having equal or higher status than the person making the statement. The first two statements indicate disrespect and ignore the feelings of others. Unfortunately, this attitude is common among Health Technicians. But this kind of approach is not only inhumane (not kind-hearted) but also harmful to health programmes. If people are not made to feel welcome in the BHU, they will not come and they will tell their friends and relatives to stay away as well.

If you are not liked in the community where you are going to work, you may not be allowed to come back. If this happens, how can you justify your work?

As Health Technicians, you need to keep in mind that you are trained to serve people, to keep them well and functioning both physically and mentally. Therefore, you need to make them feel good. Your attitude has to be the same towards all people regardless of their education, wealth, status or age. Treat everyone with respect and courtesy. Make them feel that you are their friend and are there to help them. Talk to them nicely and make them comfortable so that they are convinced you care about their welfare and are truly interested in them.

Until you convince the people by your attitude and behaviour that you are there to help them, they will not have any time for you. So from your first contact be polite, speak with respect, listen to the people and understand their needs before giving them advice. Treat each person as you would like to be treated. In this way you will gain the respect and confidence of the community.

Now that you have learned how to work with the community and to communicate with the people, you should learn about home visits.

HEALTH TECHNICIAN'S ROLE IN HOME VISITING

Home visiting is one of the most important responsibilities of the Health Technician because only you are trained in home visits; other staff members at the RHC and BHU are not. The home is where good health starts.

The principle aim of health care service in the home is to help people identify their needs and resources and to work with them in meeting these needs. This will result in a healthy family.

Before a home visit is made, Health Technicians should look at their map of the area or village and locate the health unit on the map. Then you can:

- Determine where houses are located and how far away they are.
- Know the names, titles and addresses of other Health Technicians (TBA, CHW, etc).
- Develop plans for male and female Health Technician's home visits.

Home visits should start at homes closest to the RHC or BHU. The distance for visiting other homes can be increased as you develop skills and the community sees the benefit of your visits. Once you are confident and the requests for home visits increase, you should make your first visit of the day or week at the home farthest away and work your way back to the centre.

Reasons for Home Visits. As Health Technicians you are in the community to help people attain better health. You will be responsible for explaining the services available from Health Technicians, the BHU and RHC and for giving help in these areas:

1. Routine antenatal and postnatal visits.
2. Home delivery.
3. Child health care.
4. Immunization follow-up.
5. Family requests in case of illness or injury.

6. Hospital follow-up treatment or illness or injury recovery.
7. Identification of family needs.
8. Determination of the severity of diarrhoea in small children and teaching of oral rehydration therapy and management of diarrhoea.
9. Monitoring the growth of children, preventing malnutrition and teaching sound nutrition, sanitation and personal hygiene.

Planning for Home Visits. You will need to plan the number of home visits you can make in a day, week or month in order to be most effective in serving your communities. You will need to divide the area with other Health Technicians and make plans for visiting within the time limits of your working hours. Make your home visits on a priority basis. For example, if you need to make 10 home visits and you only have 3 to 4 hours in which to make them, then:

- Determine which visits can be postponed. A new antepartum case may be visited later but a child with diarrhoea should be visited immediately.
- Visit those you have promised to visit.
- Visit those families who have come to you requesting you to assess their needs.
- Visit those who have not returned to the clinic for follow-up. Remember to keep an accurate record of all visits in your diary.

Preparing for Home Visits. Before you make home visits, know what you are going to do and what you will need. Be ready to:

1. Review your records of the individual and/or families to refresh yourself on the purpose of your visit.
2. Review the procedures you will use to make sure you know them and have the necessary materials with you.
3. Make sure you have the necessary information about other valuable services which may be required during your visit, for example, information on the World Food Programme for malnourished children. Have names and addresses of other resources, such as the CHWs, TBAs, etc.
4. Make sure your bag or kit contains the necessary equipment and supplies, including teaching aids and your diary.

Procedure for Home Visiting

First visit. Start your visit with a greeting.

1. Introduce yourself. "I am_____from the BHU located in_____ ." Give one of the following explanations:
   - "I am here because your husband said you were not feeling well so I stopped by to see if I could be of any help."
   - "Do you know our BHU is now in service? I came to explain our services."
   - "I am new to the BHU and came to introduce myself."
   - or any other reason.
2. Ask if you can spend a few minutes with the people in the house.
3. If you are not asked to sit down suggest this: "May we sit here and talk for a while?"
4. Explain the services of the Health Technicians and the BHU and ask if the person is interested in any of them.
   Make comments like: "I see you have young children. Maybe you would be interested in our immunization clinic." If the response is yes, then you can proceed with the explanation and planning. If there is hesitation or the mother says "I have to ask my husband" you may want to suggest she discuss this with him and that you will return in (one week, two weeks, a month).
5. End each visit with something like: "It was nice to see you" and "I will see you at the BHU or here next visit" or you may suggest she send for you if she wants to use your services.
6. Record your visit in your diary.

Revisit or Follow-up Visit. Start the visit with a greeting and explain the purpose of this visit. For example:

1. - "Today I am here to see your sister-in-law as you suggested during our last visit."
   - "Today I am here to see how your child with diarrhoea is doing."
   - "I came to find out how you are doing with your treatment of malaria" or worms, etc.
2. Conduct the visit by:
   - interviewing the sister-in-law for antepartum care or assessing the condition of the child.
   - reviewing with her the treatment requirements, how she feels, her observations and yours.
3. Discuss your findings with her.

4. Make plans for future follow-up visits or end the visit with a concluding remark such as:
   - "It looks like your sister-in-law is pregnant. I will also refer her to ..... or the CHW or TBA in the area who will be in touch with you to make plans for home delivery."
   - "You need to come to the BHU to be examined by our Medical Officer."
5. Conclude by reviewing the visit and saying, "I can be found at.. If you need me, let me know."
6. Record your plan in her record and yours.

HEALTH TECHNICIAN'S ROLE AT THE RURAL HEALTH CENTRE

Under the Integrated Rural Health concept, the RHC has increased its staff to 20 and also increased the number of services it offers. Therefore, you need to be clear about your responsibilities so that you can efficiently carry out your activities. If you are not clear about this, then you may have to do everything your superiors ask of you and once you start this, frustrations will occur later. So from the beginning be clear about your responsibilities and coordinate your activities with the relevant people because as Health Technicians your main responsibility lies in becoming a link between the community and the health facility. You must spend increasingly more time in the community. Your role in the RHC and BHU is very similar. The Team Leader in each place is the Medical Officer Incharge so you must keep him informed of your activities.

In going out to the community, coordinate your activities with Lady Health Visitors who are working in your area. Between the two of you, you should:

- Decide which area(s) each of you will cover.
- Determine which days you will be out in the field so that if someone is needed at the RHC, one of you is available.
- Plan periodic meetings to discuss each other's activities and improve outreach activities.
- Plan for the two of you to meet with the Medical Officer Incharge to report on your activities and discuss community needs and resources.

HEALTH TECHNICIAN'S ROLE AT THE BASIC HEALTH UNIT

The Team Leader at the BHU is the Medical Officer Incharge. The Health Technician is the second in command. Health Technicians are placed at a BHU to serve as a link between the community and the health facilities. Therefore most of the Health Technician's time should be spent in the community trying to identify health needs, and ways and resources to meet these needs. However, Health Technicians are also expected to provide some services right at the BHU. These are as follows:

SERVICES	HEALTH TECHNICIAN'S ROLE
Care of minor ailments seen in the general clinic	- One person needs to be available at the BHU to take care of minor ailments.
Maternal and Child Survival (antenatal, labour and delivery, postnatal and family planning)	- You need to coordinate these activities with TBAs and CHWs in the area. Have monthly meetings with these workers to coordinate their activities with BHU services.
Administration	- Clinics should be held regularly and on time. - Clinics should be set up and ready before people start coming in. - Rooms and surroundings should be clean and have adequate lighting, ventilation and furniture (tables, chairs, etc). - Furniture should be neatly arranged and clean. - There should be water basins for handwashing and for cleaning and they should be used at all times, even if water needs to be carried in. - Equipment should be clean and in good working condition. - Drinking water, drugs, bandages and other supplies including stationery should be in adequate supply. - All persons must be received with courtesy and friendliness.

SERVICES	HEALTH TECHNICIAN'S ROLE
	- People should be seen in order of arrival except for emergency cases. All people waiting should have a place to sit. - After completing a discussion of treatment, Health Technicians should go over the recommendations, treatments or referrals to make sure that instructions were understood. - Remind the individual to return if necessary.
Record Keeping	- Make sure that each person's record is kept up to date. Record in your diary or family health record what you observe, the condition, treatment or medicine given and any instructions for further care. - Make sure, at the end or beginning of each day, that appropriate entries are made on various types of records.
Care of the Buildings and the surrounding areas	- Buildings and surroundings should be well maintained at all times with regard to cleanliness, safety and security. - Staff should live at the BHU whenever accommodations are available. - A vegetable garden should be maintained at the BHU no matter how small. In small gardens vegetables requiring little space could be planted (eg, squash). - If water is not readily available, the BHU staff needs to determine where and how it can be obtained and work with the community to establish a reliable source. - Health Education posters should be displayed and changed periodically.

SERVICES	HEALTH TECHNICIAN'S ROLE
Schedules	- Staff must make a daily, monthly and yearly work plan and keep to these plans. - When the MO is not available, the Health Technician must function both at the BHU and in the community. It is very important to make plans to be at your BHU during the time when people come there and schedule community activities at other times.

The BHU Staff. The staff consists of seven people and everyone must know his or her own responsibilities as well as those of other members of the team and cooperate and coordinate with each other.

HEALTH TECHNICIAN'S ROLE IN SCHOOL HEALTH

School health is an important component of your Primary Health Care services. The participation of Health Technicians in school health services is new. Therefore, working closely with the MO, Program Training Officer and Tutors of the training institute and with the Management Analysts and Training Specialists of the Primary Health Care Project for orientation and guidance, will provide better results in the school than trying to work independently.

Overall objective of school health services is to promote the health of children by:

1. Detecting problems in the students that affect learning and health.
2. Helping students and parents to overcome those problems.
3. Helping the children to be health conscious and develop health promoting habits.
4. Preventing the spread of communicable diseases.
5. Keeping adequate school health records.
6. Helping the school maintain a sanitary environment including adequate toilet facilities and safe drinking water for students and staff.

Promotion of the Health of School Children. Forty-five percent of Pakistan's population is under the age of 19. Not all children in this age group are in school but most will have attended some kind of school. Teaching them about health and providing them with

some health services when they are at school is very essential because the knowledge and habits they develop then will affect them for the rest of their lives and also have an effect on future generations.

Procedure for Initiating School Health Service. As a Health Technician you should:

1. Find out the name and location of the people in charge of schools in your area.
2. Visit the school, meet the head person, find out the number of students and staff and:
   - explain the services of the RHC and BHU;
   - examine the facilities;
   - identify the needs and resources of that school;
   - enquire about health topics covered in class;
   - plan programmes with school personnel;
   - agree upon a schedule of visits with the head person.
3. Participate with teachers in health education activities for children and parents.
4. Conduct programmes according to a plan. Keep your own records of child and school health needs and the resources used in maintaining a safe and healthy environment.
5. Assist the school in maintaining the health records of the children.
6. Coordinate with leaders of the community and school to plan and conduct health education activities for adults at the school in the evenings or on holidays.

TABLE 1.2 FUNCTIONS OF THE HEALTH TECHNICIAN IN MAINTAINING SCHOOL HEALTH SERVICES

Specific Objectives of School Health Services	Health Technician's (both Male and Female) Activities
1. Help children to be health conscious	- Meet with the school principal or head teacher and offer to give classes on health topics such as personal hygiene, sanitation and immunization. - Describe what services are available to the family and community from the BHU and RHC. - Coordinate activities with the Health Education Officer in the area.

TABLE 1.2 FUNCTIONS OF THE HEALTH TECHNICIAN IN MAINTAINING SCHOOL HEALTH SERVICES

Specific objectives of School Health Services	Health Technician's (both Male and Female) Activities
2. Prevent the spread of communicable diseases.	- Identify children who are fully, partially or never immunized. - Plan with the EPI team and the school to hold periodic immunization clinics at school. - Immunize children. - Look for seasonal outbreaks of certain communicable diseases such as colds, measles, chicken pox and polio and suggest measures to minimize their spread and treat or manage these conditions.
3. Detect and help overcome common problems such as vision and hearing loss that affect learning	- Plan with school personnel to screen children in class 1, 4 and 8 for vision and hearing. - Conduct a screening programme and identify students with deficiencies. Then meet with each class and inform them of the findings for each student. - Conduct a class on individual responsibility in caring for the ears and eyes and explain: a) How to maintain good eye-sight and hearing for those with normal findings. b) How to restore lost sight and hearing for those with abnormal or questionable findings. - Those with abnormal findings should be referred to a specialist for proper diagnosis and correction.

TABLE 1.2 FUNCTIONS OF THE HEALTH TECHNICIAN IN MAINTAINING SCHOOL HEALTH SERVICE

Specific Objectives of School Health Services	Health Technician's (both Male and Female) Activities
	- Follow up referred cases within 3 months to determine whether or not the specialists were visited. If so find out what was recommended and if the recommendations are being followed. - If a specialist was not seen find out the reason and assist the student in getting to a specialist.
4. Maintain health records of all school children.	- Help the school maintain health records.

1.9 THE HEALTH TECHNICIAN'S KIT AND ITS USE

Hospitals are equipped with all the necessary supplies and equipment to carry out various examination and treatment activities. Rules for replenishment of supplies and for repair and maintenance of equipment exist to allow the hospital staff to carry out their activities and serve the community without delay or disruption. Health Technicians, as designated outreach workers, carry out most of their activities in the community, the home, the school and other settings. These settings will not have all the necessary medical health materials. Realizing this, the Government of Pakistan has developed different types of kits containing the materials essential for the Community Health Worker and the Health Technician.

The Federal Government under the Primary Health Care Project has recommended to the Provinces that each Community Health Worker and Health Technician be given a kit upon completion of training, to be used in serving the community. These kits have consumable and nonconsumable items. Items contained in these kits are listed on the following pages. It is the individual health worker's responsibility to repair or replace any of the broken or lost nonconsumable articles such as thermometers, scissors, sphygmomanometer, stethoscope, pitcher, etc. All of the consumable items such as chemical solutions, dressings, oral rehydration salts (ORS) and drugs used to control such communicable diseases as

tuberculosis (TB), malaria and leprosy should be replenished at the RHC or BHU as and when necessary. Health Technicians should, however, encourage family members to get their own supply of medicines through the proper offices of the TB, malaria and leprosy control programmes.

THE KIT

The kits are made of canvas and are easy to carry and maintain. Repair, maintenance and replacement of the kit is the responsibility of each Health Technician.

The kit has four compartments: two on the side, one in the back and one inside. The inside compartment is the largest and contains articles necessary for a variety of activities. Contents of this section will vary depending upon the type of visits planned. For example, if the female Health Technician is called to attend a woman at term or in labour, she is expected to carry material necessary for conducting a delivery. But if the female Health Technician is planning to visit a school and conduct vision screening tests, she needs to take items necessary for vision testing. Both male and female Health Technicians are expected to carry basic first aid material at all times.

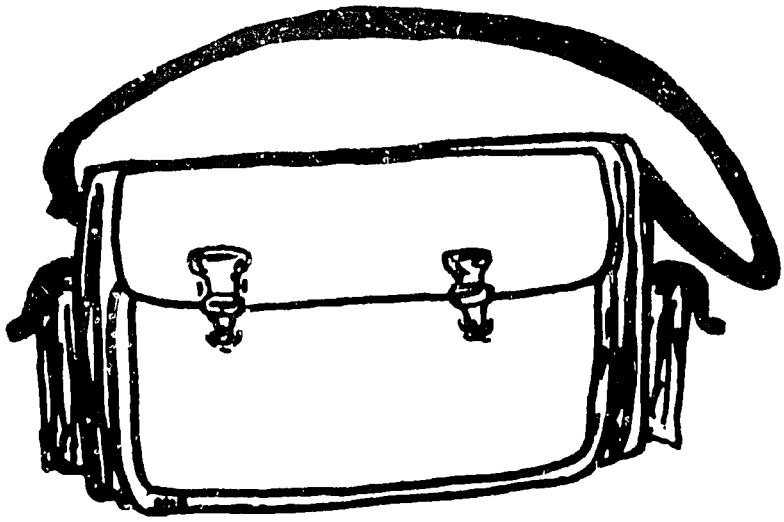


Fig. 1.4 The Kit.

This picture shows the side and back compartments of the bag. One of the side pockets is for soap in a soap dish and a handbrush for washing hands. The second side pocket is for a thin towel to dry the hands after washing.

The back contains a large, long, wide and shallow pocket. This pocket is for necessary papers and forms such as your diary, growth chart, arm circumference bands, pens and pencils.

The front flap that opens downward contains:

1. One thermometer.
2. One pair of tweezers.
3. One pair of scissors.

The inside compartment is deep, large and has one pocket on each side, five pockets on the back and empty space on the bottom. All other articles are kept in this compartment.

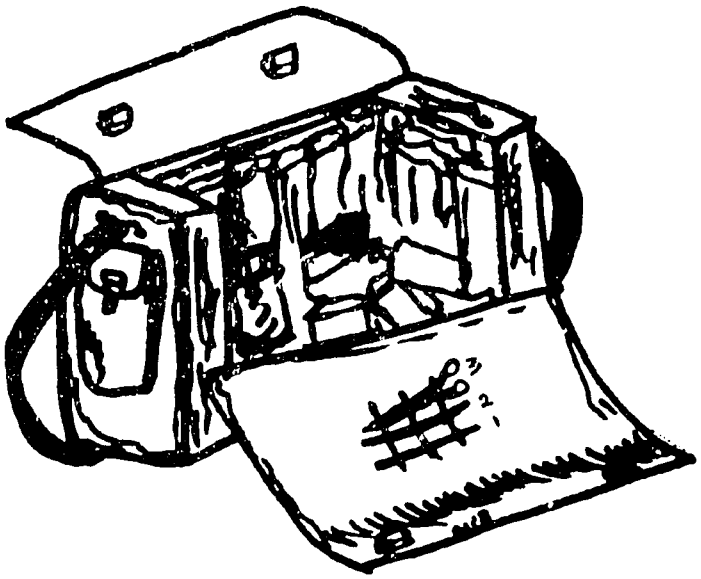


Fig. 1.5 Front View of an Opened Health Technician's Kit.

Contents of the Kit. The contents of the kit and their suggested uses are listed on the next four pages. These things should be placed in the space according to the nature of the article and its use. All liquids should be placed upright in individual pockets. Those articles which are frequently used should be on top and those not so frequently used on the bottom.

CONTENTS	SUGGESTED USE
Adhesive tape	- Use for applying cotton bandage, for splinting, to cover small cuts, etc.
Soap	- Use for (a) washing your hands when giving first aid for cuts, scrapes and small wounds; (b) washing the wound with soap and water to remove all dirt and foreign material; (c) washing your hands before and after handling delivery cases; and (d) washing animal bite wounds.
Scissors	- Use for cutting bandage, adhesive plaster, etc.
Tweezers	- Use for pulling out thorns, etc.
Thermometer	- Use for taking body temperature. Shake down the thermometer to bring the temperature below 98.6 F. For children (below 10 years of age) and very sick persons, do not put the thermometer in the mouth. Instead, place the thermometer in the armpit or rectum.
Torch	- Use for examining throat, ears, nose and eyes.
Tourniquet	- Use in taking a blood sample by tying up the part just above the site from where blood is drawn. Caution: Do not leave the tourniquet tied up after blood has been collected or it will block the circulation.
Microscope, slides and blood lancets	- Use for pricking the finger to draw blood for making malaria slides. Finger tip puncture: Clean the finger tip with an antiseptic lotion and let the finger tip dry. Hold the patient's finger tip firmly with the thumb, index and middle finger of your left hand. Using your right hand, puncture the skin with the sterile lancet. Put a few drops (2 to 3) at two spots on the same slide.

CONTENTS	SUGGESTED USE
	Thin Smear: a. Place the edge of a second slide just in front of the blood and hold it at a 30 degree angle to the first slide. b. Bring the second slide backwards till it touches the drop of blood. The blood will spread along the end of that second slide. c. Push the second slide slowly forward towards the other end of the slide covering about 2/3 of the slide. d. Let the slide dry in the air. **Thick smear:** Using the corner of another slide, spread the blood with a circular movement, rapidly and evenly. Cover an area of 2 cm.
Cotton	- Use for cleaning wounds and cuts with antiseptic lotion. Also for bandaging, cleaning the ear, etc.
Sterile gauze	- Use for bandaging and splinting.
Antiseptic lotion	- Use for cleaning wounds, cuts, abrasions and for disinfecting instruments. Apply to the affected part with cotton swab. Warning: antiseptic lotion is for external use only.
Stethoscope	- Use for examining the cardiovascular system, the respiratory system and the gastrointestinal tract.
Blank notebook	- Use for keeping a record of the patients referred to the RHC, field work activities, etc.
1 liter aluminium measuring cup	- Use for measuring 1 liter of water for preparing sugar-salt solution or mixing ORS packets.
ORS packets	- For making ORS by dissolving in 1 liter of clean drinking water.

CONTENTS	SUGGESTED USE
Tincture of Benzoin	- Use for dressing of mild cuts. Apply with cotton swab. Warning: Poison - For external use only. May stain clothing.
Multivitamins (200 tablets)	- Use for correcting dietary vitamin deficiencies. Dosage: 1 tablet daily.
Ferrous Sulphate (iron) (200 tablets)	- For anaemia in pregnant and other women. Dosage: (200 mg) 2 tablets daily - one in the morning and one in the evening with meals.
Aspirin (150 tablets)	- Use for relieving headaches, toothaches, muscular pains etc. Dosage (300 mg). 1 or 2 tablets up to 4 times per day. For adults only.
Paracetamol or other fever reducing drug	- Children: 8-12 years - 1 tablet up to 4 times/day. 3-7 years - 1/2 tablet up to 4 times/day. 1-2 years - 1/4 tablet up to 4 times/day. Or according to packet instructions.
Tetracycline eye ointment	- Use for various eye infections like blepharitis, stye and bacterial conjunctivitis (red eyes). To be used three times daily. How to put ointment in the eyes: If you are treating a patient with bacterial conjunctivitis, the pus around and in the eye must be removed first with a cotton swab. With the patient lying down, pull the lower eyelid downward, exposing the conjunctiva covering the inside of the lower eyelid. With the patient looking upwards, add the eye ointment to the eye. Caution: Do not touch the inside of the eye with the nozzle of the tube, otherwise the tube will be contaminated.

CONTENTS	SUGGESTED USE
Chloroquine tablets	- Use for the treatment of malaria (250 mg tablets, 150 mg chloroquine base)

Age Group	Day of Treatment 1	2	3
01-11 months	C=1/4*	C=1/8	C=1/8
12-24 months	C=1/2	C=1/4	C=1/4
3-4 years	C=1	C=3/4	C=3/4
5-6 years	C=2	C=1-1/2	C=1-1/2
7-14 years	C=3	C=2-1/4	C=2-1/4
15+ years	C=4	C=3	C=3

*C=chloroquine tablet.

Elastic bandage	- Use for applying pressure bandage in cases of sprains, etc.
Gentian violet	- Use on cuts, burns, wounds. Apply with cotton swab on infected skin. Warning: For external use only. May stain clothing.
Finger nail brush	- Use for cleaning your hands before and after gynaecological examinations, deliveries, dressings, etc.
Plastic screw top vials	- These have multiple uses, including measuring out small quantities of any medicine/lotion for daily use.
Arm circumference band	- Use to identify children 1 to 5 years of age who are suffering from moderate or severe malnourishment. The arm band is divided into 3 colour bands - green, yellow and red. The black line marked on the band is used to measure the arm circumference. Method: Have the child hold his arm at his side. Put the arm band around the middle of the upper left arm. Check to see where the black mark or line meets the coloured area. If the black line touches the green area, the child is usually adequately nourished. If the black line touches the yellow area, the child is moderately undernourished. If the black line touches the red area, it shows that the child is severely undernourished.
Blood pressure cuff	- Use for taking blood pressure.

How does one use the bag to ensure cleanliness? In carrying out community and outreach activities, the bag must be taken to many dirty and dusty places. It is not possible to keep a kit that is used in outreach activities as clean as a kit used for classroom demonstration only, but keeping certain principles in mind and in practice will keep the kit and its contents clean and safe for use. These principles are:

- Items that do not touch the body can be kept in the outside compartments/pockets.
- Do not touch the contents of the inner compartment without first washing your hands. Loosen the snaps before washing your hands. Afterwards put your finger inside the flap and open the kit.
- Take out only those items that are necessary and lay them on a clean working surface.
- After using the items, clean them and replace them.
- Look for a clean, easy to reach space on which to place the bag.
- Always be able to keep your eyes on the bag when you are carrying out a procedure so that children and animals do not get to the inside compartment.
- Always wash your hands before entering the inner compartment.
- Place the kit on your lap while travelling by bus or car.
- Never put the kit near your feet because the dirt and micro-organisms carried on your shoes may be transferred to the kit.
- Wash the bag with soap and water and sun dry it as it gets dirty or at least once every six months.

GLOSSARY

Alma Ata Declaration of Health for All: This is an agreement signed by 134 Member Nations of the World Health Organization who met at Alma Ata (Russia) to undertake the provision of Primary Health Care to all citizens of their respective countries.

Antenatal: The period of pregnancy prior to delivery.

Bio-Psycho-Socio Component: Bio relates to the biological component ie, the cells, tissues and organs of an individual; psycho relates to mental health; the socio component relates to living together in a community (the environment).

Behaviour: The way a person acts.

Communicable Disease: A disease transmitted from one person to another.

Community: A group of people with common interests living within a society. A community may have its own customs, traditions, leaders, even language. Examples of a community include a village, a tribe, a city block or a religious group.

Coping: A person's ability to meet identified needs.

Diagnosis: The process of determining by examination the nature and circumstances of a diseased condition.

Disability: The condition of inability; handicap.

Environment: Surroundings, especially those affecting people's living.

Prime Minister's) Five Points Mandate: Announcement of financial allocation by the Prime Minister for improvement in education, water supply, electricity, health and agriculture, especially in rural Pakistan.

Hereditary: Characteristics transferred from parents to offspring.

Holistic: Emphasizing the importance of the whole person and the interdependence of its parts.

Immunization: A procedure for protecting against diseases.

Integrate: To make into a whole by bringing all components together.

Intervention: To put a stop to the progress of a disease.

Link: A connecting part. A person who is the connection between others.

Nutrition: Process of nourishing or being nourished; food; taking in food.

Optimum Level: Most favourable or advantageous level.

Outreach: A system of providing health care in which a Health Technician travels to communities or individuals that would otherwise not have access to health services.

Postnatal: Period after birth.

Resource: Source of supply, support or aid. It usually refers to something that can help to meet a need.

Sixth Five Year Plan: The socio-economic development plan for the period 1983 to 1988 prepared by the Government of Pakistan, Planning Commission, Islamabad.

Urinalysis: Examination of urine.

Vital: Absolutely necessary.

World Health Organization: Health agency of member nations of the world in the United Nations System, divided into six regions. Pakistan is in the Eastern Mediterranean Region.

SUGGESTED LEARNING ACTIVITIES

1. Spend one week at either a Rural Health Centre or a Basic Health Unit. After completion of the course you will be placed with one of these teams. Therefore, you need to become familiar with these centres.
2. Keep a diary on your observations of the RHC or BHU during your stay and include all or some of the following:

   - Number and type of staff posted at the centre.
   - Total number of persons coming to the centre.
   - Reasons for their visits.
   - What services were provided.
   - What was your reaction to the centre, the people coming and the staff's attitude and activities.

3. Use information from your diary for discussion in class.
4. Have a community leader come to class and lecture on the characteristics of his community.
5. Discuss his description/presentation in light of this chapter.
6. Draw a map of your own village or town's physical characteristics.
7. Identify the population characteristics of your own home community and determine its needs.
8. Visit the community, RHC and BHU in your area.
9. Make a home visit with a teacher or supervisor.
10. Visit a school and describe its needs and resources.
11. Open the Health Technician kit and lay out all the contents on a table surface. Identify each item and its use.

REVIEW QUESTIONS

1. How much of the population is served by a BHU?
2. Where is the Health Technician posted after completion of training?
3. What are the six basic services performed by Health Technicians?
4. Define Health.
5. What are the eight elements of PHC?
6. What is the Alma Ata Declaration?
7. What are possible situational needs of a family?
8. List different members of the health team.
9. What are the main responsibilities of Health Technicians?

10. What are the responsibilities of a Medical Officer as a leader of the health team?
11. List some of the principles of behaviour to be observed by a Health Technician while carrying out his duties.
12. Through which activities are curative and preventive services provided?
13. What are the responsibilities common to both male and female Health Technicians?
14. Review the Health Scale and identify your level of functioning.
15. What settings do Health Technicians work in?
16. What is a community?
17. What type of groups exist in a community?
18. What is the difference between a formal and informal group?
19. Which of the two groups is more important for you to work with?
20. What information do you need about a community?
21. In a village of 5,000 people how many births a year do you expect?
22. What is an opinion leader? Why is an opinion leader important?
23. Give five reasons for making home visits.
24. Where should you visit first - the farthest village from the Health Centre or the nearest?
25. Give reasons for your answer.
26. Is your role in a RHC different than in a BHU?
27. Describe your role in a school.
28. A teacher tells you about a student who is hard of hearing. What would you do?
29. What is the reason for having a Health Technician kit?

30-40 List ten items in your kit. Describe when and how each item should be used.

LEARNING ACTIVITIES RECORD IN AN OCCUPATIONAL SETTING
Learning about customs and habits relating to health maintenance.

Name of student: _____

Describe the activities from birth to death of 16 to 20 families.

1				

1. In each box write the name of the family from whom information on customs was obtained. Teachers verify students' written work and put your signature after each completed paper.

Make maps of your assigned villages. Tutors assist students in completing the map. A minimum of three area maps must be completed and updated.

Village 1	Village 2	Village 3

Supervisor to indicate on each box whether the map was new or updated and put date and signature when the map is satisfactorily completed.

LEARNING ACTIVITIES RECORD

Name of Student:_____

Name the three categories of leaders in your village(s).

	NAME OF VILLAGE			
Formal Leader				
Informal Leader				
Opinion Leader (s)				

A minimum of 16 Home visits must be completed.

EVALUATION FORM

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of Presentation	[ ]	Simple to understand
	[ ]	Difficult to understand
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 2

THE PROBLEM SOLVING APPROACH

Objectives: After completing this chapter you will be able to:

1. Distinguish between medical and health services.
2. Describe the problem solving approach.
3. List the five steps involved in the problem solving approach.
4. Define the following words:
   - Need.
   - Resource.
   - Motivation.
   - Cope.
   - Plan of Action.
   - Evaluation.
5. Describe and differentiate the three kinds of needs.
6. Describe the kind of information necessary to identify a person's needs and resources.

CHAPTER 2

THE PROBLEM SOLVING APPROACH

INTRODUCTION

Traditionally, health service and medical care have meant the same thing. The quality of medical/health service was measured in terms of how accurately a disease(s) was diagnosed and whether appropriate drugs or treatment were provided. In recent years, however, the difference between health and medical service has been recognized and the need for health services of better quality and greater quantity has been emphasized.

Over the years health professionals have come to realize that medical services, that is the diagnosis and treatment of diseases, are only a part of total health service, and consequently, address only a portion of health needs and problems. For this reason the definition of health services has been expanded to include health promotion and illness prevention. Unfortunately, the tools (approach/techniques) used in delivering health promotive and illness preventive services are not as well developed as are those for the treatment of illness. The drugs and service procedures for the treatment and management of disease have been well identified and developed. During their training, medical students learn to identify a disease or condition and to prescribe a drug or treatment for that particular disease. However, the same attention is not given to health promotion and illness prevention. Therefore, no ready-made solutions or formula exist for identifying and managing health promotion.

In 1978, when the World Health Organization announced the Alma Ata Declaration on Health for All by the Year 2000, the health promotive and illness preventive services began to receive attention from governments. Although tools for delivering these services are still not well developed, the Problem Solving Approach is one tool that is now being used. This approach has already been used in business management and general administration. The Problem Solving Approach has been found to be effective in providing health promotive services. As Health Technicians your role has been expanded to include more illness prevention and health promotion and less curative activities. Therefore, you need to be skillful in using the Problem Solving Approach.

2.1 WHAT IS THE PROBLEM SOLVING APPROACH?

The Problem Solving Approach is a stepwise method of solving problems or working out solutions for identified needs or problems by using available information and resources.

The important point to remember is that a problem (a need) or a list of problems must be identified before you look for ways to solve them. The steps involved in problem solving are:

1. Gathering information/data on needs and resources.
2. Identifying actual needs.
3. Identifying existing resources.
4. Developing and implementing a Plan of Action.
5. Evaluating the Plan of Action.

Before going further, you must understand the terms used in problem solving. These terms are:

- Need.
- Resource.
- Motivation.
- Cope.
- Plan of Action.
- Evaluation.

Need. Need is a condition requiring supply or relief. Needs are categorized accordingly as being either simple or complex. For example, certain needs such as breathing, drinking and eating are simple and basic, necessary for all living things in any environment. But for a person to travel to the moon and stay alive, his requirements would be many and complicated. When basic needs are not met, problems arise. Needs vary according to many factors.

Resource. A resource is a source of supply, support or aid. A resource usually refers to something that can help meet a need. For example, to stay alive the necessary resources are: air, water and food (nourishment). Needs and resources are closely linked. Both needs and resources are determined according to the situation and individual values and preferences.

Motivation. Motivation refers to a stimulus that prompts a person to perform in a certain manner in order to meet his/her needs. Individuals vary, so what motivates one person may not motivate another. Motivation is the trigger that makes an individual with certain needs reach out and use existing resources to meet them, either fully or partially.

INDIVIDUAL NEEDS	EXISTING RESOURCES
Basic Situational Personal preference	Personal Material Support systems

MOTIVATION

Motivation is the factor that links existing needs and resources.

In all cases, needs and resources exist side by side. How a need is met by an existing resource is determined by the individual's motivation. In other words motivation acts as a link in using existing resources to meet needs. A Health Technician's role in many circumstances may be to motivate someone to meet his/her needs. A person must first understand his/her needs. Unless the needs are felt or seen by an individual, he/she may not do anything about them. For example:

- When a person is hungry, he/she will seek food.
- When a person is sick, he/she will seek treatment.
- When a person understands that immunizations will protect a child from childhood diseases, the child is taken for immunization.
- When a mother realizes the benefits of breast-feeding, she may choose this method.

There are certain known facts about motivating individuals. For example, when a person is hungry, he can be motivated to do certain things if he knows his hunger will be satisfied by doing those things. Generally it is an accepted fact that unless people feel the need to overcome certain deficiencies, they will not be motivated to overcome them. So in health promotion and illness prevention, the deficiency must first be felt. Health Technicians need to make the person feel the need to overcome that deficiency before the person will be motivated to take any action.

Cope. To cope is to struggle, with some degree of success. Here cope means to meet identified needs. In health promotion, the state of a person's well-being is measured in terms of how well he/she copes with day to day demands and whether or not outside support or service is necessary for him/her to meet the felt needs. If outside service is necessary, it can be provided by Health Technicians. After you are taught the problem solving approach, you can use this approach to help people deal with their needs and problems. If the people you are dealing with are managing well enough to meet all their needs, then they are coping well and do not need your help.

You may want to learn about that person's own technique of coping so that you can expand your knowledge and skill in the problem solving approach. Remember, earlier it was mentioned that the use of the problem solving approach in the health field is new and not enough is known about it. This means that we must continue to learn from each other's experience in using this method.

Plan of Action. A plan of action refers to a systematic way of using certain resources to meet identified needs. For example, a child with a moderate degree of malnutrition is found. A plan of action would consist of all the activities planned to correct that situation. The following activities may form a plan of action:

1. Determine more specifically the reasons for the child's malnutrition by:
   - weighing and measuring the child.
   - determining his/her food consumption: amount, type and frequency.
   - determining any medical explanation for the malnutrition.
2. Inform (educate) the family about your findings.
3. Inquire how they want to go about making such necessary changes as:
   - buying and preparing food high in nutritional value.
   - feeding the child the adequate amount, frequency and type of food.
   - seeking adequate treatment for an illness.
4. Help them to carry out their decision.
5. Weigh the child at specified times.
6. Follow-up the lessons the family has learnt to protect any brothers or sisters from growth failure.

Evaluation. Evaluation refers to how much has been accomplished with your plan of action and to the measurement of your activities in relation to your goal. For example, with the above situation, your goal is to make the malnourished child well-nourished but you cannot accomplish this goal within a short time. So a criteria (way) for intermittent and final evaluation needs to be developed. In this case, a weight gain of 10 pounds within two months may be the goal, but you do not have to wait two months before finding out if the child is gaining weight. Weighing the child every week will tell you how much weight it is gaining and how close you are to reaching your goal. Therefore, an evaluation should be conducted at various intermittent points as well as at the end of the scheduled time.

2.2 USE OF THE PROBLEM SOLVING APPROACH

In the problem solving approach, one must collect all necessary information on possible needs and resources. Needs are categorized into three groups:

1. Basic needs.
2. Situational needs.
3. Individual values and preferences.

Basic Needs. This refers to those factors that are common to all human beings. For example, all individuals need the following regardless of age, nationality or income just to stay alive:

- Air.
- Water.
- Food.
- Rest.
- Clothing and shelter.
- Activities.
- A sense of belonging.
- A sense of worth and respect.

As Health Technicians you are expected to learn these basic needs common to all human beings.

As already stated, everyone has basic needs and with the resources available they try to meet these needs. If their basic needs are met, people manage to stay alive and function well. When the available resources are not enough to meet their requirements or there is a lack of resources to meet even the need for food, clothing or shelter, then their well-being will be affected, resulting in a loss of work or income. As Health Technicians you are expected to learn that although the way in which these needs

are met may vary, unless and until they are met, a person cannot be motivated to improve his/her well-being. As Health Technicians one of your major roles is to improve the health of the people. So your job is to:

1. First determine a person's basic needs.
2. Determine what resources are available.
3. Decide whether the available resources are adequate for meeting the needs.
4. Determine whether the available resources are adequately used.
5. Decide which new or additional resources are necessary to meet the identified needs.
6. Find out how the family can obtain the required resources.
7. Make a plan of action using existing or new resources to meet identified needs.
8. Evaluate the situation after a period of time (every few days, weeks or months) to see how well the family is adjusting in overcoming the identified needs or problems.

Here is a list of common basic needs and resources:

NEEDS		RESOURCE/SUPPLY
Air	-	Free.
Water	-	May be free or provided by the municipality and paid for by users.
Food/nutrition	-	Has to be grown or purchased.
Shelter/clothing	-	Shelter may be provided,owned or rented. Clothing has to be bought or given by someone else.
Rest/sleep	-	On the floor, ground, mat or bed with mattress.
A sense of belonging/love	-	Being a member of a family and community where a person is loved and shares in the day to day activities of the group.
A sense of worth/ respect	-	How a person feels about himself or herself based on other's attitudes and behaviour.

The Health Technician must learn that these basic needs exist in all individuals regardless of their social or financial status and these needs must be met before a person can be motivated to do anything new. One way you can help meet some of these basic needs is by treating everyone with respect and by being polite and courteous. Treating people with respect will not only erase any sense of discomfort they feel, but will also make them respect you. Therefore, no matter how rich or poor or how high or low a person's status is, learn to give each individual respect; do not take away dignity. All human beings have the need to be respected and treated well and to feel a sense of worth.

If you do not treat an individual with respect, he/she will not trust or respect you either. People may force themselves to show courteous behaviour outwardly, but inwardly they will continue to feel badly about themselves and you. Therefore, learn to be polite and treat everyone with respect. If you treat them with respect, they will open up and provide you with the necessary information to determine their needs and resources.

Situational needs. This refers to those needs arising from certain situations. Even basic needs are affected by situations. For example:

1. The need for food is common to all, but the age of the person determines the type of food required: an infant requires milk and soft food, older children normally can eat any kind of food, older people without teeth require soft food.

2. Sick people not only require treatment but they also need to be handled gently, physically as well as emotionally. This is because people become more sensitive during illness.

3. A father is the head of the household and expects all family members to give him special respect and preferential treatment but in his place of work he may hold the lowest position, and is therefore treated accordingly.

4. A family which has been recognized as being very important in one setting becomes less important in another. For example, a village chief moving into a large urban community cannot expect to be treated with the same deference as before.

Individual values and preferences. A person is either born with or acquires individual characteristics that make him/her different from others in the same family. Each individual learns how to behave or act according to his/her individual characteristics and the characteristics of his/her family and community. A measure of importance is put upon a person's behaviour and actions, which gives value to the way they behave. Groups also prefer certain ways of acting (values). An individual will sometimes adopt the ways and behaviour (values) presented by the community. Individuals may also develop their own ways of behaving (values) or adopt behaviour that the community does not endorse. This is because in any community, individuals have certain choices including the freedom to choose certain values. By choosing certain values they may be rewarded, punished or ignored. For example, a college graduate looking for a job may find that most jobs are beyond him or beneath him. He is faced with the decision to accept a job beneath his qualifications, meet some of his needs and face the consequence of being laughed at by his friends or remain unemployed and not able to meet most of his needs. His decision will be affected by what he considers important or of value to him.

Resource. As you have learned, resources are sources of supply, support or aid. They can also be:

1. Personal/individual.
2. Material.
3. Support system.
   a) Informal.
   b) Formal and professional.

Personal/individual Resources. These are characteristics of an individual such as:

- intelligence
- good health and/or strength
- education, knowledge and skills
- level of energy
- interest in certain areas
- ability to communicate effectively.

Material Sources. These are things which have buying power, including:

- money
- land
- labour

- animals
- wagons
- jewelry
- crops.

Support Systems. This refers to people within certain groups who can provide necessary help. There are two types of support systems. One type is informal and includes such groups as family, friends or relations in a village or community. The second type consists of professional groups or organizations and includes workers in health, education and welfare services, from the Medical Officer to the chowkidar of the BHU as well as the staff of other related institutions. Each member of a team has a specific role to play in helping the individual, family and community improve their health status.

You as Health Technicians are trained in the problem solving approach in order to assist and motivate individuals and families to meet their needs. You can do this by identifying existing needs and resources and utilizing those existing resources. When existing needs and resources are well matched and adequately used, the family or individual is said to be coping well. In other words, they are maintaining a proper balance and the Health Technician's service may be minimal or not necessary at all.

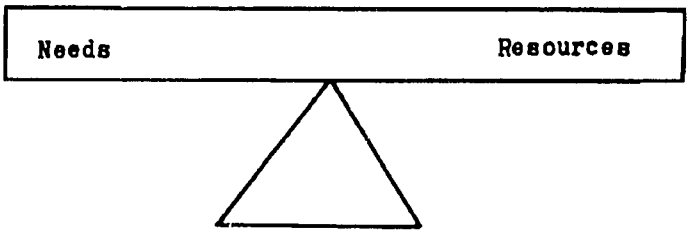


Fig. 2.1 Coping well with existing resources.

When existing resources are not available or appropriate for identified needs, then the needs will continue or become greater and more complex creating an imbalance in coping. This is illustrated in the figure below.

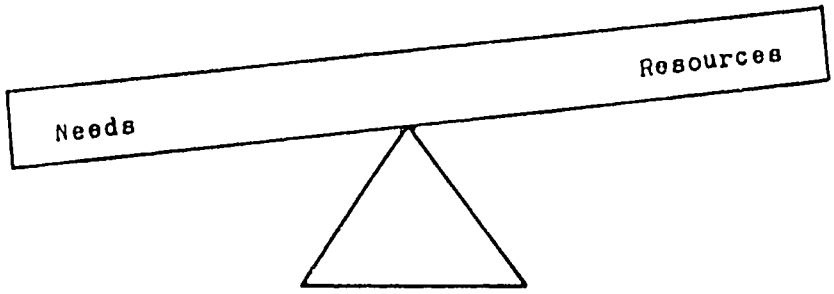


Fig. 2.2 Needs are greater than resources.

The existing resources are not appropriate for the identified needs and attempts to cope with the imbalance continue. Health Technicians need to work with the family in identifying what resources exist and what additional resources are needed to cope with the presenting problem.

Sometimes a family has resources but does not know how to use them to meet their existing needs. In this case the imbalance also continues. The Health Technician has an important role in helping families identify all existing resources and teaching them to sort out the resources to fit the needs.

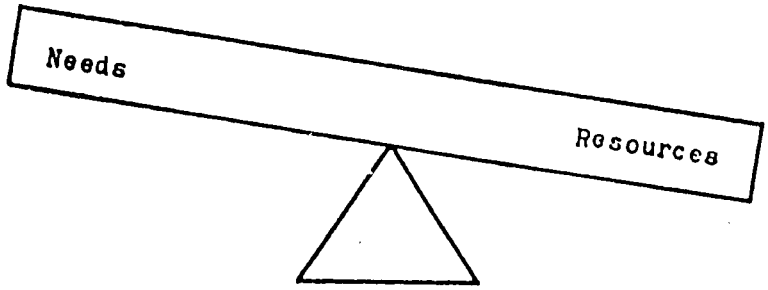


Fig. 2.3 Too many resources creating an imbalance also means the family is not coping well.

As an individual, you have some of the same needs and resources as the people you serve. Therefore, it is important for you to first understand yourself and your own needs. You also need to determine how well you are coping in meeting your own needs/ problems by utilizing the problem solving approach. If you are more or less satisfied with how you are meeting your needs, you are said to be coping well. To determine how well you are coping let us follow the following problem solving steps:

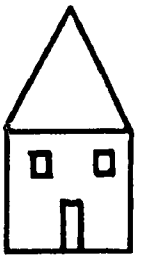
1. Gather information on:
   - basic needs
   - situational needs
   - your values and preferences
   - existing resources.
2. Identify actual needs.
3. Develop a plan of action.
4. Determine criteria for evaluation.

2.3 EXAMPLES OF USING THE PROBLEM SOLVING APPROACH

Example 1. After completing your training course all of you will need to find a job. That is your possible need. The resource is the Government's sanctioned post for which you would be eligible. These posts are not all in one geographic area. This means that each member of your group will have to go to a different place. For some, it may not be a problem to meet the need (job) because the resource (government post) may be nearby.

Health Technician

Job



Not a problem

Possible need: completed HT training and needs a job. +

Resources: sanctioned post vacant in your own village. =

Need and resource match.

For others, accepting a job will mean moving to a new location. This then becomes the actual need. You then need to identify resources for the move and relocation and plan accordingly.

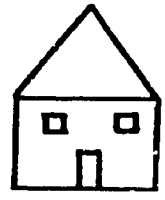
In this situation resources exist for the original need (a job) but the nature of the resources changes the characteristic of the need; the need is then not to find a job but to move.

Health Technician

Job 30 miles away.

Can't leave family

Can't live alone



Completed training and needs to find a job.	+	Sanctioned post is 30 miles from home and family.	=	Actual need is to decide whether to (1) accept or (2) not to accept the job.

If you decide to accept the job, then moving to a new location becomes the actual need. You need to identify resources for the move and plan accordingly.

NEED	RESOURCES
Move to a new location by the first of the month (in two weeks).	- Have relatives to live with. - Can get there by bus or train. - Have two weeks to get there.

PLANNED ACTIVITIES

- Write, telephone or visit relatives to see if it is possible to live with them.
- Find out the bus and train schedule and cost.
- Set a date for travel.

EVALUATION

- Relatives agree to have you live with them.
- Bus goes twice a week, but train goes once a week.

NEW NEED

- To decide whether to go by bus or by train.

Example 2. Health Technicians are expected to visit the community but transportation in the form of a vehicle is not available. How can this need, to visit the community, be fulfilled?

NEED	POSSIBLE SOLUTIONS
To visit the community	1. Start work first in the nearest village, within walking distance.
	2. Have Medical Officer arrange with patients or community leaders who come to the centre with a car to pick up and drop off Health Technicians in the community.
	3. Coordinate your community visits with the BHU visit of the Medical Officer so that you can be dropped off and picked up by him.

Existing resources here are:

1. Workers motivated to walk to the nearest community.
2. Patients with vehicles.
3. Medical officer's vehicle.
4. Community leaders/other community programmes.

The problem solving approach helps you to:

1. Identify existing needs and resources.

2. Further pinpoint the reasons for the existence of the problem/need by asking if it was caused by lack of resources or inappropriate use of resources or lack of motivation to seek or utilize resources?

3. Help an individual or family identify various possible solutions and choose the best one or combination of several, as in the case of example 2.

The Health Technician needs to be knowledgeable and skillful in problem solving approaches, that is, an ability to observe the situation carefully, discuss the problems with the affected persons or group and improve the situation by helping people to understand and solve their own problems. Health Technicians should not try to solve problems but should ensure that the problems get solved by the people themselves. Health Technicians should resist the temptation to provide quick answers or solutions.

Example 3. A weak and tired pregnant woman walks into the clinic. A usual approach is to immediately comment, "You are looking anaemic and need good food and lots of rest. I will give you iron tablets."

In this situation, instead of providing quick answers, you should obtain data from a history and physical examination to help you to identify the patient's needs. Discuss these needs with her and then advise her on diet and rest according to her life-style.

2.4 CONDUCTING A GROUP PROBLEM SOLVING ACTIVITY

Problem solving skills can also be used in identifying and solving group needs. The emphasis in the problem solving process is that concerned or affected persons are encouraged to identify their own needs or problems and work out the appropriate plans for their solution. The Health Technician acts as a guide in solving these problems and helping people to discover their own potential and resources. With communal problems, the group is encouraged to find solutions. Health Technicians should organize and facilitate a step by step problem solving approach.

One way is to introduce the group to a brainstorming session. Unrestricted participation in discussion can create a sense of group unity, so:

Step 1. Assemble the group and make the following recording table on a blackboard or a sheet of paper.

Step 2. Have the participants identify and write down their felt needs/problems.

TABLE 2.1 RECORDING TABLE

Needs/Problems	Resources	Goals

Under 'Problems' list the problems identified by the group. Under 'Goals' write the solution(s) suggested by the group. Have the group identify resources. Add to their list resources you have identified.

Step 3. Demonstrate how, through group activities, resources can be used to meet the needs of the group and facilitate the reaching of their goals. Stress to the group that individual motivation and activity becomes a bridge which makes it possible to reach these goals. Organize needs in numerical order to match resources and goals.

Needs/Problems		Goals
1. 2. 3. 4.	Group work --> --> --> ==========	1. 2. 3 4.

<u>Resource</u>
1.
2.
3.
4.

Fig. 2.4 Identification and listing of needs, goals and resources for group problem solving.

Step 4. Have one of the group members report on how the group linked the needs and resources to reach the goals.

Step 5. Help the group to plan and implement the actions resulting from this activity.

Step 6. Suggest and arrange a time and place to meet again to discuss the completion of the planned action.

Participants will feel happy and rewarded to see a list of resources they had not been aware of before. They will be delighted and excited to discover that they can use those resources to solve their own problems.

As existing needs are met, new needs requiring different types of resources and activities may develop. Therefore, in working in the Primary Health Care setting, remember there is no ready-made formula for solving health problems such as exists for traditional disease oriented medical care, where a pattern of treatment is prescribed for each disease.

However, in helping to promote health and prevent illness we need to remember to look at each person as having unique needs and resources. We must work out an individualized plan based on the problem solving approach. This is difficult in the beginning but as you gain experience, it will become second nature to you. It is very important to apply your classroom learning of problem solving to real life situations. This will help you develop your skills faster and make you more effective in providing health maintenance activities.

In summary, the problem solving approach consists of six steps.

1. Identification of possible needs.
2. Identification of actual needs.
3. Identification of resources.
4. Planning activities to match needs with existing resources.
5. Evaluating the success of the plan.
6. Formulating a new set of activities or concluding that needs have been met.

GLOSSARY

Cope: To struggle, with some degree of success, in dealing with a problem.

Category: A class of things.

Categorize: To place into a category.

Element: Fundamental; essential.

Evaluation: To find out or state the value of.

Motivate: Something that makes a person move or reach out or use a resource to meet a need.

Need: A condition requiring relief.

Plan of Action: Activities planned for utilizing certain resources to meet the identified needs.

Preference: Something that is desired over another.

Resources: A source or supply.

Support system: To strengthen through manpower, equipment, supplies, transport, etc.

Stimulus: Something that moves a person or thing to be active or that produces a reaction in an organ or tissue of the body.

Value: Something that is considered of worth or importance to an individual.

SUGGESTED LEARNING ACTIVITIES

1. Based on your one week stay in a RHC and BHU describe the services these centres provide.
2. How many of the eight elements of PHC are considered in the health services provided from the BHU and RHC.
3. Identify the existing needs and resources of your school.
4. Identify what additional resources are needed to supplement the existing resources of the school.
5. Identify your own needs and resources and make a plan of action for meeting these identified needs.

REVIEW QUESTIONS

1. What is the difference between Health Services and Medical Care?
2. What is the Problem Solving Approach?
3. What are the steps involved in problem solving?
4. Define Need, Resource, Motivation, Cope, Plan of Action and Evaluation.
5. What are the basic needs?
6. What is meant by situational needs?
7. Why do Health Technicians need to learn about the Problem Solving Approach?
8. What is the Health Technician's role when an individual's:

   a) needs equal their resources.
   b) needs are many and resources few.
   c) needs are few and resources numerous.

9. From your own experience, give two situations in which you used the Problem Solving Approach.
10. Define the exact role of a Health Technician in the Problem Solving Approach at a BHU.
11. Define the exact role of a Health Technician in the Problem Solving Approach in outreach activities.

CHAPTER 3

HEALTH EDUCATION: COMMUNICATION IN HEALTH WORK

Objectives: After completing this chapter you will be able to:

1. Describe what health education is.
2. State who a health educator is.
3. Describe a Health Technician's role in health education.
4. List specific areas of your responsibility for each component of health education.
5. List all steps necessary for planning and carrying out health education sessions.
6. List and describe seven methods of teaching used in health education.
7. Discuss the best method of teaching and give a justification.
8. List all the materials used in health education.
9. Describe the best site for giving health education and why.
10. Identify ways to plan and evaluate your health education sessions.
11. Describe ways to keep records and to display them in your office.

EVALUATION FORM

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of Presentation	[ ]	Simple to understand
	[ ]	Difficult to understand
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 3

HEALTH EDUCATION: COMMUNICATION IN HEALTH WORK

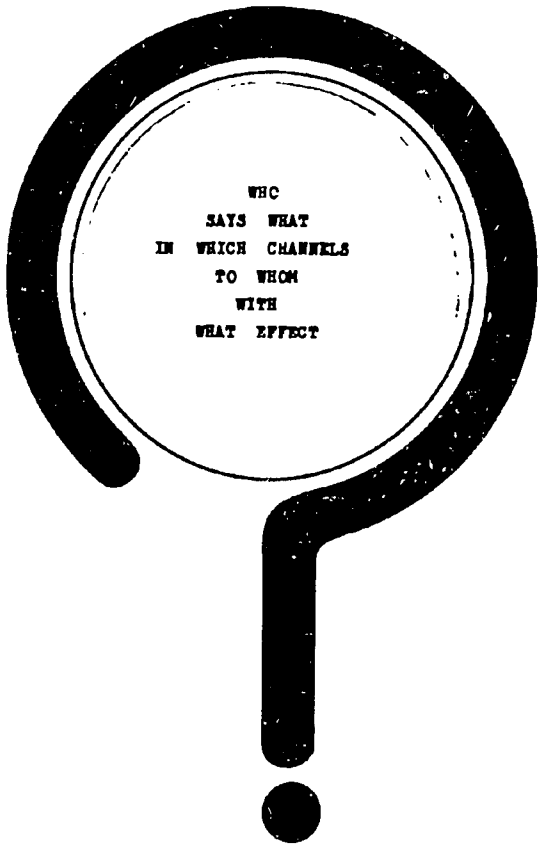


Fig. 3.1 What is health education?

INTRODUCTION

What is health education and what can be achieved by it? Health education is the process by which people learn and as a result of their learning change their health habits and attitudes. Success in health education is achieved by providing necessary information and motivating people to change their behaviour or attitudes leading these to enjoy better health.

In other words, health information is given to an individual or group so that they will be better informed and change any undesirable or unhealthy habits to healthy behaviours based on newly acquired knowledge, attitudes and skills. The success of health education is measured in terms of changes in these three areas.

Health education is not just information or propaganda, but a learning process which appeals to reason more than to emotion. Education helps to make people think for themselves and brings about a change in behaviour. Health education helps people develop and maintain health practices that promote individual, family and community well-being.

3.1 WHAT IS A HEALTH EDUCATION PROGRAMME?

The steps involved in the health education process are outlined in this example:

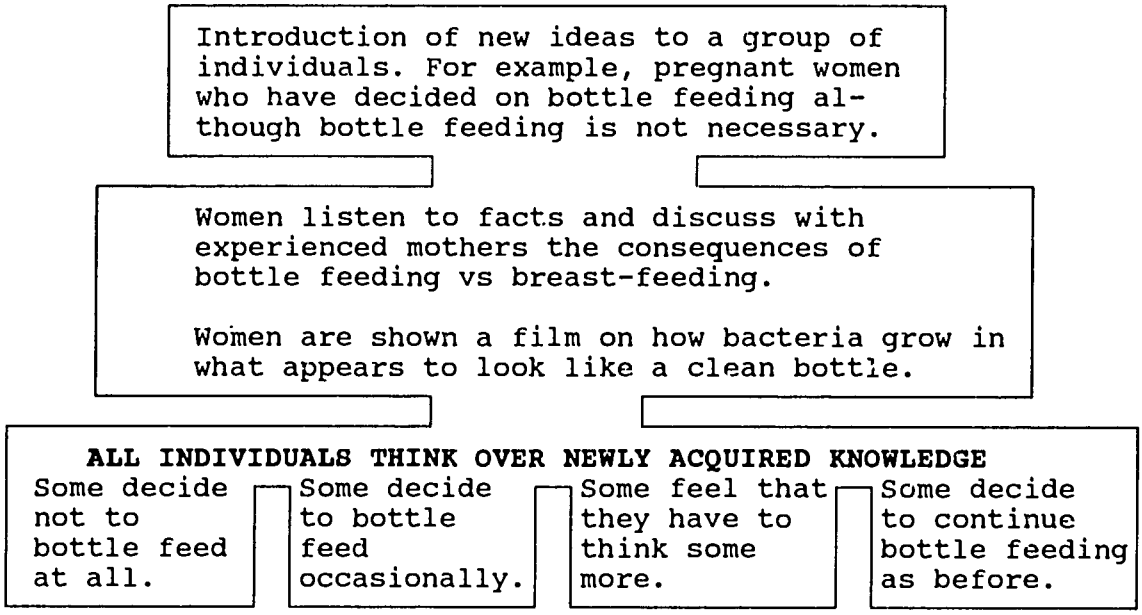


Fig. 3.2 Steps in the health education process.

This example shows that health education activities will not bring about the same change in behaviour for all participants.

What health education does is to provide adequate and appropriate information to all participants. This newly acquired knowledge can then be incorporated with each individual's previous knowledge and experience, resulting in an individual decision. Therefore, we should not expect to change the health attitude of all participants nor should we consider our programme unsuccessful if 100% of the participants do not change. Having participants attend a health education programme in itself indicates success to some degree.

3.2 HEALTH TECHNICIANS ARE ALSO HEALTH EDUCATORS

Who are the health educators? Each individual member of a health team needs to assume the role of a health educator. Health education can and should be given in every hospital, RHC, BHU, school, home and community for it to be effective. It should be integrated into every activity of the health service. As a Health Technician, health education is one of your most important tasks because:

- You have direct contact with people at local levels.
- You are trusted by the people.
- You are the person to whom people come to seek advice on health problems.

Your role in health education will be to:

- Identify health problems needing health education.
- Identify associated health practices of people which contribute to their problems.
- Analyze these contributing factors or behaviours and identify those that need to be changed.
- Design and test messages for health education.
- Select who is to be taught, where, when and how.
- Prepare your health education programme.
- Carry out the health education programme.

You need to identify the components of health education in your area of responsibility in order to plan for each session. Table 3.1 provides some examples.

TABLE 3.1 COMPONENTS OF HEALTH EDUCATION

Overall duty	Health education component/part
Provide MCH care	Advise about: - prenatal, natal and postnatal care - nutrition for pregnant women - high risk pregnancies - breast-feeding from birth - supplementary food - weaning food
Immunization	Educate parents about: - immunizable diseases - doses of immunization - schedule of immunization - value of immunization - side effects
Diarrhoea control	Counsel mothers on: - what diarrhoea is - dangers of diarrhoea and dehydration - use of ORT and/or home remedies to prevent dehydration - need to continue feeding - prevention of diarrhoea
Treatment of minor ailments: diarrhoea worms boils scabies dysentery	Instruct people about: - ORT - how, why and where the disease spreads and how to prevent it - spread of skin infections and prevention - when to seek referral
Care of emergencies and referrals	Conduct classes on: - first aid - continued use of ORT on the way to the hospital - how to avoid accidents and fires - artificial resuscitation - burns
Sanitation water	Teach about: - sources of water supply - ways to make drinking water clean and safe

TABLE 3.1 COMPONENTS OF HEALTH EDUCATION

Overall duty	Health education component/part
Food hygiene	Advise about: - storing, cooking and serving of food
Use of toilets	Discuss: - dangers of using open fields for defecation - advantages of having and using a toilet - diseases spread through stools and their prevention
Nutrition programme	Provide information on: - balanced diet - food requirements of vulnerable groups - worms and infectious diseases and their role in malnutrition
Control of communicable diseases	Instruct about: - symptoms, modes of spread and control measures
School health education	- advise on healthful school living - organize a school health committee - arrange cleanliness competitions - arrange debates on health subjects - arrange essay competitions - address morning school assemblies - help improve school water supply and toilets

TABLE 3.2 IDENTIFYING AND DESIGNING A HEALTH EDUCATION PROGRAMME

Problem	Associated behaviour	Cause	Design health education message relevant to cause
High morbidity and mortality due to communicable diseases(CD).	People do not have their children vaccinated.	Not aware of what a CD is. Not aware of EPI services or resources. Not convinced of the value of immunization. Afraid of side effects.	Vaccination is safe; it saves children's lives.
High morbidity rate of diarrhoea and the resulting high mortality rate in children.	Believe giving food and drink during diarrhoea makes it worse.	Unaware that dehydration leads quickly to death. Unaware that ORT can be used for rehydration. Non-availability of ORS.	Diarrhoea causes loss of fluids from the body; dehydration can kill the child. ORS replaces fluids in the body and saves the life of the child.
Poor sanitation resulting in diseases.	Do not dispose of body wastes in proper ways.	Not convinced of the value of using toilets.	Defecating in fields and streams spreads diseases such as dysentery, typhoid, cholera and parasites. Use of a toilet is convenient and keeps some infections from spreading.

3.3 PLANNING AND CARRYING OUT A HEALTH EDUCATION PROGRAMME

The steps to be considered in planning and carrying out a Health Education Programme are:

1. Defining the health problems.
2. Identifying the cause/reason for these problems.
3. Identifying the needs of the individual.
4. Identifying specific health behaviours which contribute to the health problem.
5. Locating the areas in which people need to be educated.
6. Selecting target groups.
7. Designing and testing proper health education messages.
8. Clarifying and listing duties/tasks which you will perform to educate people in health matters.
9. Making a health education programme for your area.
10. Scheduling health education activities.
11. Carrying out health education activities designed to motivate people toward desired health actions.
12. Properly recording and reporting health education activities.
13. Evaluating the results and modifying the plans if necessary.

After identifying a problem, you should prepare a chart as shown in Table 3.2 to design you health education activity.

3.4 METHODS UTILIZED IN HEALTH EDUCATION

There are many methods and techniques used in education. Each has its own strength and weakness in accomplishing objectives. There is no one method that is effective for all situations. Different situations need different methods. Criteria for selecting the most appropriate methods are: the size of the group, the type of message to be conveyed and the teaching materials available. The following is a list of various teaching methods as well as the criteria for when to use them.

TABLE 3.3 METHODS OF TEACHING

Teaching method	Criteria for using the method
Lecture	- Large group (50-100 persons). - Providing knowledge.
Discussion	- A small group of two to ten persons.

TABLE 3.3 METHODS OF TEACHING

Teaching method	Criteria for using the method
Demonstration and practice	- A small or large group, when a teacher feels it is appropriate and materials are available. - Teaching procedures.
Role playing	- Small or large group. - Conveying inter-personal communication.
Storytelling	- Small group. - Transferring new or different ideas and relating them to local behaviour.
Counseling	- One to one. - A small group.
Games	- Small or large group depending on the game.

Lecture. This is the oldest and most commonly used method of teaching. In this method, the teacher usually speaks while the students listen. A lecture is a one way communication method because only the teacher is talking. It is the least effective teaching method because there is very little or no opportunity for the audience to particpate in the learning process. Sometimes the audience loses interest just having to sit and listen. When combined with discussion however, this method becomes more effective.

Discussion. To discuss means to talk over. Here the participant and teacher talk over the topic and everyone expresses an opinion. In a discussion, questioning is accepted and answers are given by the teacher or the group. By involving the group in the process of learning, they remain alert and interested.

Discussion, when combined with lecture, is very effective. You can present the main ideas one at a time and initiate a discussion by asking questions of the group as well as their experiences on the subject.

Demonstration and practice. Demonstration is a method of showing step-by-step how something is done. For example, to demonstrate the preparation of a supplementary diet for a baby, parents must be shown the procedure step-by-step. After showing them, ask them to repeat the procedure. This is practice. In order to give a good demonstration, the following principles must be followed:

- Prepare a plan for the demonstration.
- List the steps to be demonstrated.
- Practice the steps by yourself.
- Use available audiovisual aids.
- Use locally available and appropriate material.
- Involve the viewers in the preparation and presentation of the demonstration.
- Compare the similarities and differences in your ways and their ways.
- Allow time for discussion after the demonstration is over.

Preparing for the demonstration:

- Make sure that everybody will be able to see the demonstration.
- Be sure that you have collected all the things which you will need during the demonstration.
- Gather utensils to prepare ORT or weaning food. Peel, cut and wash vegetables.
- Bring all items to the place of demonstration.
- If possible, use a table for your demonstration. If a table is unavailable, use a cloth spread on the ground.

Tell your viewers:

- What you are going to demonstrate.
- Why it is important.
- How your method compares with theirs.

Talk clearly and slowly and make sure that everybody understands what you say.

Start your demonstration:

- Explain each step.
- Do not run through it.
- Use simple words.
- Speak loudly and clearly.
- Be friendly and polite.

Answer questions:

- Invite questions after you finish each step of your demonstration.
- Ask viewers to repeat the step which you have just explained.
- Repeat the step if it is not understood.

Summarize what you have demonstrated:

- At the end, when you have finished the demonstration and the discussion has taken place, please do not forget to summarize each step.
- Tell your viewers where they can get the materials and items you used.

Find out whether your demonstration was successful by asking:

- Did your viewers learn how to prepare supplementary food for the baby?
- Can they do the same in their homes?
- What were your weak points?
- How can you improve them in your next demonstration?

Follow-up:

- Go into the homes and see whether parents are practicing the newly learned and proper ways of preparing food for babies.
- Give further needed advice.

Role playing. Role playing means that a person or a group takes the role or position of someone else and tries to act as that person would or should. In the health field, we work with people to try to develop new, healthful habits or change old ones. In doing so it is important to understand the people we work with and their beliefs and customs. In addition to understanding people, it is also important to anticipate their probable reactions to your suggestions. To help students like you to face a real situation, role playing demonstrates how people react and how a Health Technician should handle the situation.

Role playing helps to develop skill in working with people. It is like a drama, but it requires no written script or memorization. You act or play the part of another person, acting out how you think the other person would act or behave in a particular situation. Depending on what an actor does, the other actor(s) respond. Role playing is closer to real life than a drama, which is fixed and cannot be changed. In role playing the actors learn how scenes or situations develop and where the situation is heading. In the role playing it is important to identify the goal for each session, in other words, what is this specific role play designed to teach.

This method can also be used with the villagers to help them understand each other and their ways.

Role play is useful for:

- Developing practical skills.
- Developing social skills.
- Developing teaching skills.
- Developing observation skills.
- Developing alternate solutions to different problems.
- Starting a discussion on topics people find difficult to talk about.

Storytelling. Telling stories is the oldest method of teaching children about their culture. This has been used in settings where people cannot read. Storytelling can make a topic simple and lively. However, to be effective a story should be interesting and relate well to the audience.

Counseling. This means to give advice, or instruction in guiding or helping someone. In health, it refers to talking to an individual or a family and helping them to discuss their concerns and arrive at a decision on what to do and how to do it. As Health Technicians you will be spending the majority of your time counseling. The steps involved in counseling are the same as in problem solving; review Chapter 2 for these steps. To be effective you have to establish a good working relationship, be a good communicator and demonstrate an interest in the welfare of those you counsel.

Games. This usually refers to an amusement or pastime. Games are played by adults as well as children. Because people like to play games, games are becoming more popular as a method of teaching. With this method, people become thoroughly involved and learning takes place easily. You as Health Technicians may know of games that you can use in conveying your messages to the people.

Games like "Ludo" or "Snakes and Ladders" have been used in various countries to convey the message of good nutrition and family planning. You may want to ask some of the family planning workers to teach you about this.

What is the best method of teaching? There is no single method of teaching that will be effective for all situations. Each method has its own advantages and disadvantages and these have to be considered in choosing for a given situation.

Experience has shown that combining more than one method in each teaching session gives better results than using a single method alone. In one study, the effectiveness of various teaching methods was evaluated and the following results show how many families were influenced to adopt new advice.

TABLE 3.4 EFFECTIVITY OF ONE OR MORE TEACHING METHODS

No. of methods used in teaching	Families adopting advice
One	35%
Combination of three	64%
Combination of four	86%
Combination of more than four	98%

From this study we can learn that we can be most effective by using a combination of at least four methods of teaching.

3.5 MATERIALS USED IN HEALTH EDUCATION

So far the discussion has focused on the methods of health education. You now need to learn what materials can be used. These are limitless and there is no rule about which is best to use. Anything that helps to convey the message is considered appropriate, from whatever exists in a house (such as food items) to the most sophisticated and commercialized items such as films, slides, etc.

The choice of material is determined by the message to be conveyed, the audience and availability. You are encouraged to use a combination of locally available materials along with what you can find in your institution or District Health Education Office.

Research findings show that most people retain:

10% of what they read.
20% of what they hear.
50% of what they see and hear.
90% of what they practice.

Once again you shoud use various resource materials and combine them with different methods of teaching to be most effective.

This section will describe what is generally available in your school or health education office. These items include:

Flip charts
Flannel graphs
Posters
Booklets
Slides, films and overhead projector

These materials are called audiovisual aids. Audio refers to hearing and visual to seeing. In this list, film is the only item that would be both audio and visual. The others are visual aids, meaning they make messages clearer because learners can see what is being taught.

A flip chart. This is a visual teaching aid showing a sequence of charts of drawings which are fastened together at the top. Each chart or picture can be turned forward or backward.

A flip chart may be used during a lecture or group discussion to highlight the points or steps in a process or treatment.

When using a flip chart, make sure it is placed high enough for everyone to see and stand beside it rather than in front of it while you are talking so that you do not block the view.

Flannel graphs. These visual aids are made of flannel or another fabric with a rough surface and stick to each other. Pictures, words or illustrations made of textured cloth with sticky material on the back are placed on a board for demonstrations. Flannel graphs can easily be made anywhere. Instructions on how to make a flannel graph follow.

1. Assemble the following materials:

   - A table or any other flat surface.
   - A pair of scissors.
   - Gum or cooked starch.
   - Picture, larger words printed on paper or diagrams.
   - Flannel, lint or sandpaper.
   - A large piece of carton board.
   - Pins.

2. Cut out the picture or diagram that you want to use leaving a one centimeter margin around it if possible. You may draw the picture or collect pictures from magazines, newspapers or book stores.

3. Cut the flannel, lint or sandpaper to about the size of the picture.
4. Turn the picture face down on the table and apply a gum of cooked starch lightly and evenly over the back of it.
5. Place the flannel, lint or sandpaper over the back of the picture.
6. Turn the picture, with the flannel, lint or sandpaper sticking to it, face up again and press it firmly with a sweeping motion to force out air bubbles.
7. Now using scissors, trim the picture and backing together, leaving about a 1/2 centimeter margin of the original paper or the contact with the bigger pice of flannel cloth.
8. Allow the gum to dry before use.
9. Pin a piece of flannel cloth to cover the carton board. Press the cutouts on the board to illustrate what you are talking about as you proceed with your health talk. For example, display cutouts of supplementary foods (khichri, fruits, mashed banana, milk, vegetables etc). As you talk take away old and put up new cutouts on the flannel.

Posters. Posters can also be used to make counseling and group discussions more effective. There are many agencies that can provide you with posters on different subjects. Please write to your Divisional or Provincial Health Education Officers to send you posters. You can also make your own posters very easily by cutting photos from calendars and newspapers, gluing these on art paper and writing a short message under the picture. A poster should have the following qualities:

1. A title that is instantly understood.
2. An emotional appeal.
3. A realistic picture which is better understood than symbolic picture. (Funny cartoons should be used only when they will not offend).
4. A single, simple message.

Booklets. Booklets or leaflets are printed material, with or without illustrations, usually covering a single subject. For example, immunization, diarrhoea, malnutrition or weaning foods could be covered in a booklet. Booklets are available through the health education section of the Primary Health Care Project of the government and through other organizations like UNICEF, WHO and the Red Cross.

Slides, films and overhead projectors. A slide is a single transparent picture projected onto a screen. A film usually refers to a reel of motion pictures. Both require a kind of projector to produce the picture. Instructions must be followed and you are encouraged to learn how to use these two projectors, if you are interested and have access to them.

You may also use an overhead projector which has transparent plastic sheets on which you can write out or draw your message. The procedure for using an overhead projector has been prepared for tutors and is found at the end of this chapter for your information.

3.6 DO'S AND DON'TS IN HEALTH EDUCATION

There are certain "Do's" and "Don'ts" you need to follow in conducting health education sessions. Do's refer to things you should do, Don'ts to those things you must avoid. The Do's are covered under the following eight points.

DO'S:

1. Do communicate well with people. Be sure to:

   - Listen.
   - Share ideas.
   - Receive ideas.
   - Understand behaviour.
   - Share, give and receive information.

2. Do learn the skills needed to work with other people. These include:

   - Listening to what people say.
   - Understanding people's problems.
   - Sharing ideas.
   - Supporting and helping people.
   - Finding ways to solve problems together.
   - Learning from mistakes.
   - Learning from each other.

3. Do identify people in the community who can help you, such as:

   - Local counsellors.
   - Numberdars.
   - Local leaders.
   - Government workers.
   - Hakims.
   - Dais.
   - Imam.

4. Do explain your health topic to them. For example, if you want to talk about immunization, explain:

   - The dangers of childhood communicable diseases.
   - The value of vaccines.
   - Your immunization programme.

5. Do ask their advice on how to motivate people to bring their children to you for vaccination or education:

   - Request their help in arranging a session.
   - Be reliable and punctual.
   - Tell people about the side effects of vaccinations, that is, that the injection may cause slight fever in a child.

6. Do be polite and friendly:

   - Have your group sit comfortably.
   - Sit with people according to their customs either on charpoys, the ground, etc.
   - Do not try to show yourself as a big and proud government officer.
   - Treat everybody equally.

7. Do teach in interesting ways:

   - Use simple language (the language of the people to whom you are talking).
   - Do not use medical terms such as immunization.
   - Talk for a short time, then ask people their opinion. (Do not ask questions as if you are examining them.)
   - Use your teaching aids - posters, flip charts, etc.
   - Listen to what people say about the subject you are talking about.
   - Encourage people to tell you their experiences.

8. Do plan what you want to teach:

- Make a list of the ideas that you want to teach.
- Teach one idea at one session.
- When you have finished the list, go back to the beginning and start again (there will be some new people in the audience by then).
- Make sure that you know what you will teach today.
- Your list helps you decide on and not leave out important ideas, but you do not need to follow it exactly.

DON'TS:

- Don't be frightened to let people ask you questions.
- Don't be worried if you do not know the answers. Tell them you are not sure of the answer but will find out.
- Don't give wrong information, if you do not know the answer.
- Don't use language which people cannot understand.
- Don't wear clothes that are unacceptable to the people.

3.7 SITES OF HEALTH EDUCATION ACTIVITIES

You can carry out your health education activities in the following places:

- Health institutions
- Community meeting places
- Union councils
- Mosques
- Local leader's house/dera/hujra/baithak
- Schools
- Homes
- In a field

Repeated health education through schools, mosques and union councils can be very effective.

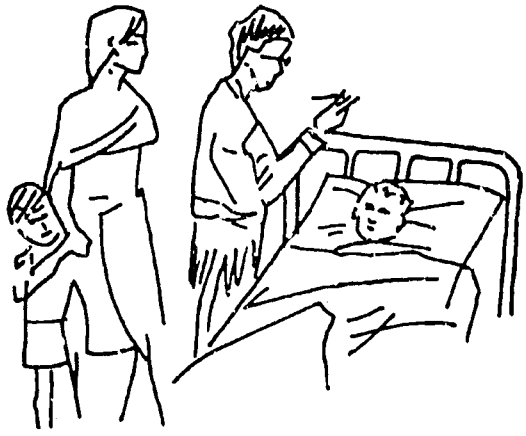


Fig. 3.3 Health education is very effective when given during treatment or at bedside

Health Education in a health facility. The Integrated Rural Health Complex, RHC, BHU, MCH centre or hospital where you work is the first obvious place where you can teach people through:

- Individual consultations
- Mother's classes
- Demonstrations

Fig 3.4 When a health talk is well prepared and presented in a lively way, it is an effective method for sharing health knowledge and facts.

3.8 PLANNING AND CONDUCTING A HEALTH EDUCATION PROGRAMME IN YOUR ASSIGNED AREA

After you know your community and its needs, it is important for you as Health Technicians to sit down and plan health education programmes for a period of time, for instance three months, six months or one year. This will help you schedule your other activities as well. You may want to use the following suggested plan as an example or come up with your own.

Set up health education centres/locations in the area according to your convenience. Centres can be set up in the houses of your friends, local leaders, schools, etc. List the centres on the map. You can make as many centres as you can easily go to at least once during each month. Make a key for the centres on the map as shown below in the example.

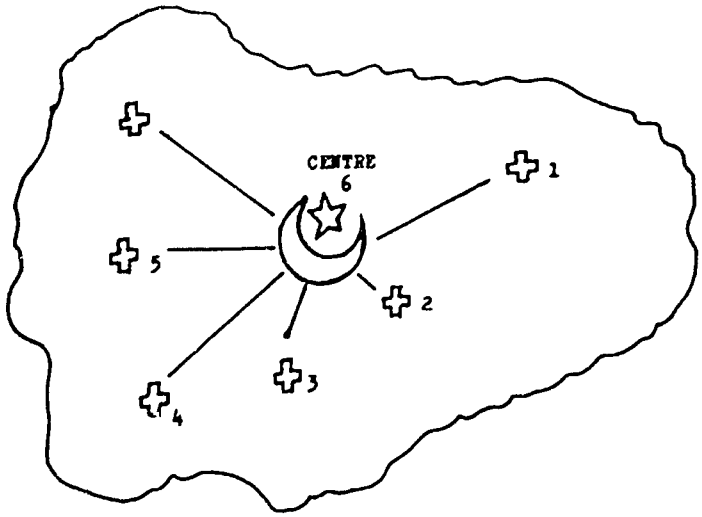


Fig 3.5 Area map.

KEY:
Center 1. House of Begum Saeeda
Center 2. Local Councillor's House
Center 3. Sakina Villa
Center 4. Industrial House
Center 5. Primary School

Source: Courtesy of Mr. Abdul Sattar Chaudhary, Health Education Advisor, Basic Health Services Cell, Islamabad.

Now that you have identified the centres, plan your health education programme. You should plan a monthly programme that allows one day of the week for each centre. If there are too many centres to visit in a week, then make the visits every two weeks, but always visit on the same day of the week.

The example below illustrates how you can arrange weekly health education programmes in six centres or locations. Details of the abbreviations used are given at the bottom.

HEALTH EDUCATION SCHEDULE FOR THE MONTH OF_____

FRIDAY	SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
	C.1 PM	C.2 PM 1	C.3 PM 2	C.4 PM 3	C.5 PM 4	C.6 PM 5
6	C.1 IC 7	C.2 IC 8	C.3 IC 9	C.4 IC 10	C.5 IC 11	C.6 IC 12
13	C.1 SD 14	C.2 SD 15	C.3 SD 16	C.4 SD 17	C.5 SD 18	C.6 SD 19
20	C.1 ORS 21	C.2 ORS 22	C.3 ORS 23	C.4 ORS 24	C.5 ORS 25	C.6 ORS 26
27	C.1 NM 28	C.2 NM 29	C.3 NM 30	C.4 NM 31	C.5 NM	C.6 NM

C Center number
PM Care of pregnant mothers
IC Infant care (breast-feeding and immunization)
SD Supplementary diet
ORS Diarrhoea control through ORS
NM Diet of nursing mother

Fig. 3.6 Visit Schedule

The above schedule uses only some of the topics suggested at the beginning of the chapter. You can use any topic that you feel is important for your area in scheduling your work.

3.9 KEEPING A RECORD OF ACTIVITIES IN HEALTH EDUCATION

Most Health Technicians do a lot of health education but do not keep a proper record and therefore do not get the admiration they deserve. Recording daily health education activities also helps in the preparation of monthly and yearly reports by:

- Showing what subject you advised people on at each centre, when you last visited it and what questions were asked by the audience. You can prepare to answer such questions by referring to the Health Talk Register described below. You can also prepare the next subject by referring to the monthly program chart.
- Evaluating your work.

TABLE 3.5 HEALTH TALK REGISTER

Date	Place	Group	No. attended	Subject	Teaching aids used	Remarks
1.12.86	C.2	PM*	10	Food for pregnant mothers	Flip chart	Mothers asked about schedule of immunization. Talk on this subject should be given during next visit.
2.12.86	C.3	PM	15	Food for infants	Flip chart, demonstration	Mothers do not give eggs to babies in summer.

You can prepare a chart from the monthly record of your health education activities for display in your centre. Calculate the number of people who were provided with health education during each month and then make a graph like the following:

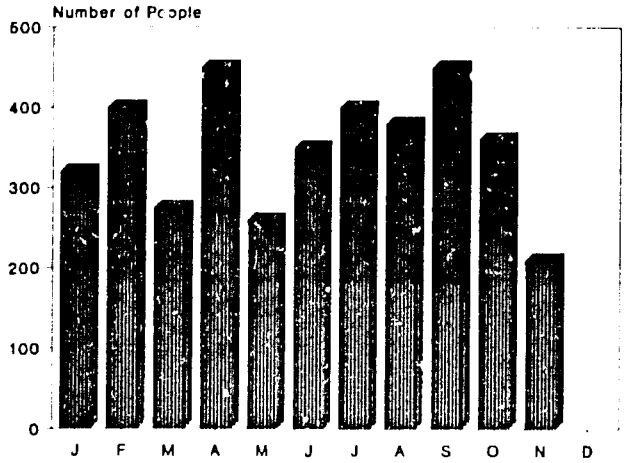
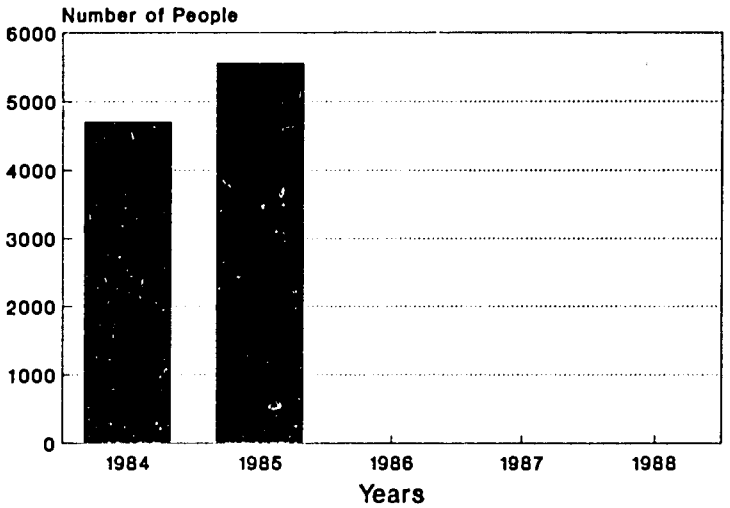


Fig. 3.7 Graph showing the number of people who were provided with health education during the year 1986.

Source: Courtesy of Mr. Sattar Chaudhary, Health Education Advisor, (BHS Cell), Islamabad.

You can add a bar for every previous month. This graph shows the progress of each month up to November 1986. This means that the visits for the month of December 1986 are still going on. You will add the bar for December in the month of January 1987.

You can prepare an annual graph from the monthly graphs of your Health Talk Register comparing your work with previous years. This can be done by keeping a bar graph for each year:



Y E A R S

Fig. 3.8 Graph showing the numbers who were provided with health education from 1984.

Display your charts on a board in your office or in your BHU/RHC/MCH centre, and include:

1. A map showing your area and the health education centres.
2. Your monthly health education programmes.
3. A monthly graph of people receiving health education.
4. A yearly graph.

You should know that displaying the above charts will bring appreciation for your hard work.

3.10 EVALUATION OF YOUR HEALTH EDUCATION ACTIVITIES

Evaluation should be done to see the progress of your work. It is a continuous process. You can evaluate your work at the end of each month and/or each year.

How can you evaluate your health education programme? Analyze what you have done thus far:

- Number of talks given.
- Number of materials distributed.
- Number of home visits made.
- Number of demonstrations arranged.
- Number of field trips.
- Number of planned activities that were cancelled or postponed.

Find out whether the results you have observed or seen on your record show:

- A change in knowledge.
- A change in the attitudes of the people.
- A change in the health practices of the people.
- An increase in the number of deliveries done by a Lady Health Visitor.
- An increase in attendance at your centre.

3.11 GUIDE TO TRAINERS ON THE USE OF AN OVERHEAD PROJECTOR

Materials needed:

- Transparent plastic sheets (transparencies)
- Screen
- Projector

Procedure:

- Prepare transparencies on appropriate topics to be covered.
- Before class set up the projector.
- Turn it on to make sure the electricity is on and that the bulb is working.
- If the bulb is not working or the electricity is out, make last minute changes and report the malfunction.
- If all units function well, arrange transparencies in order of use.
- Turn off machine.

- During class, when you present your lecture/discussion, turn on the projector to use when you need a visual display to illustrate a lecture topic.
- If the time between use of transparencies is more than 5-10 minutes, then switch off the motor and turn it on again when you need the next transparency.
- At the end of class, turn off the machine.
- Take it back to its usual storage place.

GLOSSARY

Abbreviation: A short term; a brief form of a longer word, title or phrase.

Attitude: A state of mind or feeling with regard to a belief.

Boils: A blocked pocket occurring because of bacterial infection in the root of the hair or other parts of the body containing pus.

Criteria: Condition.

Dysentery: Condition with frequent passage of small amounts of mucous and blood with loose stool.

Incidence: New disease cases.

Mortality: Death due to a disease.

ORS: Oral rehydration solution.

ORT: Oral rehydration therapy.

Participant: Person who joins in an activity or a group.

Rate: Amount or incidence of; percent.

Scabies: Disease of the skin caused by small creatures called mites and resulting in frequent scratching.

Skill: Ability.

Supplementary foods: Foods that are given to an infant in addition to breast milk.

Tools (education): Something that is used to facilitate teaching.

Utensils: Vessels or containers.

UNICEF: United Nations International Children's Emergency Fund. It is an organization in the UN system.

Visual teaching aid: A teaching aid used for projecting pictures.

SUGGESTED LEARNING ACTIVITIES

1. Plan and conduct one health education class for your friends on:

   - Cleanliness in hostel living.
   - Student's responsibility in hostel and classroom maintenance.
   - Ways to eat better in your mess, within your budget.
   - Importance of developing health promoting habits.
   - Responsibility of women to eat well to safeguard the welfare of future generations.
   - A topic of your choice.

2. Plan and conduct a health education session for the Tutors and Programme Training Officers.
3. Develop a health education slogan for this chapter.
4. Plan and conduct a minimum of 20 health education sessions and keep records of them.

REVIEW QUESTIONS

1. What is the difference between health education and propaganda?
2. Who is a health educator?
3. Describe the Health Technician's role in the health education programme.
4. What are the steps involved in planning and carrying out health education sessions?
5. What method(s) of teaching would you use for the following topics:

   - Need to immunize children.
   - Preparation of oral rehydration solution.
   - Preparation of weaning foods using locally available food.
   - Breast-feeding.

6. What material(s) would you use for the above?
7. Where would you hold each of the above sessions?
8. Write down the steps necessary for planning and evaluating health education sessions.
9. How many methods of teaching should be use to achieve a high percent effectiveness?

LEARNING ACTIVITY RECORD

Name of student:_____

Record of 20 health education sessions.

	Date	Place	No. of partici-pants	Subject	Teaching aid used	Remarks	PTO/Tutor Signature
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

EVALUATION FORM

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of Presentation	[ ]	Simple to understand
	[ ]	Difficult to understand
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 4

ANATOMY AND PHYSIOLOGY

Objectives: At the end of this chapter, you will be able to:

1. Describe the different systems of the body, their major functions and the major organs in each.
2. Describe the functions of different types of tissue.
3. Describe the growth of an individual from cells to a human being by comparing him to a house.
4. Identify different bones and joints in the body and explain the types of joints.
5. Describe the fontanelles and their significance in determining health status.
6. Explain the functions of voluntary muscles in different parts of the human body.
7. Describe the structure and function of the heart and circulatory system.
8. Describe the systemic and pulmonary circulation of the blood.
9. Define and discuss ways of assessing the function of the circulatory system by measuring blood pressure and the pulse.
10. Locate the heart and the pulse points.
11. Describe technique for examining the chest and heart.
12. Describe the method for palpating the pulse.
13. Describe the normal pulse rate in an adult.
14. Describe the normal range of haemoglobin in adults.
15. Describe the lymph system and its significance in checking the spread of infection.
16. Name the organs of respiration.
17. Define the purpose of respiration.
18. Describe the structure of the chest.
19. Explain the mechanism of respiration.
20. Explain inspiration and expiration.
21. Describe the technique for assessing respiratory function.
22. Explain the structure and function of the digestive system and its organs.
23. Describe the location of the organs of the digestive system.
24. Mark the quadrants of the abdominal surface.
25. Describe the structure and functions of the urinary system.
26. Identify and locate the parts of the urinary system on a chart.

27. Describe the parts and functions of the brain.
28. Describe the functions of the central nervous system and the peripheral nervous system.
29. Describe the main components/parts of the nervous system.
30. Describe the organs of the special senses.
31. Describe the structure of the eye.
32. Describe how sound messages reach the brain.
33. Describe the structure of the nose.
34. Explain how the sense of taste occurs.
35. Name the ductless glands and identify their locations.
36. Describe the main functions of the ductless glands.
37. Conduct a complete health examination on an adult.

CHAPTER 4

THE STRUCTURE (ANATOMY) AND FUNCTIONS (PHYSIOLOGY) OF THE HUMAN BODY

INTRODUCTION

In Chapter 1 an individual was viewed as having bio-psycho-socio parts and bio-psycho-socio needs. What is meant by the biological part of a person is the living and growing part. Certain life-supporting needs must be met in order to continue to survive and function adequately. This chapter will describe a person's biological component in terms of structure and function. This does not mean that the psycho-social components are less important. All three components have equal importance in maintaining one's well-being and will be discussed throughout the text.

An individual is a complex unit consisting of many parts which have specific functions. Each part or unit of structure must work in coordination with all others for the well-being of the person. In this respect our body is like a machine in that all parts must be in good working order. To keep the parts in good working order, the following conditions must be met:

- Each structure must receive proper nutrition.
- Each structure or part must get adequate stimulation and rest between activities.
- The body's structure and functioning should be assessed periodically to determine its needs.

If the above conditions are not met, certain neglected parts of the body will not function properly and will affect other parts. This will result in the development of disease or disability.

If the body's functioning is evaluated periodically it may be possible to detect diseases or disabilities early so that measures can be taken to minimize suffering. But if the early signs of disease or disability are not promptly attended to, the presenting problem will not only get worse but may cause new damage to the body. This is because one part affects all other parts. Therefore, you need to know the normal structure and functioning of the body so that you can detect abnormal signs and symptoms early and help individuals to make necessary adjustments.

4.1 THE STRUCTURE AND FUNCTION OF THE HUMAN BODY

People and other living things move, take in food, react to their surroundings and to other people to stay alive. An individual's body consists of systems that are interdependent. This means that the functioning of each system is determined by the other systems and every system affects the functioning of all systems. No single system can function alone. These systems are:

- Musculo-skeletal
- Circulatory
- Respiratory
- Digestive
- Excretory
- Nervous
- Ductless
- Reproductive

Each of these systems performs specific roles and has major "actors" or organs which are responsible for the performance of that system. Table 4.1 presents the specific functions of the body systems and the major organs involved in those activities. Organs, like systems, are also dependent on other organs to function properly.

TABLE 4.1 FUNCTIONS OF THE BODY SYSTEMS

Systems	Main functions	Major organs
Musculo-skeletal	1. Bones hold up the body and give the body shape. 2. Muscles contract to help us move. 3. The bony frame protects delicate organs such as the heart, lungs, brain, etc. 4. Bones store minerals. 5. Some bones produce red and white blood cells. 6. Skin provides a covering for the body.	Bones Muscles Skin
Circulatory	1. The heart pumps blood through the body. 2. Blood carries nourishment and oxygen to all the cells and collects cell wastes. 3. The system regulates body temperature. 4. The system fights infection.	Heart Blood vessels Blood cells Lymph glands Spleen

TABLE 4.1 FUNCTIONS OF THE BODY SYSTEMS

Systems	Main functions	Major organs
Respiratory	1. Supplies oxygen to blood cells. 2. Gets rid of undesired gases e.g., carbon dioxide.	Nose Mouth Trachea Lungs
Digestive	1. Changes the food we eat into a simpler form (liquid) so that nutrients can be absorbed into the blood through the intestinal walls and carried to all body cells.	Mouth Teeth Tongue Oesophagus Stomach Liver Intestines Salivary glands Pancreas Gallbladder
Excretory	1. Eliminates waste from the body. 2. Removes cell water from the blood.	Skin Lungs Intestines Kidney Ureters Bladder Urethra
Nervous	1. The communication system of the body. 2. Automatically controls vital activities such as respiration, circulation, digestion and gland action. 3. Also controls some voluntary activities such as moving, learning, etc.	Brain Spinal cord Nerves
Ductless glands	1. Helps regulate body activities by chemical control. 2. Secretes hormones into the blood.	Pituitary gland Thyroid gland Pancreas

TABLE 4.1 FUNCTIONS OF THE BODY SYSTEMS

System	Main functions	Major organs
Reproduction	1. Continues the human race. 2. Continues the family line and characteristics.	Ovaries Testes Vas deferens Seminal vesicles Prostate gland Urethra Penis Vagina Uterus Fallopian Tubes
Two ancillary systems:		
Sensory	Sends messages to the brain.	Eyes Nose Ears Tongue
Regulatory	Maintains body temperature.	Skin Lungs Blood vessels

Some organs are part of more than one system and are described for the system in which they play a major role.

As you have learned, a person is viewed as a unit having three components: biological, psychological and social. In this chapter we are concerned with the biological component which has two parts: structural (anatomy) and functional (physiology). These two parts consist of several body systems. These body systems consist of many organs. Each organ is composed of tissues and cells.

What are tissues and cells? A group of similar cells form a tissue which has a specific function.

TABLE 4.2 TISSUES AND THEIR FUNCTIONS

Type of tissue	Functions
Epithelial	- Forms boundary tissue membranes. - Covers the outside surface of the body and the organs inside the body, e.g., mucosal membrane and skin cells.
Connective	- Supporting tissue such as bone, cartilage and connective tissue.
Nerve	- Brain and spinal cord. Responds to stimulation; transmits impulses or messages.
Muscle	- Smooth muscle forms the intestine and blood vessel walls. Straited or cross striped forms the skeletal muscles.

Each person is made up many types of tissues and each tissue is made up of many cells of a similar kind. A cell is the smallest functioning unit in the body. All the body's activities occur within cells.

So far we have attempted to describe the structural and functional organization of the human body. In doing so, the individual was first viewed as a complex whole and then the parts were identified. One way of viewing individual from the cell to the complete human being is by comparing the body to a house as shown in figure 4.2.

It is important to remember that a cell is the smallest functioning unit of the body. A group of similar cells make up tissue, a group of similar or different tissues make up an organ, a number of organs make up a system and a combination of all systems working together make the human body.

From this it should be obvious that an individual is a very complexly organized unit and is very difficult to study and understand. A great deal is known about the biological component, but the same cannot be said about the psychological and social components.

Now that you have some general understanding of the structure and function of the human body, let us look at each of the systems separately and try to learn more details about them. The reproductive system will be covered in Chapter 6.

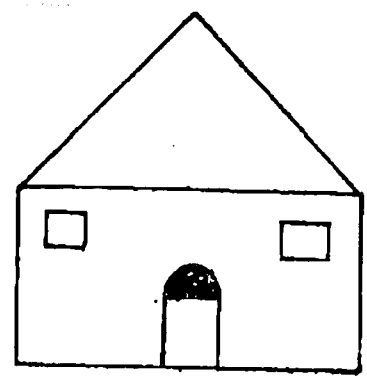
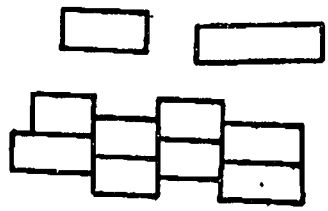


Fig. 4.1 *A person is a complex of many parts.* *A house is also a complex unit.*

A MAN/WOMAN **A HOUSE**

Cells

Tissues



Bricks

Structural foundation

Organs: heart, lungs, stomach, etc

A human being is composed of the following systems:

Nervous
Digestive
Respiratory
Excretory
Reproductive

Pipes, wires, windows and doors

A house is composed of the following systems:

Water
Sewerage
Electric
Telephone
Rooms for sleeping, eating, visiting, bathing.

Fig. 4.2 Comparing the body to a house.

4.2 THE MUSCULO-SKELETAL SYSTEM

This system really covers two systems, the skeletal system comprised of the bones of the body, and the muscular system involving the muscles. These systems work together to make it possible for our bodies to work and for us to move about.

There are over 200 bones which make up the frame of the body. This framework of bones is called the skeletal system and is composed of joints as well.

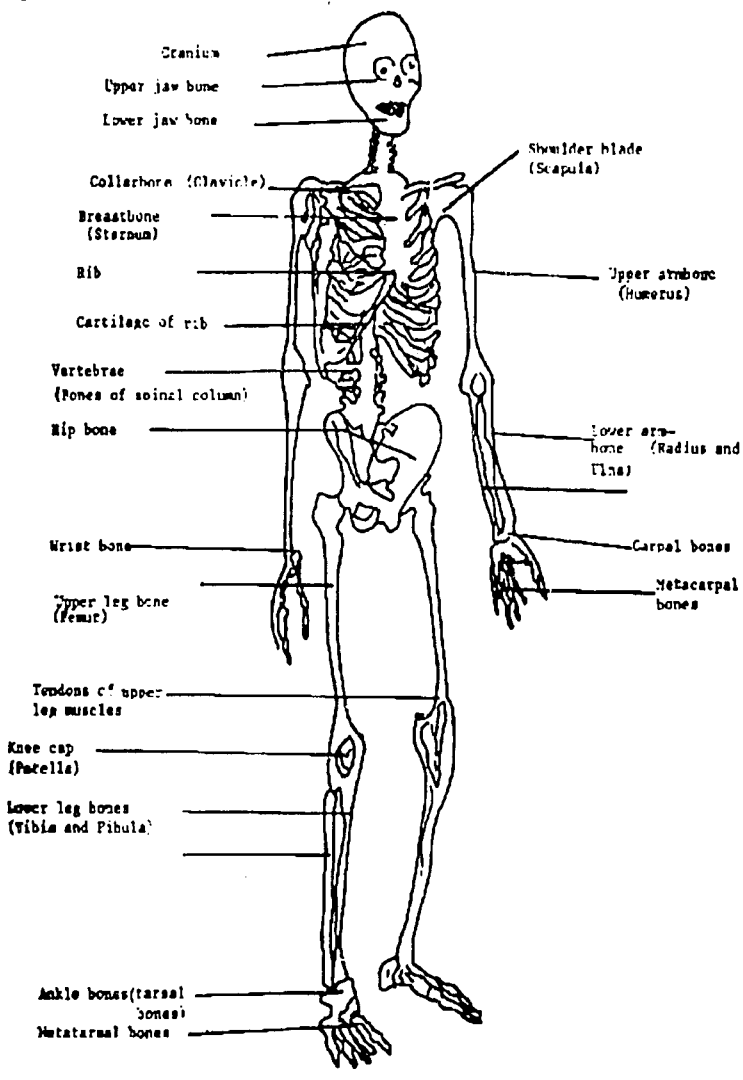


Fig. 4.3 The bones of the body.

BONES

The skull. The skull is made up of the flat bones that protect the brain, and the bones of the face and jaw. The structure of the facial bones gives each person his unique facial appearance.

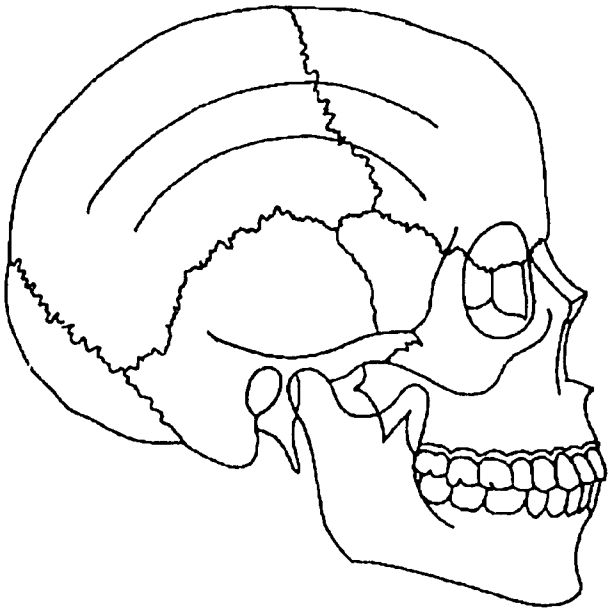


Fig. 4.4 The skull.

The spine. The spinal column, or the backbone, is made up of small irregular bones called vertebrae. Strong fibres or ligaments join the vertebrae to protect the spinal cord and support the back. Each space between the vertebrae is filled with tissue that is softer than bone. This tissue is called a disc. The discs cushion the vertebrae and absorb shock.

Sometimes a disc deteriorates and breaks down. A damaged disc may protrude from between the vertebrae and press on the spinal nerves. This pressure causes severe pain or paralysis.

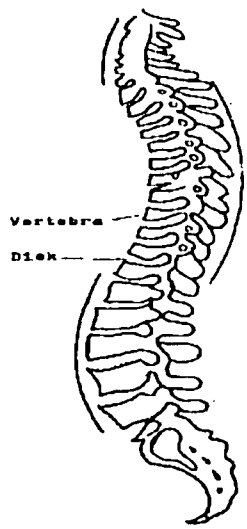


Fig. 4.5 The spinal column.

The shoulder. The shoulder is made up of the scapula and the clavicle. The scapula, or shoulder blade, is located behind the ribs. The clavicle, or collar bone, extends from the breastbone out toward the shoulder to meet the scapula.

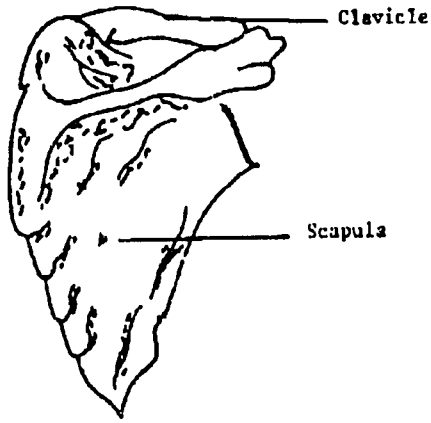


Fig. 4.6 The shoulder.

The arms. Each arm has two parts. The upper arm contains one large bone called the humerus. The humerus extends from the shoulder to the elbow. The lower arm contains the ulna and the radius. These two bones extend from the elbow to the wrist. They form the forearm.

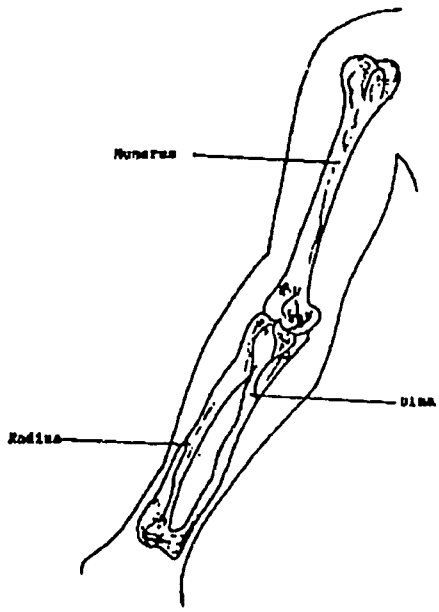


Fig. 4.7 The arm.

The hand. The wrist has eight bones called carpal bones. Attached to the carpal bones are the metacarpal bones that form the hands. The thumb is made up of two small bones called phalanges. The other fingers have three phalanges each.

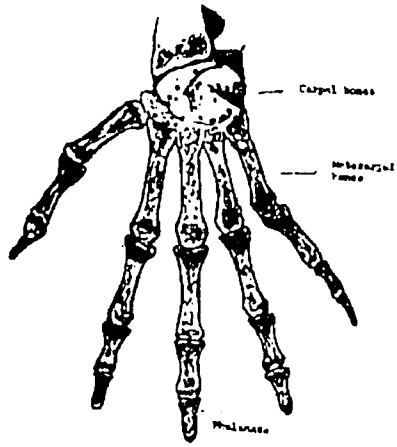


Fig. 4.8 The hand.

The ribs and sternum. The ribs (costae) are twelve pairs of narrow curved bones in the chest. The twelve ribs on each side are attached to the spine in the back. The ten upper ribs are attached to the sternum or breastbone in the front. The two lower ribs are free, or floating, in that they are not attached in the front to the sternum.

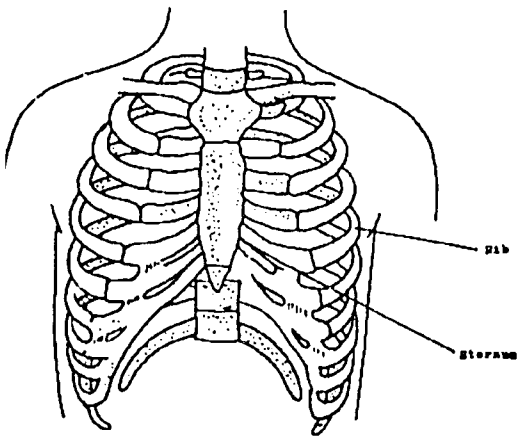


Fig. 4.9 The ribs and sternum.

The pelvis. The pelvis is a ring of bones in the lower trunk that supports the spinal column and rests on the legs. The pelvis consists of two pelvic bones joined by the sacral vertebrae in the back and by the symphysis pubis in the front.

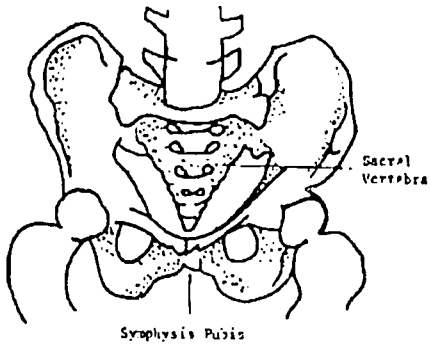


Fig. 4.10 The pelvis.

The leg. The leg has three parts. The upper leg contains one large bone called the femur. The femur fits into the pelvic bone and extends to the knee.

The lower leg contains the tibia (sometimes called the shin bone) and the fibula. At the upper end, the tibia forms part of the knee. At the lower end, both the tibia and the fibula extend to the ankle.

The patella is a small bone that forms the front part of the knee. The patella protects the knee joint.

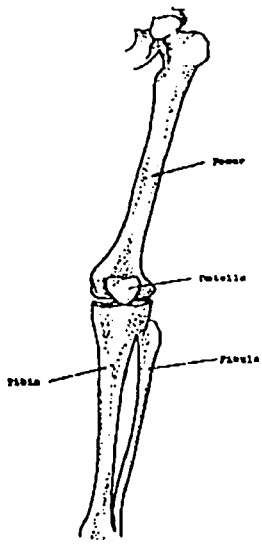


Fig. 4.11 The leg.

The foot. Seven tarsal bones make up the ankle. Attached to the tarsal bones are the metatarsals that make up the foot. Attached to the metatarsals are the phalanges of the toes. Two phalanges form the big toe. The other four toes have three phalanges each.

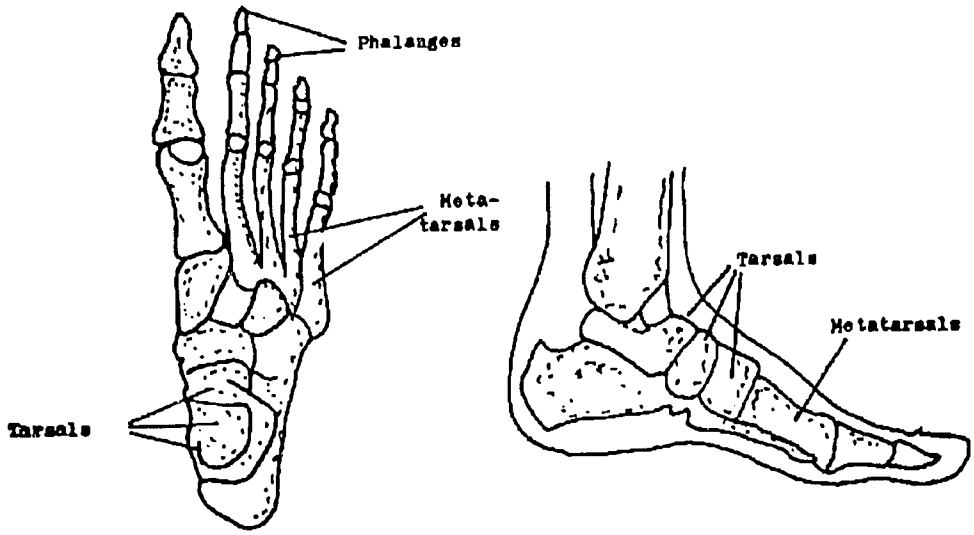


Fig. 4.12 The foot.

Joints. Joints are formed when two bones come into contact with each other. There are two types of joints, those that move and those that are immovable.

Movable joints. These joints allow us to turn our heads, move our hands, fingers and toes and raise and bend our arms, hips and knees. When bones come together a joint is formed. Strong fibres called ligaments extend over the bones and hold them in contact with each other but still allow movement. There are three types of movable joints: the ball and socket, the hinge and the pivot. Examples of these three types are illustrated as follows:

Ball and socket joints. These work somewhat like the socket of a pen holder and move up, down and in a circle. The hip and shoulder joint are of this type.

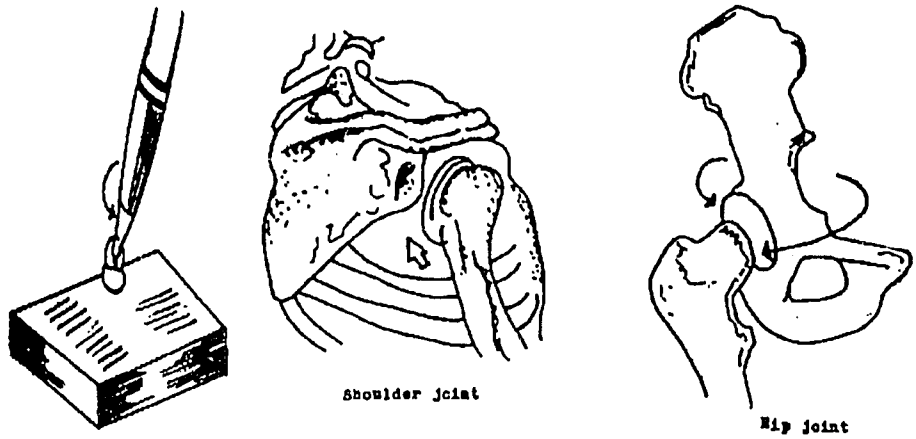


Fig. 4.13 Ball and socket joints.

Hinge joints. These joints move like the hinges of a door. A hinge joint allows for bending and stretching or up and down movement. The knees, elbows, fingers and toes have hinge joints.

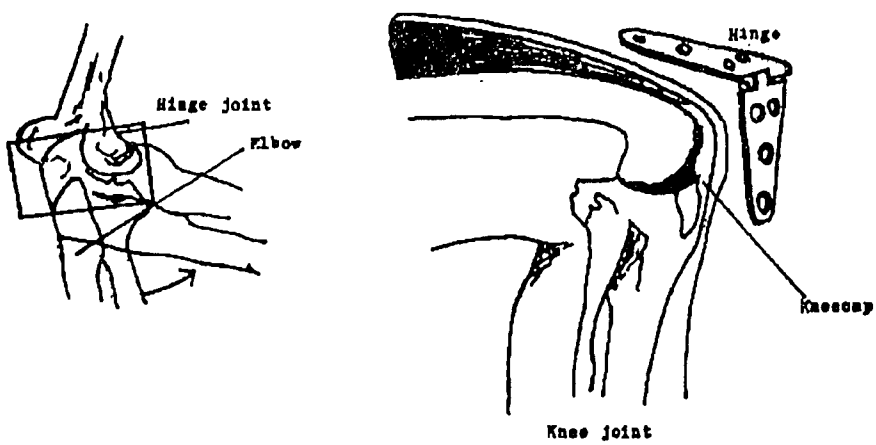


Fig. 4.14 Hinge joints.

Pivot joints. Pivot joints are in the neck and elbows. This type of joint allows one bone to rotate on another.

Gliding joints. These are pivot joints that allow the bones to glide in several directions. The wrists and ankles have gliding joints.

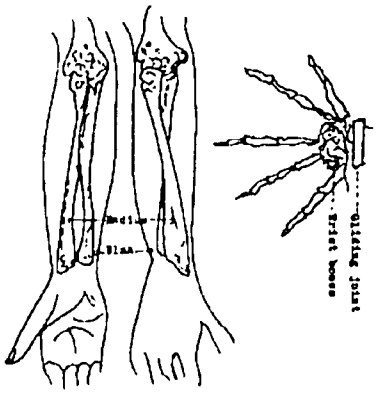


Fig. 4.15 Pivot joints.

Joints that are not movable. Some joints, such as the joints that hold the skull together, do not move at all. These joints are stronger than either movable or partly movable joints.

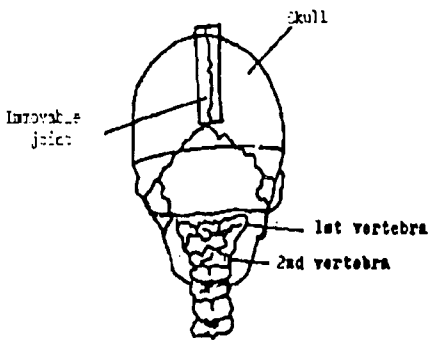


Fig. 4.16 Immovable joints.

The more a joint is able to move, the greater the chance of injury or damage. Movable joints have the greatest range of movement but are at the greatest risk of injury, damage and disease.

The fontanelles. The bones of an infant's skull are joined by narrow membranous spaces called fontanelles. The fontanelles allow the bones of an infant's skull to move. Movement of the bones allows the infant's head to pass more easily through the narrow birth canal during delivery. Movement also allows the skull to expand as the child's brain grows. The two main fontanelles are the anterior and the posterior fontanelles.

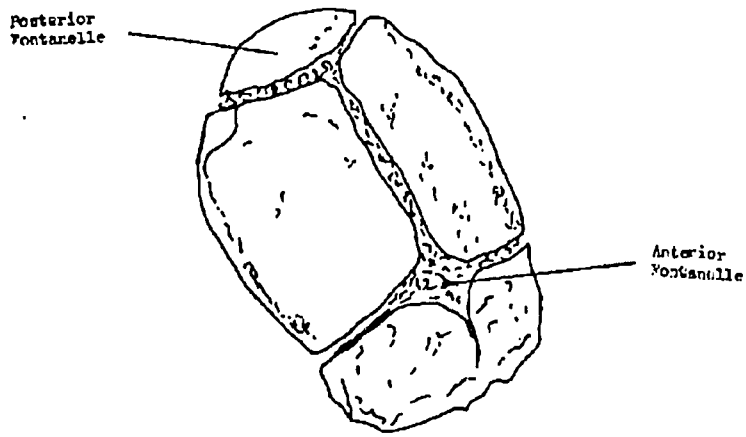


Fig. 4.17 The fontanelles.

The fontanelles are soft for the first few months of life. The posterior fontanelle closes at about two to four months of age. The anterior fontanelle closes at about nine to eighteen months of age.

The fontanelles provide a useful sign of disease in infants. For example, meningitis or bleeding into the brain increases the pressure in the skull. Increased pressure in the skull makes the fontanelles bulge out.

Dehydration, loss of body fluids, causes the fontanelles to sink in.

MUSCLES

How the muscles of the body work. A muscle is made up of tissues or fibres that contract or expand causing movement. Bones depend on skeletal muscle for movement. These muscles are called voluntary muscles because the person controls the movement. The movement of the arms, legs, spine and head are controlled by the skeletal muscles.

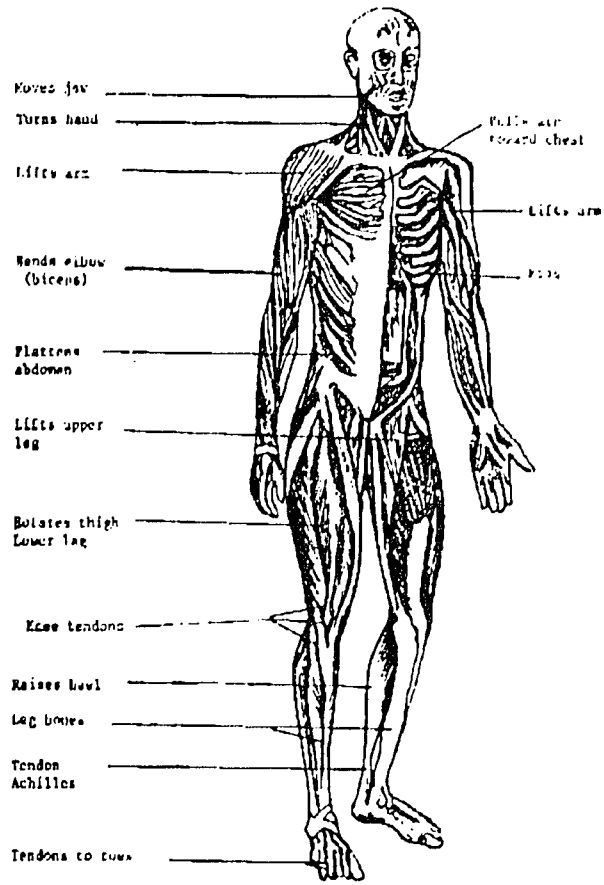


Fig. 4.18 The muscles of the body.

Why do Health Technicians need to learn about the musculo-skeletal system? When the bones and muscles of our body are healthy and working well, then it is possible for us to move from place to place, to hold and use tools and participate in various activities. As Health Technicians, you need to know what the normal structure and functioning of the body is so that you are quick to detect any deviation from the norm. In this way you will be able to help people at an early stage of their illness.

How can Health Technicians detect deviations from normal? This can be done by observing a person's movement. If the person moves easily and accomplishes all of the desired activities, then he or she is functioning normally. But if the person complains or you observe one or more of the following, this indicates a need for further evaluation of the musculo-skeletal system to determine the problem:

- Stiffness.
- Weakness in movement.
- Swelling.
- Pain.
- Deformity.
- Difficulty in any activity.

4.3 THE CIRCULATORY SYSTEM

The circulatory system moves the blood to and from the cells. This system includes the heart and a series of tubes called blood vessels. There are two ways that blood flows through the body. One way is the pulmonary circulation and the other is the systemic circulation.

The pulmonary system carries the blood to the lungs for the oxygen-carbon dioxide exchange. The systemic system carries blood to the entire body.

The systemic system. The purpose of the systemic circulation is to carry oxygen and nutritive materials to the cells and tissues of the body and to collect their waste products. In this system blood circulates from the left side of the heart to the toes and fingers as well as to the brain and heart tissues.

Blood in the capillaries picks up the waste product carbon dioxide from the cells and tissues. Veins return the blood to the heart. Blood filled with carbon dioxide enters the upper right chamber of the heart, the right atrium. The right atrium contracts sending the blood into the lower right chamber, the right ventricle.

The pulmonary system. The pulmonary artery carries the blood to the capillaries of the lungs. In the lungs the blood gives up carbon dioxide and picks up oxygen. The pulmonary veins bring blood filled with oxygen back from the lungs to upper left chamber of the heart, the left atrium. The left atrium contracts and forces the blood into the left ventricle. Contraction of the left ventricle forces the blood into the arteries. The arteries of the systemic system carry the blood to the capillaries of all the body tissues. The blood brings oxygen and nutrients to the tissues and carries away carbon dioxide.

In this way, all the blood that is returned to the right side of the heart from the body tissues is sent to the lungs, where it picks up oxygen and eliminates carbon dioxide, before being pumped back to the body tissues by the left side of the heart. The flow of blood from the right side of the heart through the lungs to the left side of the heart is the pulmonary circulation that exchanges oxygen and carbon dioxide. The flow of blood from the left side of the heart to the body tissues to the right side of the heart for nutrient-waste exchange is called the systemic circulation.

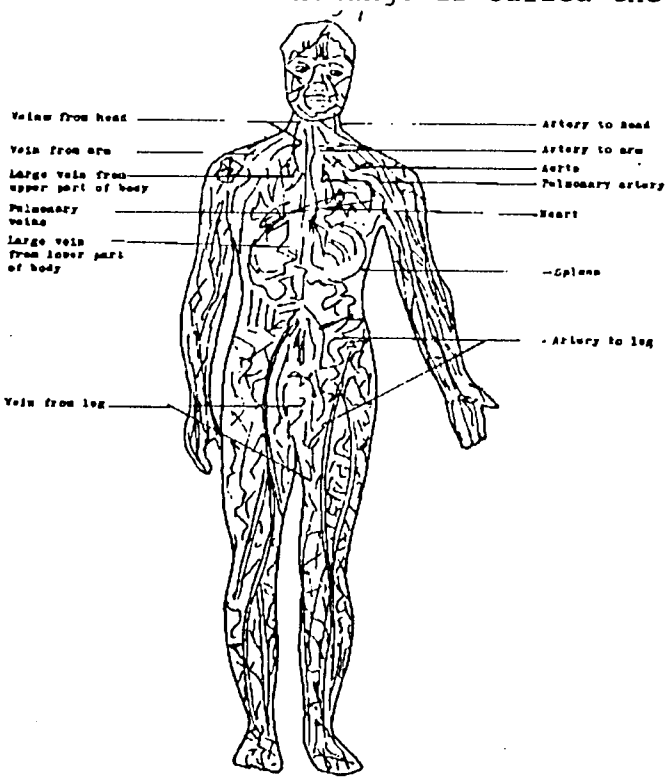


Fig. 4.19 The circulatory system.

The blood vessels. Blood flows through tubes called blood vessels. There are three kinds of blood vessels, the arteries, veins and capillaries.

Arteries carry blood away from the heart. The pressure of the blood inside the arteries is high. The walls of the arteries are thick and muscular to withstand the high pressure. Blood spurts out when an artery is cut.

Veins return blood to the heart. Veins are thin walled blood vessels. The pressure inside the veins is low. Blood does not spurt out when a vein is cut.

Capillaries are very small blood vessels that connect arterioles (the smallest arteries) to venules (the smallest veins). Capillaries have very thin walls. The pressure inside the capillaries is low. The capillary wall is the barrier between the blood in the vessels and the rest of the body. Red blood cells, plasma proteins and other large substances stay in the capillaries. Water, oxygen, carbon dioxide and nutrients can pass freely through the thin walls. Normally, the proteins in the plasma keep water inside the capillaries. Water leaks out when capillaries are injured or when plasma proteins are low. Then water builds up in the tissues, causing oedema.

Another cause of oedema, or swelling of the tissues from water, is the increased permeability of the capillary walls due to venous obstruction. Oedema may also occur with heart failure and lymphatic obstruction as well as when there is a reduction in plasma proteins and capillary injury.

The heart is a pump made up of many muscles. The muscles of the heart contract to pump blood through the body. The heart is located in the chest between the lungs and behind the breastbone. The lower part of the heart reaches into the left side of the chest under the third, fourth and fifth ribs.

The function of the heart. The heart is a pump driving blood through the circulatory system to all parts of the body. It is a double pump, each side being distinct from the other. The left side pumps the bright red reoxygenated blood to different body parts. The right side pumps the dark purplish unoxygenated blood to the lungs where it gives up carbon dioxide and takes on oxygen.

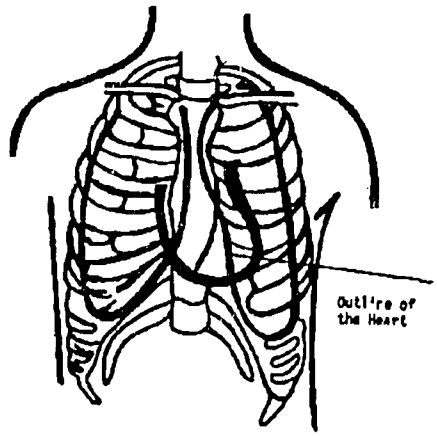


Fig. 4.20 Outline of the heart.

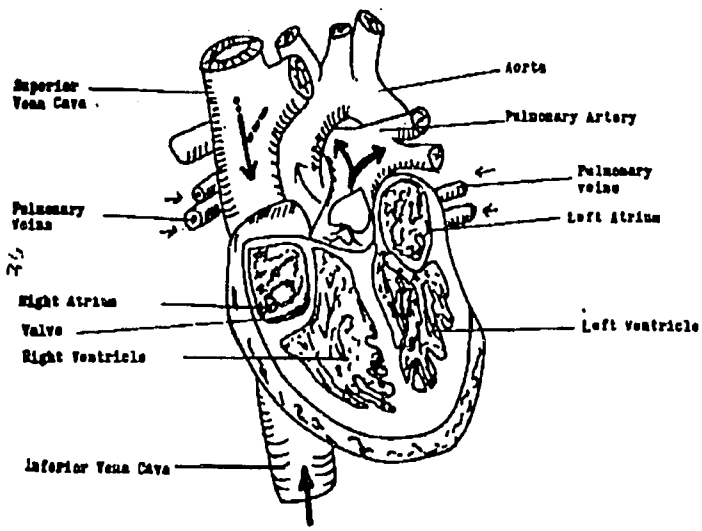


Fig. 4.21 Anatomy of the heart.

The structure of the heart. A muscular wall divides the heart into a right and left half. Each half is divided into two areas or chambers. The lower chambers are the ventricles. The upper chambers are the atria.

Heart sounds. Heart sounds result from the closing of the four valves of the heart. You hear heart sounds with a stethoscope. The first heart sound is the closing of the valves between the atria and the ventricles (the mitral and tricuspid valves) as the ventricles contract. The second heart sound is the closing of the pulmonary and aortic valves (valves between the ventricles and the aorta and pulmonary artery) as the ventricles relax. Together the two create a "lub-dub" sound. This is the sound of your heart, or the heart sounds.

Pulse. Blood in the systemic circulation is under high pressure when it leaves the heart. Waves of pressure spread along all the arteries each time the heart contracts. These waves of pressure are called collectively the pulse. The pulse depends on the rate of the heart beat and on the volume of blood that the heart pumps out with each contraction. The pause between pulses occurs when the ventricles relax. You can feel the pulse at different points on the body called pulse points.

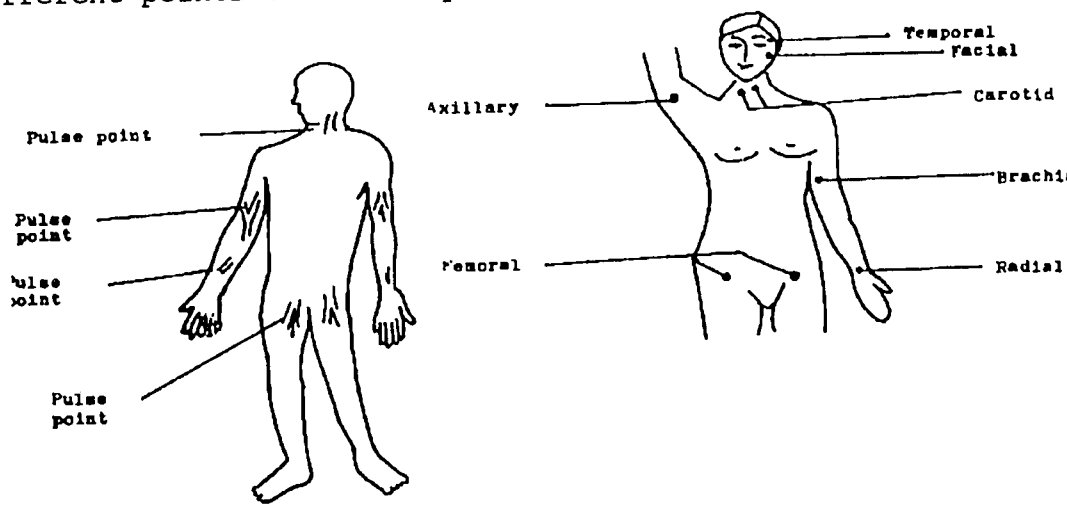


Fig. 4.22 The pulse points.

4.4 BLOOD COMPONENTS

Blood is made up of:

- Red cells
- White cells
- Platelets
- Plasma

Red blood cells. These cells are manufactured in the marrow of the bones. The spleen and liver are also involved in producing red blood cells. Red blood cells are round and very small. They can pass easily through the smallest blood vessel. They are constantly made and destroyed. The average red blood cell lives for about four months. Red blood cells contain a substance called haemoglobin that carries oxygen from the lungs to the cells and tissues of the body. The oxygen in the haemoglobin makes the blood red. Carbon dioxide combines with water in the red blood cells and is carried from the body to the lungs.

A lack of normal numbers of red blood cells or haemoglobin in the blood results in a disease called anaemia. One cause of anaemia is a lack of iron in the diet. The body needs iron to produce haemoglobin.

White blood cells. White blood cells are the disease fighting cells. White blood cells help protect the body against disease-causing organisms such as bacteria, viruses and parasites. Some white blood cells surround and digest disease-causing organisms in the body while others make substances called antibodies that kill or destroy the organisms. White cells are made in bones and lymph nodes.

Platelets. Platelets are cells without a nucleus which help the blood to clot. The blood clots to stop bleeding when a blood vessel is cut.

Plasma. Plasma, or serum, is the liquid part of the blood. Plasma consists of water, proteins, nutrients and waste products. Plasma contains the cells that fight infection and clot the blood.

Haemoglobin. Haemoglobin is the oxygen carrying part of the red blood cells. A normal range is:

Neonate	14-20 Gm/100 ml.
Child	10-12 Gm/100 ml.
Female (adult)	12-16 Gm/100 ml.
Male (adult)	14-18 Gm/100 ml.

4.5 THE LYMPH SYSTEM

The lymph or lymphatic system is similar to the circulatory system in that it has large and small vessels and capillaries. The function of the lymph system is to carry fluid from the tissues to the veins where the fluid is mixed with blood. Tissue fluid surrounds the cells of the body and moves through the walls of the lymphatic system carrying the waste products of the cells into the circulatory system.

An infection in the body produces many dead cells. When the lymph glands remove large numbers of these dead cells the glands become swollen. The spleen, which is located in the upper left side of the abdomen, helps clear away dead cells and bacteria from the blood.

Each of the lymph glands removes dead cells and bacteria from a particular area of the body as well as the area surrounding the gland. For example, the inguinal lymph glands in the groin drain the leg and groin area.

As part of the physical exam all lymph glands must be felt with the hands for swelling or tenderness.

A swollen lymph gland is an indication of some kind of infection in the body and should be referred to the Medical Officer for diagnosis and treatment.

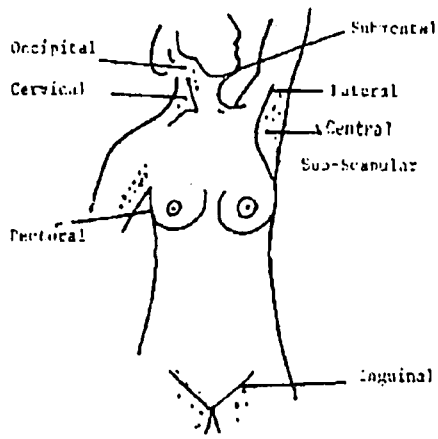


Fig. 4.23 The lymph glands.

4.6 THE RESPIRATORY SYSTEM

The function of the respiratory system is to supply the cells of the body with oxygen and to rid them of carbon dioxide. Cells need a constant supply of oxygen to live and grow. As the cells use oxygen they produce a harmful waste product called carbon dioxide. Through breathing, the respiratory system obtains oxygen from the outside air, brings oxygen to the blood and takes away carbon dioxide. Respiration also helps to regulate body temperature.

The respiratory system begins at the nose and the mouth. Air filled with oxygen enters the nose or mouth with each breath. The air flows to the back of throat past the larynx or voice box, down the wind pipe or trachea which branches into two large tubes called the bronchi. The bronchi carry the air into the left and right lungs. In the lungs, the bronchi form smaller branches called bronchial tubes which further divide into bronchioles.

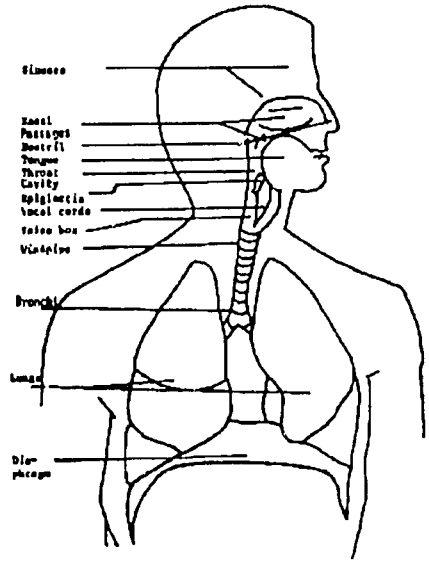


Fig. 4.24 The respiratory system.

The bronchioles carry air to thousands of tiny sacs, called alveoli, which make up the lungs. Small blood vessels, called capillaries, surround each group of alveoli. Oxygen passes through the walls of the alveoli and the walls of the capillaries into the blood where it attaches to the haemoglobin in the red blood cells.

Red blood cells carry the oxygen to the other cells of the body. The cells use the oxygen and excrete carbon dioxide. Red blood cells pick up the carbon dioxide and travel back to the lungs. The red blood cells release the carbon dioxide through the capillaries to the alveoli. Breathing out rids the blood of the carbon dioxide. Breathing in brings air containing oxygen into the body.

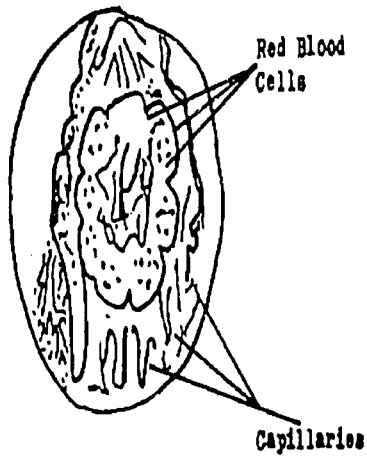


Fig. 4.25 Gas exchange in the alveoli.

The structures of the respiratory system provide a pathway for air to enter and leave the body. They also ensure that the air that reaches the lungs is warm, clean and moist. The nose and mouth warm the air. The mucous membranes of the nose, mouth, throat and sinuses clean and moisten the air. The trachea, bronchi and bronchioles are lined with tiny, hair-like structures that push mucous and dirt particles out of the airways toward the nose and mouth. Coughing or blowing the nose forces these particles out. When a respiratory system infection develops, the trachea, bronchi and bronchioles produce more mucous to fight the infection. The mucous may become thick and cloudy. It may contain blood. This thick mucous is called sputum.

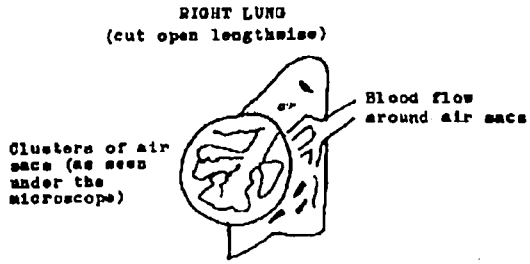


Fig. 4.26 Cross-section of the right lung.

Inspiration and expiration. Breathing in is called inspiration. Air is drawn in when the lungs expand. The diaphragm and the muscles between the ribs expand the lungs. The diaphragm is a flat muscle that lies just below the lungs. When the diaphragm pulls down, the lungs expand. The ribs pull out when the muscles between the ribs contract. The chest grows larger, causing the lungs to fill with air. Blowing air out is called expiration. Air is forced out of the lungs when the diaphragm lifts up and the muscles between the ribs relax. The chest shrinks, causing the lungs to force air out.

The space between the lungs and the wall of the chest is called the pleural space. The pleural space gives the lungs enough room to get bigger and then smaller during inspiration and expiration. The pleural space is lined with a membrane called the pleura. Inflammation can cause the pleural space to fill up with cellular fluid making breathing painful and difficult (pleurisy).

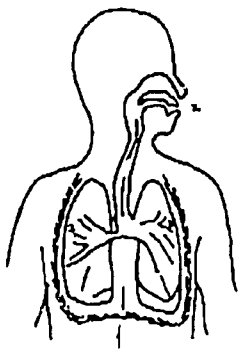


Fig. 4.27 Inspiration: When the diaphragm moves down, air is sucked in and the lungs expand.

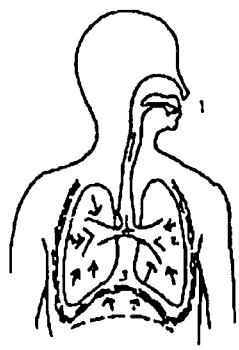


Fig. 4.28 Expiration. When the diaphragm lifts up, air is forced out of the lungs.

Structures of the chest. The chest extends from the bottom of the neck to the lower edge of the ribs. Most of the respiratory system is enclosed in the bony structures of the chest.

The sternum, or breastbone, is in the center of the front of the chest. The twelve pairs of ribs form most of the front, sides and back of the chest. The spaces between the ribs are called the intercostal spaces. You can hear the heart and breath sounds in these spaces with your stethoscope. The scapulae, or shoulder blades, lie over the upper back part of the chest. They cover the outer parts of the upper ribs. The clavicles, or collar bones, extend from the upper breastbone to the scapulae at either side. The clavicles lie over the first ribs.

These landmarks will help you locate the structures and organs that are located within the chest.

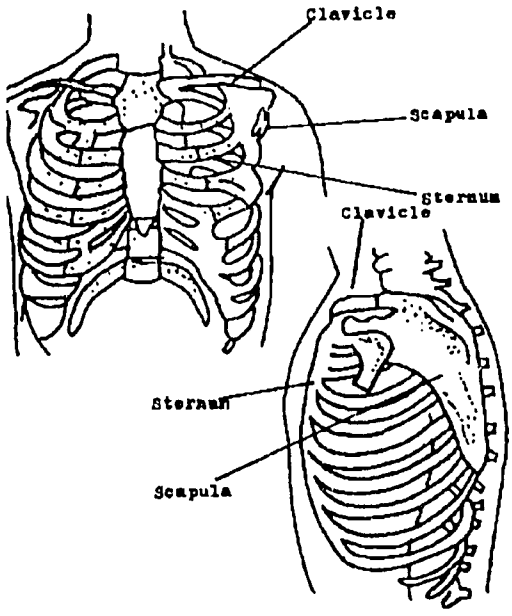


Fig. 4.29 The structure of the chest.

Sinuses. The sinuses are air pockets in the bones of the face that connect with the inside of the nose.

The two main pairs of sinuses are the frontal and maxillary sinuses. The frontal sinuses are located above the nose between the eyes. The maxillary sinuses are located on either side of the nose.

Infection can spread quickly from the nose to the sinuses. The sinuses become filled with fluid. Fluid trapped in the sinuses causes severe pain and runny nose and may affect the quality of the voice.

4.7 THE DIGESTIVE SYSTEM

The digestive system has three main functions:

- Digestion
- Absorption
- Elimination

Digestion. The cells of the body need food to live and multiply but the cells cannot use the food until it is broken down into substances called nutrients. The breaking down of food is called digestion. The digestive system changes food into substances the cells can use.

Absorption. The digestive system moves digested food from the digestive tract to the blood, allowing the passage of nutrients to the cells. This process is called absorption.

Elimination. The digestive system rids the body of undigested food and waste. This is called elimination.

The digestive system consists of a long tube that begins at the mouth and ends at the anus. This tube is called the digestive tract. The digestive system also includes the organs that help the digestive system work.

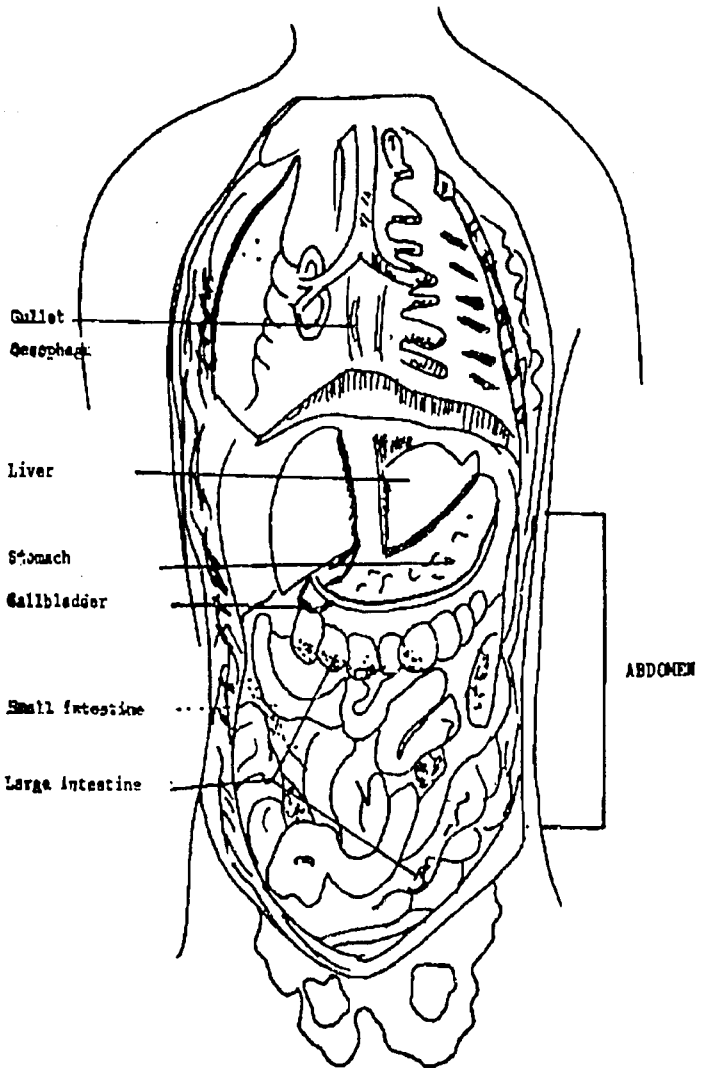


Fig. 4.30 The digestive system.

Organs of the digestive system:

Mouth. The mouth consists of the lips, cheeks, tongue, salivary glands and teeth. The hard and soft palates form the roof of the mouth. Mucous membranes line the entire inside surface of the mouth.

Lips. The lips are fleshy structures that surround the opening to the mouth. They help bring food into the mouth and hold the food in place. They also shape the mouth for speaking.

Cheeks. The cheeks are flaps of skin on either side of the mouth. The cheek muscles help in eating.

Tongue. The tongue is attached to the base of the mouth. In the mucous membrane lining of the tongue are the nerve endings for taste. The tongue is the organ for taste. The tongue also moves food around the mouth during chewing. It pushes the food into the throat as a first step in swallowing. It helps shape the mouth for speaking as well.

Salivary glands. There are three pairs of salivary glands. The parotid glands lie below and in front of the ears. The other glands lie below the tongue and on the inner side of the lower jaw.

The salivary glands produce the fluid called saliva. Saliva moistens and softens food and helps keep the mouth moist. The salivary glands also produce chemical substances that help in digestion.

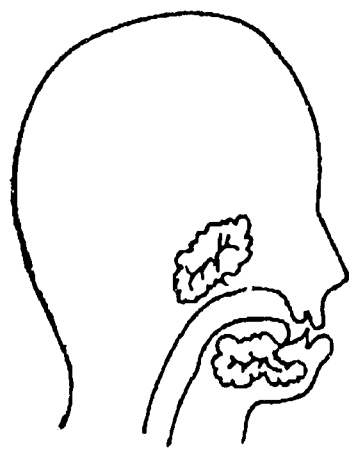


Fig. 4.31 Location of the salivary glands.

Teeth. Teeth are held in sockets in the upper and lower jaws. Soft tissues called gums surround the teeth. The gums cushion the teeth and hold them firmly in place. The gums fall away from the teeth when they are diseased on infected. The teeth then loosen and eventually fall out.

The adult has thirty-two teeth: four incisors, two canines, four bicuspids and six molars in the lower jaw, and the same number in the upper jaw. Young children have a set of twenty teeth which are temporary and are replaced by adult teeth as they grow older. The incisor and canine teeth are located in the front of the mouth. They cut and tear food. The bicuspids and molars are located at the sides and back of the mouth. They grind food.

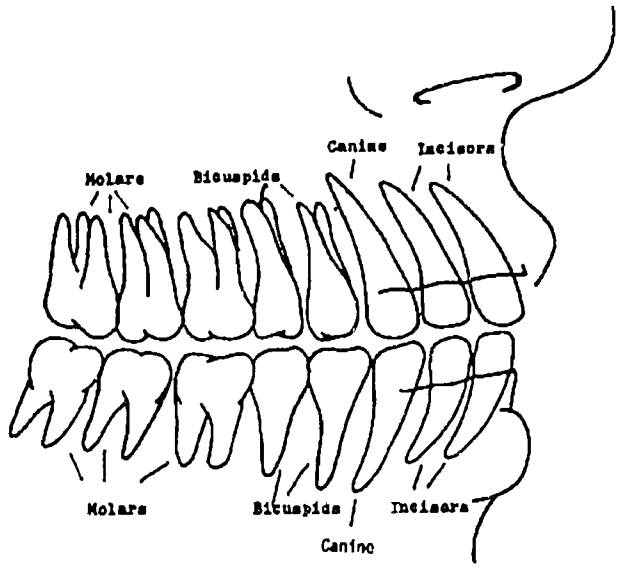


Fig. 4.32 The teeth.

Each tooth has a crown, a neck and a root. The crown is made of hard, white enamel and is the cutting surface. The neck is covered by the soft, fleshy gums. The root is buried in the bone of the jaw. The root contains nerves and blood vessels.

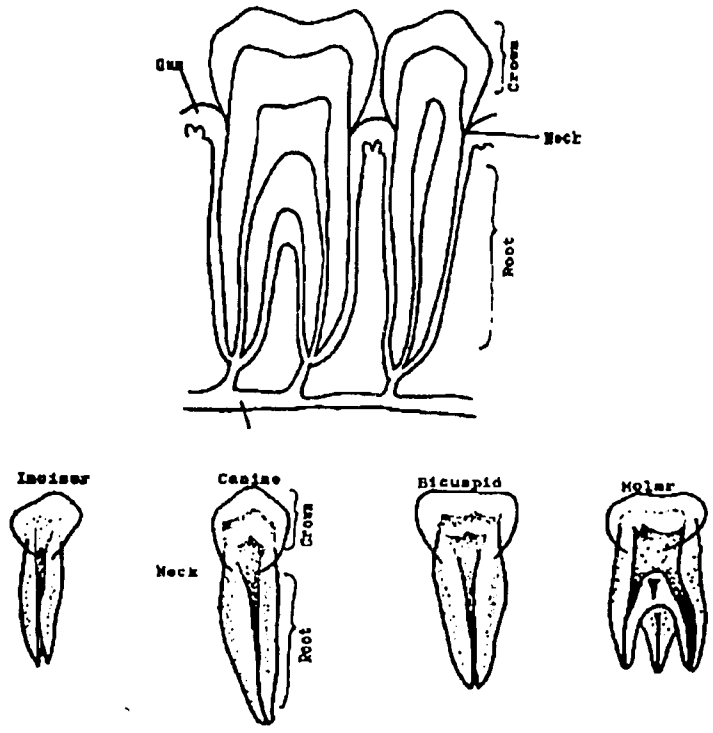


Fig. 4.33 Cross-section of a tooth.

Stomach. After the food has been chewed and moistened with saliva, it is swallowed. Food moves from the back of the mouth to the stomach through the oesophagus. A ring of muscles at the lower end of the oesophagus prevents the food from passing back up again into the mouth.

The stomach is a large sac with strong, muscular walls. The stomach churns and mixes food. The lining of the stomach secretes a strong acid and other chemical substances that help digest food. The acid is strong enough to burn the stomach tissue. This usually does not happen because mucous membranes protect the stomach lining.

Small intestine. After the food has been mixed and broken down in the stomach, it becomes a thick liquid. Contractions push the liquid through a muscular opening in the lower part of the stomach and into the small intestine. The small intestine is a long, thin tube that connects the stomach with the large intestine. Most of the digestion and absorption of food takes place in the small intestine.

Like the lining of the stomach, the lining of the small intestine secretes chemical substances that aid in digestion. Digestive fluids from the pancreas and the liver are added in the small intestine. The lining of the small intestine absorbs water and nutrients into the blood. The muscles of the small intestine contract mixing the food with the fluids and moving the mixture through the intestine.

Liver. Nutrients absorbed into the blood are carried to the liver. The liver changes the nutrients into the chemical substances the body cells need to live and grow. The liver also removes harmful waste products from the blood. When the liver is diseased, the body cells do not get the nutrients that they need. Harmful waste products remain in the blood and affect the entire body. The liver produces a substance called bile which aids in digestion.

Gallbladder. The gallbladder is located on the under surface of the liver and stores the bile secreted by it. The gallbladder empties bile into the upper portion of the small intestine. Bile helps in the digestion of fat particles and the removal of harmful wastes.

Pancreas. The pancreas secretes substances into the small intestine which help in the digestion of carbohydrates. Malfunction of the pancreas leads to diabetes.

The stomach and intestines normally secrete several litres of fluid each day. Most of this fluid is reabsorbed into the blood by the large intestine. Stools therefore, normally contain very little water. Irritated or inflamed intestines move their contents rapidly through the body. If the body does not have time to reabsorb the fluid, the person passes loose, watery stools. When the stool remains in the rectum for too long, it becomes dry and hard. Passing dry, hard stools is difficult. Difficulty in passing stools is called constipation.

Large intestine. Food which cannot be digested or absorbed passes from the small intestine to the large intestine. The large intestine is a tube that extends from the small intestine to the rectum. The diameter of this intestine is larger than the small intestine. The large intestine collects waste products and moves them toward the anus to be eliminated from the body. These products are called feces or stools.

Structure of the abdomen. Most of the organs of the digestive system are located in the abdomen. The abdomen extends from the diaphragm to the pelvic bones. The abdomen can be divided into four areas, called quadrants, by drawing two imaginary lines that cross at the navel. The areas are the right and left upper quadrants and the right and left lower quadrants.

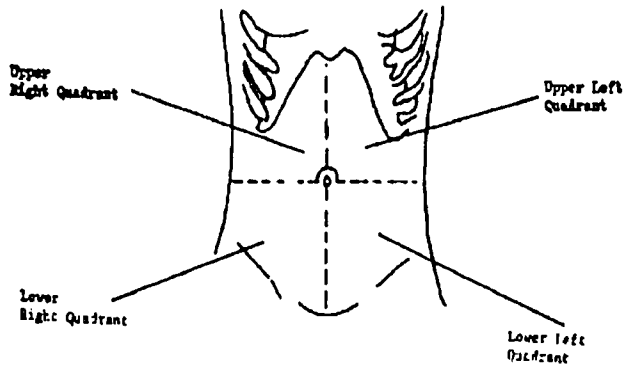


Fig. 4.34 The quadrants of the abdomen.

Other terms are also used to describe the parts of the abdomen. The epigastric area is below the sternum in the middle of the abdomen. Below the epigastric area is the area around the navel, the umbilical area. The area below the umbilical area and above the pubic bones is the suprapubic area.

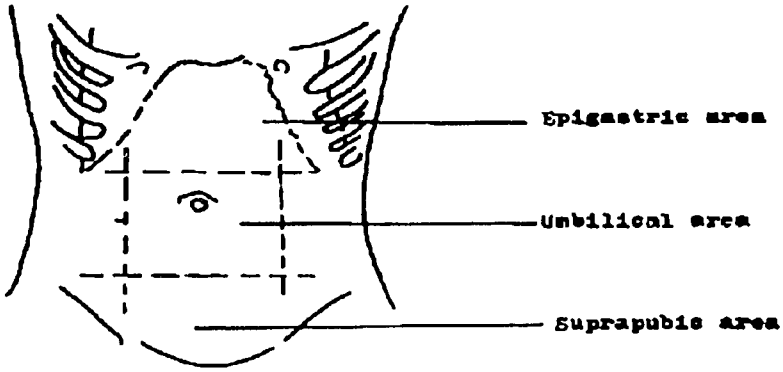


Fig. 4.35 Areas of the abdomen.

The liver lies behind the lower ribs on the right side. The upper edge of the liver is in the space between the sixth and seventh ribs. The lower edge is at the lower end of the ribs. The liver extends slightly beyond the lowest part of the breastbone in the epigastric area.

The stomach is located under the left ribs. The large intestine runs up the right side of the abdomen, across to the left and down to the rectum. The spleen is behind the stomach under the left ribs. The kidneys are located in the back part of the abdomen next to and under the ribs.

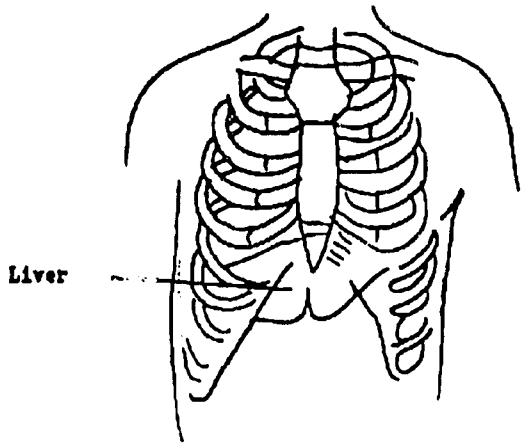


Fig. 4.36 Location of the liver.

4.8 THE EXCRETORY SYSTEM

The excretory system is made up of the sweat glands of the skin as well as the lungs, kidneys, ureter, bladder and intestines. All these structures help remove cell wastes from the blood and from the body.

Removal of cell wastes (excretion) is just as important as breathing, digestion and other life saving processes.

How the lungs rid the body of waste was discussed under the respiratory system. How the digestive system rids the body of waste was discussed under the digestive system while the role of the skin in excretion will be discussed under the section on the skin. This section will concentrate on the urinary system.

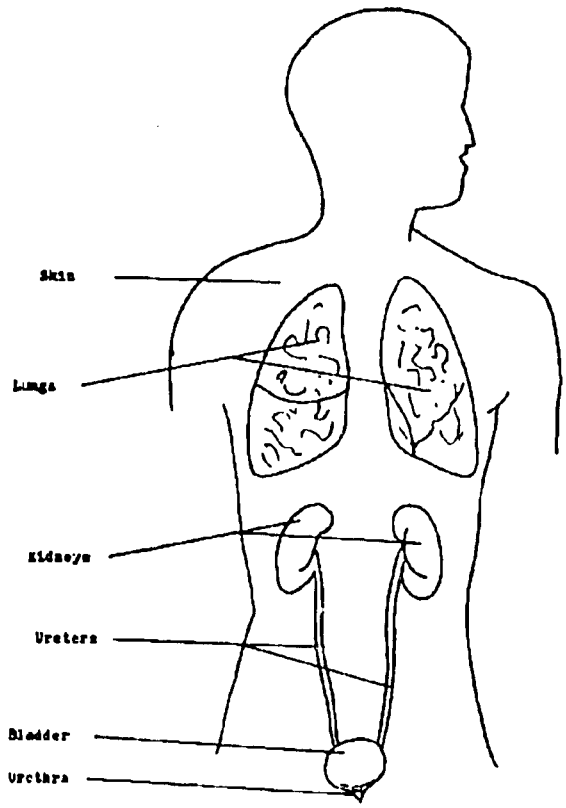


Fig. 4.37 The organs of excretion.

4.9 THE URINARY SYSTEM

The urinary system includes the kidneys, the ureters, the bladder and the urethra. The kidneys are two fist-sized organs located on either side of the spine behind the abdomen. The kidneys collect harmful minerals and excessive fluid from the blood which it eliminates in the form of urine. The other structures in the urinary system transport and store urine before it leaves the body. The function of the urinary system is to rid the body of excessive water and harmful materials.

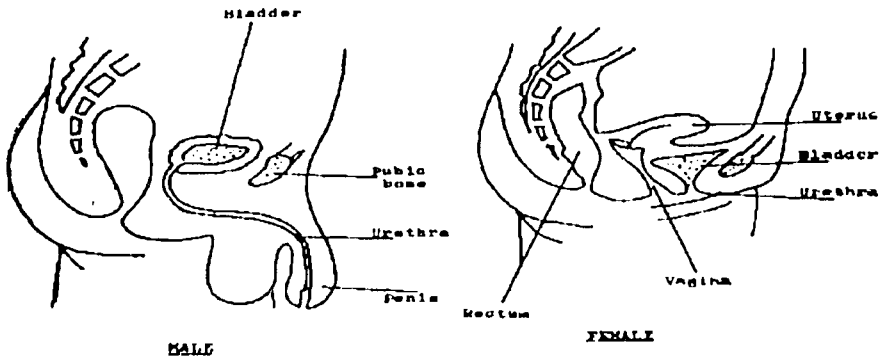


Fig. 4.38 Male and female urinary system.

Production and transport of urine. The kidneys contain thousands of blood vessels, or capillaries. Nearly all of the fluid in the blood passes through the capillaries of the kidneys and collects in small sacs. Connected to each sac is a small kidney tube, or tubule. Most of the water and important minerals pass through the tubules into the veins of the kidneys and back to the

heart. But harmful waste products (mineral salts) from the blood remain in the kidney tubules. In this way, a large volume of blood is cleaned of waste products and poisons.

Just before leaving the kidney, all of the kidney tubules join and empty their waste materials. The resulting fluid, called urine, passes through narrow tubes, or ureters, into the bladder. The bladder is a sac with thick, muscular walls. When the walls of the bladder are stretched by the urine, the nerves in the bladder wall send a signal to the brain. Then the person empties his bladder through a tube-like structure, the urethra, which leads to the outside of the body.

Evaluation of urine. Freshly voided urine should be examined for colour, appearance, specific gravity, protein, sugar and blood.

Normally the colour of urine is light yellow and is clear and transparent.

Deviation from normal Urine is not normal if it is colourless or dark yellow, cloudy or contains pus, blood or any other cells

Also abnormal is a smell of ammonia or a sweet, fruity or bad (rotton) smell.

Note: The colour and smell of urine are also affected by certain foods, drinks and medications.

4.10 THE SKIN

The skin covers the entire outer surface of the body. The skin is made up of two layers, the epidermis and the dermis.

Functions of the skin. The skin has four main functions:

1. **Excretion:** Sweating helps rid the body of waste products. Sweat contains salt and other substances that remain on the skin when the water dries.

2. **Regulation of body temperature:** The thousands of capillaries in the skin help regulate the temperature of the body. When the body temperature rises, the capillaries enlarge. Blood flow to the skin increases, and excess heat is given off. The skin becomes red and feels warm. The capillaries narrow when the body temperature drops. Blood flow to the skin is reduced, and body heat is conserved. The skin becomes pale and feels cold.

When the body temperature rises, the sweat glands also produce more sweat. Sweating uses up excess heat and helps cool the body.

3. **Response to sensation:** Nerve endings in the skin are sensitive to temperature, touch, pressure, pain and changes in position. When the nerves in the skin are destroyed, a person cannot feel heat, cold or pain. He can easily injure himself. A typical example is a leprosy case.

4. **Protection:** The skin covers the body and protects it from injury and infection. The oil produced by the oil glands keeps the skin soft and waterproofs it. Most fluids are unable to pass through the skin. Too little oil dries the skin. Dry, flaky skin becomes infected easily. Too much oil may block the hair follicles and also increase the risk of infection.

The thin, outer layer of the skin is mainly made of dead cells that flake off and are gradually replaced. The nails of the fingers and toes are examples. The nail beds are normally a pinkish colour because they lie above a large number of small blood vessels.

Just below the skin surface is a layer of subcutaneous tissue. Below this tissue is a layer of muscular tissue. These layers, where intradermal, subcutaneous and intramuscular injections are administered, are part of the dermis. It contains all the blood vessels and nerves of the skin as well as parts of the hair, sweat and oil glands. Below this tissue is a layer of muscle tissue.

Hair. Hair grows from small structures called hair follicles in the second skin layer. Disease agents which cannot pass through the skin sometimes lodge in the hair follicles. Skin infections can start this way.

Oil glands. Oil glands are attached to the hair follicles. They help keep the skin soft and moist. Oil glands sometimes cause skin problems during adolescence. The openings of the glands become blocked and infected and red lumps develop on the skin of the face and upper body.

Sweat glands. Opening onto the surface of the skin are tiny tubes that are attached to sweat glands. The sweat glands help regulate the temperature of the body. The sweat glands secrete a fluid, called sweat, which is mostly water and salt.

Blood vessels. Thousands of tiny blood vessels called capillaries are also found in the dermis of the skin. Capillaries bring nutrients to the skin and help regulate body temperature.

Nerves. The skin contains nerves that carry messages about the environment to the spinal cord and the brain. Different nerve endings respond to temperature, touch, pressure, pain and changes in position.

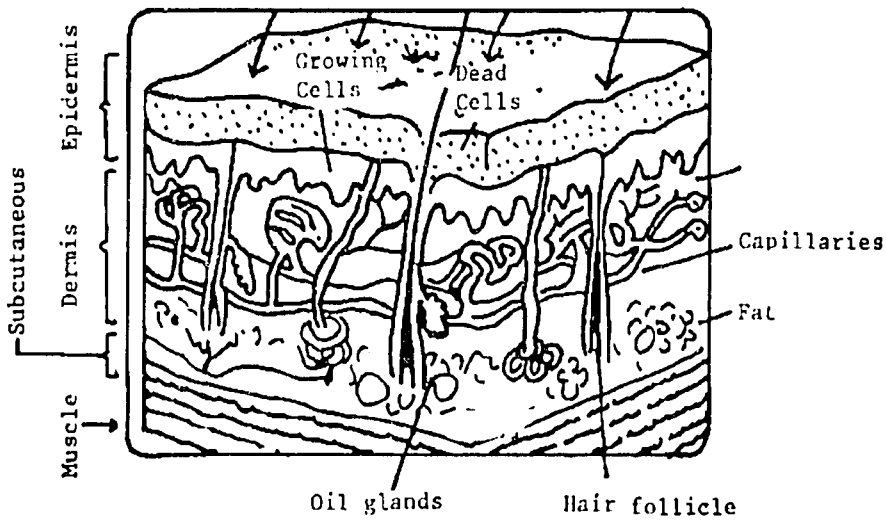


Fig. 4.39 The structure of the skin.

4.11 THE NERVOUS SYSTEM

The nervous system is the body's main communication system. It sends messages to and receives messages from all parts of the body. It also coordinates the functioning of all body organs and systems.

There are two types of nervous systems, the central nervous system and the peripheral nervous system. The central nervous system includes the brain and the spinal cord. The brain and the spinal cord are made up of nerve tissue. The nerve tissue is made up of nerve cells that send and receive messages. The peripheral system is made up of the nerves that carry messages throughout the body back and forth to the brain and spinal cord.

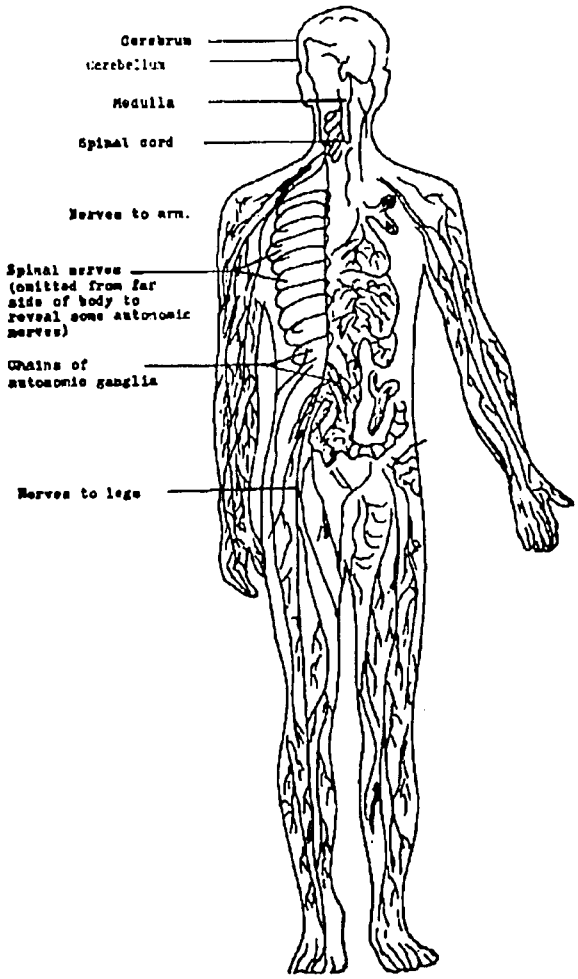


Fig. 4.40 The nervous system.

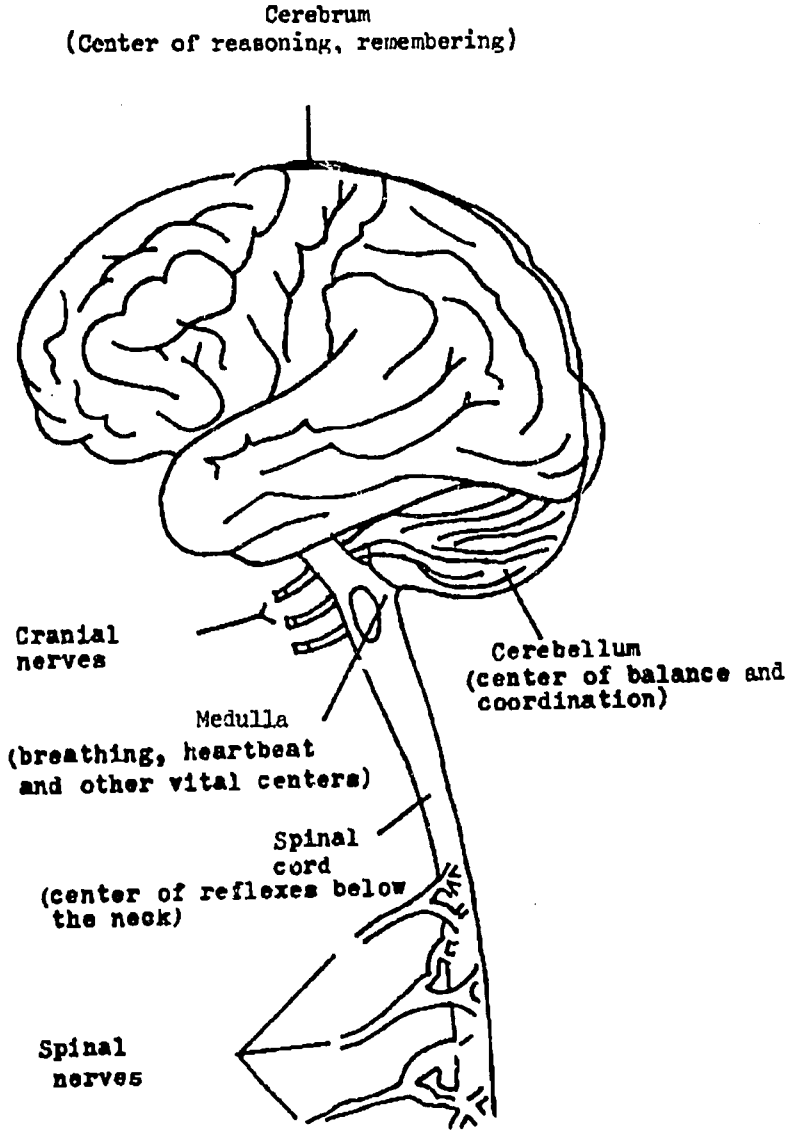


Fig. 4.41 The brain and spinal cord.

The brain. This is a large mass of nerve tissue located inside the skull. The brain is divided into three main parts. One part controls activities such as walking, talking and writing. The second part maintains balance and body coordination. The third part controls the automatic regulation of the body systems. This part of the brain regulates the heart rate, blood pressure, respiratory rate and the automatic functions of the digestive system and other body systems.

The spinal cord. The spinal cord is a long narrow structure that extends from the brain to the lower end of the spine. The spinal cord is an extension of the brain. The vertebrae of the spine protect the spinal cord. Messages from the brain travel along the spinal cord to the nerves of the body and from the nerves of the body back to the brain. The spinal cord also sends messages to the body directly. This is called reflex action.

In addition to being protected by the skull and the vertebrae, the brain and spinal cord are covered by a protective membrane. A fluid is produced in this membrane and this provides further protection. The fluid cushions the brain and the spinal cord against injury. Infection or bleeding can increase the pressure of this fluid. Increased pressure can damage the brain and cause unconsciousness. Unconsciousness is a serious symptom. In infants, increased pressure can make the fontanelles bulge. As was said before, bulging fontanelles are a sign of serious illness in an infant.

The peripheral nervous system. The peripheral nervous system includes two types of nerves that carry messages to and from the brain, the spinal cord and the body. The two types of nerves are called sensory nerves and motor nerves. Sensory nerves carry messages to the brain from the skin and organs of the body. Sensory nerve endings are located throughout the body. Some respond to pain, some to touch and some to vibration.

Motor nerves carry messages from the brain to the muscles and organs of the body. Messages from the motor nerves cause the muscles to contract. If a motor nerve is cut or damaged, messages from the brain cannot reach the muscles. The muscles become weak and lose tone. They can no longer contract. The loss of ability to contract a muscle and the resulting loss of power to move a part of the body is called paralysis.

4.12 THE SENSORY SYSTEM (SPECIAL SENSES)

The sensory system includes the eyes, nose, ears as well as the tongue. These are a part of the nervous system because:

- The eye sends information in the form of impulses to the brain of what it sees.
- The ears provide information to the brain. Sounds travels in waves, and the ear converts them into signals that the brain can understand.
- Special nerve endings in the tongue and nose provide us with ability to taste and smell. These nerve endings are sensitive to substances in the food we eat and in the air. They send the information they receive to the brain where it is interpreted as different tastes and smells.

Organs of the sensory system:

The eye. The eye enables you to see. It is the organ of vision. The eye collects light from objects in the environment. The light passes through the cornea and the pupil to the lens. The lens changes its shape to focus the light. Then the light falls on the retina. Special cells in the retina change the light into sensory impulses that travel along the optic nerve to the brain. In the brain the messages become the things that you see. The ability to see is called vision. Anything that affects the movement and focusing of light will affect vision. For example, the cornea or lens may be clouded. Then light cannot reach the retina. Or, the retina may be damaged. Then sight messages cannot reach the brain.

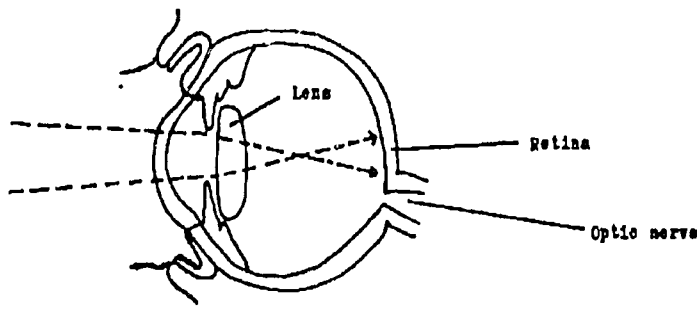


Fig 4.42 The eye.

The eye is a round structure located in a bony hollow in the skull. The eyelid is the fleshy covering of the eye. The eyelid protects the eye from injury. Frequent blinking keeps the eye moist. The eyelid is edged with fine hairs called eyelashes. At the root of the eyelashes are small glands. These glands can become swollen and infected.

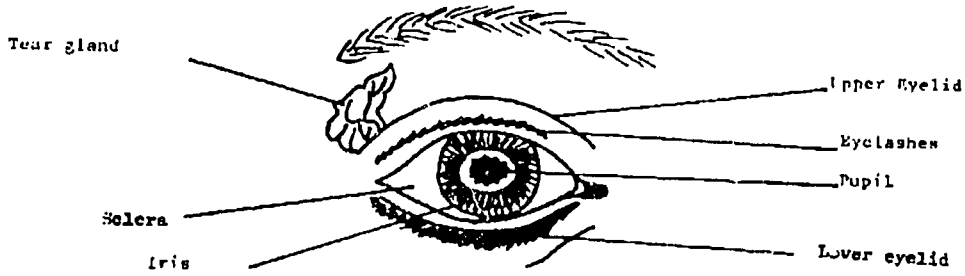


Fig 4.43 The front of the eye.

Glands above the eyes produce tears. Blinking of the eyelids spread tears across the eye. Tears keep the eye moist and clean. Irritation or strain on the eye increases blinking and the production of tears, called tearing.

The eyeball has three layers. The outer layer is the sclera. The sclera is a tough, white membrane that surrounds the eyeball. The middle layer contains the blood vessels. The inner layer is the retina. The retina is a dense mass of special nerves that respond to light and allow you to see.

The conjunctiva is a thin mucous membrane layer that lines the eyelid and covers the front of the sclera. Mucous produced by the conjunctiva allows the eyelid to slide smoothly over the eye. The conjunctiva is normally pink because it is supplied with blood vessels. Pale conjunctiva is a sign of anaemia. Red conjunctiva is a sign of infection or inflammation. The cornea is the clear tissue that covers the front of the eye. The cornea is not supplied with blood vessels. Therefore, the cornea must be kept moist to remain healthy.

The pupil is the small round opening through which light passes into the eye. By changing size, the pupil controls the amount of light that enters the eye. The pupil becomes very large in darkness and very small in bright light. The reaction of the pupil to bright light is called the light reflex. Narrowing of the pupils indicates that the nerve pathways to the brain are working. Damage to the brain can affect the light reflex in one or both eyes. Enlarged pupils that do not react to light may be a sign of serious brain damage. Irregularly shaped pupils may be a sign of an eye injury or infection.

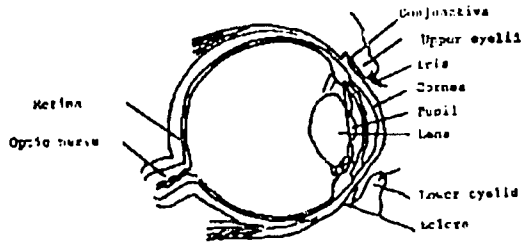


Fig 4.44 The interior of the eye.

The iris is the coloured structure that surrounds the pupil. Contraction and relaxation of the circular muscles of the iris cause the pupils to narrow or widen.

The lens is a small round piece of clear tissue located behind the iris The lens adjusts automatically to allow you to see objects at different distances. People must wear glasses when their lenses do not work properly.

The optic nerve extends from the back of the eye to the brain. The optic nerve carries sight messages from the retina to the brain.

Ears. The ears receive sound messages and send them to the brain. Sound travels in waves. The ears change sound waves into messages that the brain can understand.

The ear is divided into three parts, the outer ear, the middle ear and the inner ear. The outer ear helps to collect sound waves and to direct them down through the ear canals. Sound waves are rapid vibrations transmitted by air. The waves strike the eardrum

which lies at the end of the ear canal. The sound waves cause vibrations in the three tiny bones attached to the eardrum in the middle ear. The movement of these bones stimulates the nerve endings in the inner ear. These endings send nerve messages that travel through large nerves to the brain. In the brain, the messages become the sounds that you hear.

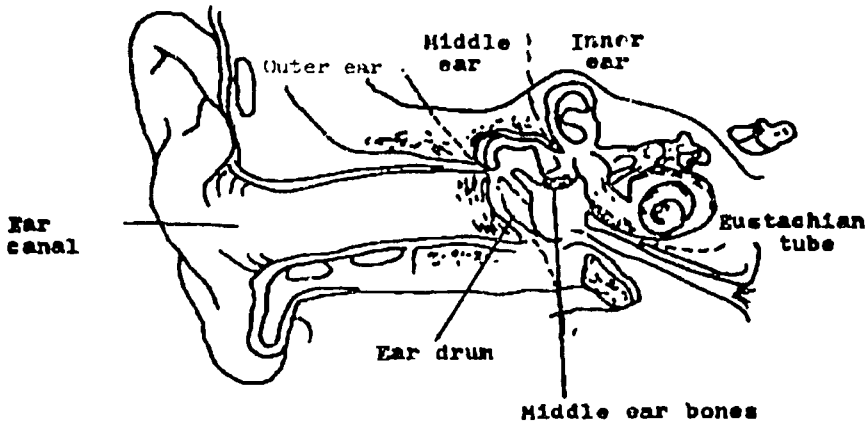


Fig 4.45 The ear.

The walls of the outer ear canals are lined with tiny glands that produce ear wax. The ear canal is also lined with very fine hairs. The hairs gently flush ear wax down the canal and out of the ear. This flushing keeps the ears clean.

The middle ear is small and is filled with air. The walls are covered with a mucous membrane. Air enters the middle ear through the eustachian tube, a small air passageway that extends from the middle ear to the pharynx. The eustachian tube helps keep the pressure in the middle ear equal to the outside pressure. Normally, air passes between the throat and the middle ear through the eustachian tube. But infections can also travel easily from the throat to the middle ear. The mucous membranes that line the eustachian tube can become swollen. Air cannot pass easily through a swollen tube. The increased pressure in the middle ear causes severe pain.

Directly behind each ear lobe is a hollow bone with many air pockets. These are the mastoid bones. The air pockets of the mastoid bones are connected to the middle ear. An infection of the middle ear can spread to the mastoid bones as well.

Nose. The nose is the organ of smell. The nose is divided into right and left nostrils by the nasal septum. The septum is made of bones and cartilage. Mucous membranes line the nasal septum and the inside of the nose. The mucous membranes clean, warm and moisten the air that you breathe. The opening of the nose contains fine hairs that filter out dust.

The mucous membrane lining of the nasal septum has a rich blood supply. In this area of the nose are the nerve endings which are stimulated by odours. Through these nerve endings messages go to the brain which then identifies that smell or odour. An injury to this area can cause severe bleeding or distortion in the sense of smell.

The bony roof of the mouth separates the inside of the nose from the mouth. The inside of the nose leads into the upper part of the throat.

Tongue. The main organ of taste is the tongue. The taste buds on the tongue transmit messages to the brain to distinguish the different tastes: salty, sweet, bitter or sour.

4.13 THE DUCTLESS GLANDS

Ductless glands are those glands that secrete internal chemicals that have a specific action upon the body. Their secretions are called hormones. Some of the common ductless glands are listed below.

Pituitary. This gland affects menstruation and lactation (see Chapter 6). It also regulates the growth of the skeleton.

Thyroid. The secretions of this gland regulate the rates of metabolism and body growth. Deficiency of iodine in the water or food causes enlargement of the thyroid, a condition known as endemic goitre.

Adrenal. This gland produces internal secretions or hormones that are essential to life.

Pancreas. This gland produces secretions that help digestion. Its interior cells produce insulin which regulates sugar metabolism. Insufficient insulin production causes diabetes.

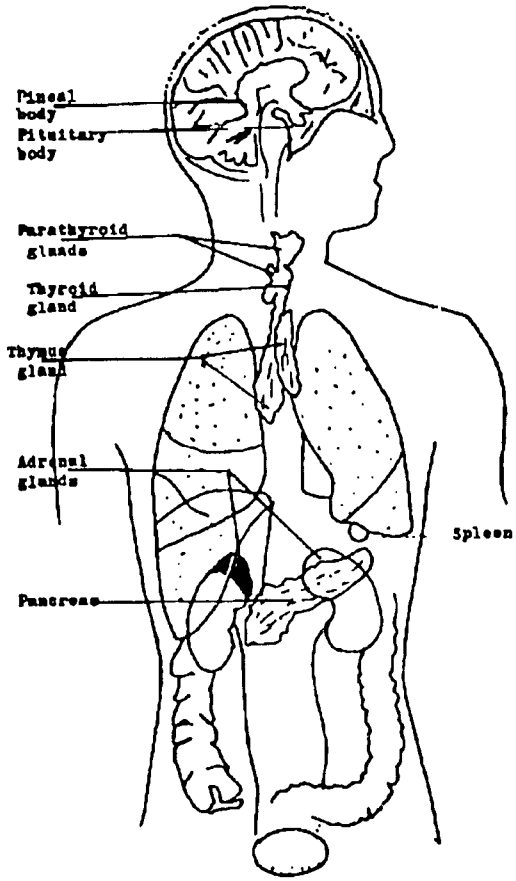


Fig 4.46 The ductless glands.

4.14 THE HEALTH EXAMINATION

Now that you have gained knowledge about the structures and functions of different parts of the body, you will be taught to do a health examination on an individual. The knowledge you have so far gained in anatomy and physiology, will guide you in becoming aware of the normal structure and function of different parts of the body. Being aware of a person's normal structure and function will help you in doing a health exam.

Reasons for a health exam. As Health Technicians you want to see each individual attain the highest possible level of functioning. In order to attain this, the individual's body structure and function should be close to normal. If it is not normal, then the individual may need help in making necessary health related adjustments and this is where Health Technicians play a crucial role. Therefore, health examinations will provide Health Technicians with information on the person's body structure and function and how close it is to normal. Remember, the Health Technician's role should be one of guiding the individual to reach his/her optimum level of functioning (OLOF).

How does one do a health exam and who needs it? The best approach to doing a health exam is to assess a person by using all of the following senses:

- Looking
- Listening
- Feeling
- Smelling.

Looking at the individual gives you a general observation. Listening to the quality and quantity of various body sounds such as respiration and pulse provides you with information on the functioning of the specific organs. Feeling and examining with your hands provides you with information about the size and location of various organs. Smelling certain discharges from the body such as breath, stool and urine helps you to identify the cause of the problem.

One cannot give a brief answer to the second part of the question as to who needs a health exam without some explanation. When health was seen as just an absence of disease, it was easy to view a person as being well and not needing an exam. Now we know that health (illness and wellness) is measured on a continuum scale (as described in Chapter 1) and that a person may be anywhere on the scale at any given time. The goal of the Health Technician is

to facilitate a person's well-being or their optimum level of functioning. This means that every individual needs a health exam periodically. Also, the Health Technician's role is to inform the individual about how their various organs function so that (s)he may participate in his own care to attain an optimum level of functioning or health. Therefore, the objective of a health examination is to evaluate a person's current level of functioning and to use this information to meet their needs.

The Health Technician should keep the following points in mind:

1. A health examination should be complete from head to toe.
2. There is a normal range for an optimum level of functioning.
3. The purpose of doing a health examination is to determine the level of functioning at the time the examination is done.
4. Abnormal findings should be referred to the Medical Officer.

There are three ways to obtain information when performing a complete health examination. Health Technicians should obtain at least two or three types of information. They are:

1. A basic health history of the individual.
2. Your findings from a physical examination.
3. Laboratory test results which you will learn about in later sections where the tests are described.

Basic health information. This type of information is obtained by asking the individual, the caretaker and/or the companion. The following basic information is required:

- Date of the visit.
- Name.
- Address or locating information.
- Age.
- Sex.
- Marital status.
- Past illness, injury or accidents.
- Past significant health events such as pregnancy and delivery.
- Current health status.

How does a Health Technician proceed in obtaining basic health information? Remember that you should set a good example by being clean and neat in your own appearance as well as during the examination.

1. Wash hands before doing a physical examination.
2. Greet the individual in a pleasant and courteous manner.
3. Help the individual(s) feel comfortable and at ease.
4. If the person has come to the centre on his or her own initiative, ask the reason for his coming.
5. Take down identifying basic information.
6. Write down the information on item 4 and 5.
7. Continue to ask about past health/illness.

When these seven points are completed it is then possible to proceed with the physical examination. Table 4.3 outlines the procedure for a physical examination.

4.15. THE PHYSICAL EXAMINATION

TABLE 4.3 PROCEDURE FOR A PHYSICAL EXAMINATION

What to look for	Ways to examine	Normal findings	Your findings
General colour	Observe with your eyes.	Pink undertone.	
Body movements	"	Present and symmetrical.	
Responses	"	Quick and alert.	
Hair	"	Colour and texture bright or shiny.	
Skin	"	Skin colour pink and clear, absence of rash or any other marks.	
Nose	"	When breathing through the nose patient's nostrils should be equal, pink and moist, no mucous drainage.	

TABLE 4.3 PROCEDURE FOR A PHYSICAL EXAMINATION

What to look for	Ways to examine	Normal findings	Your findings
Mouth	Observe with eyes.	Tongue, roof of mouth and cheek lining pink, no sores.	
Teeth	"	Permanent(32) or temporary (20) in children.	
Front of the neck and veins	"	No tenderness, lumps or swollen veins.	
Thyroid gland	Feel front of the neck.	Thyroid gland is not visible or palpable.	
Spine and muscles	Feel the back of the neck along the spine at base of head. Feel muscles of the arms and legs.	Muscle tenderness, tightness and lumps should not be felt.	
Lymph glands	Feel the glands behind the ears, under the arms and in the groin.	These glands should not be felt unless swollen, which is abnormal.	
Arms	Ask the individual to move both arms to assess if all movable joints are functioning.	Arms should move freely in symmetry without pain or stiffness.	

TABLE 4.3 PROCEDURE FOR A PHYSICAL EXAMINATION

What to look for	Ways to examine	Normal findings	Your findings
Blood pressure	Refer to procedure.	95-140 systolic 60-85 diasystolic.	
Chest	Listen with stethoscope to the heart sounds and breath sounds for quality and quantity.	Pulse should be regular and between 60-100/min. Respiration should be regular and between 16-20/min.	
Breasts	Have woman lie flat and observe the breasts. Note colour of nipples. Feel for lumps, squeeze nipples for any drainage.	Both breasts should be equal. No tenderness or discharge should be present. Some lumps may be felt due to hormonal changes during the menstrual cycle. Abnormal lumps should be referred to the Medical Officer.	
Abdomen	Ask the person to empty bladder. Conduct an abdominal examination according to procedure and identify the liver, spleen, kidney and bladder.	Any mass, tenderness or enlarged organ or swelling are all abnormal signs.	
	With a stethoscope listen to the bowel sounds.	Bowel sounds should be present.	
	Feel the inguinal area for any swelling or lymph nodes, bulging veins.	Normally there is no swelling, nodes or bulging veins.	

TABLE 4.3 PROCEDURE FOR A PHYSICAL EXAMINATION

What to look for	Ways to examine	Normal findings	Your findings
Pelvic area	Observe for any abnormal growth signs, symptoms or discharge. Feel lymph nodes in groin.	Should observe no growth or discharge. Lymph nodes should not be felt.	
Anal area	Observe anal opening.	Opening should resemble a purse closed with string.	
Legs, joints feet	Observe symmetry of legs and functioning of joints.	Both legs should be equal in size and length. Person should walk and move without being stiff or in pain.	

After obtaining the basic health information and completing the health examination, the findings should be recorded and the individual should be given an explanation of the findings. If all findings are normal, this should be stated. If some findings are questionable, then guidelines should be given as to what should be done. For example, if a combination of symptoms is observed then the person should be referred to the Medical Officer. If a blood pressure reading is high by itself for the first time, then several more readings should be done over a week's time before referring to a physician. But if the blood pressure reading is high and at the same time two or more symptoms such as headache, blurred vision and difficulty in breathing are experienced, then referral to the Medical Officer should be immediate with a written note about your findings. An explanation should also be given to the family.

Sometimes laboratory tests may be desired. In this situation the individual needs to be encouraged and assisted with obtaining appropriate laboratory tests.

What to do after the physical exam? The purpose of doing a physical exam is to assess a person's level of functioning. If all is functioning within normal limits the person needs to be informed of this and then there is no need for further follow-up. If an individual shows one or two vague or abnormal symptoms then you need to assess how those symptoms are affecting him/her. If the symptoms are having a negative affect, then a referral to the Medical Officer should be made immediately. If the symptoms are affecting them slightly then these persons should be observed for a period and then either referred if the condition persists or not referred if the condition disappears. In any case, if signs and symptoms are acute and serious, they should be referred to the Medical Officer immediately.

You have now learned that the purpose of doing a physical examination is to determine the current health status of an individual. It will you decide what to do next to help the individual meet his optimum level of functioning.

4.16 PROCEDURE FOR HAND WASHING

Hands and nails are major sources of infection and should be cleansed thoroughly to protect oneself as well as others.

When should hands be washed?

- Immediately after coming home from shopping or from any other public place, after gardening or handling of animals and poultry.
- Before eating.
- Before and after caring for someone or handling their discharge.
- After defecating.
- Before preparing or handling food.
- Before breast-feeding or giving other kinds of feeding to babies.

Items required:

- Soap
- Water
- Clean towel.

How does one wash hands properly:

- Roll up long sleeves.
- Remove your wrist watch.
- Wet hands,apply soap and rub hands, make out a lather.
- Rub the whole surface of the hands, including nails as well as wrists.
- Rinse off the bar of soap after each use.
- Rinse hands.
- Soap a second time, rub well, work up a lather and rinse off under running water or have someone pour water from a jug.
- Dry hands with a clean towel.
- If hands are dry, use cream or lotion at night.

Fig 4.47 Hand washing.

Note: In some situations, water for hand washing may be limited or not available. In this case an antiseptic solution or 70% alcohol may be utilized for cleansing the hands. These solutions are hard on hands and require special care of the skin.

4.17 PROCEDURE FOR TAKING THE BODY TEMPERATURE

Items required:

- Thermometer
- Soap
- Water
- Container for thermometer
- Kidney dish or watch container.

A thermometer is used to take the temperature of a person. Thermometers are available in fahrenheit and centigrade. The glass tube of a thermometer contains mercury. This mercury expands with heat, so when the temperature is taken, the mercury will rise to that of the body's temperature. The mercury will remain at this point until it is shaken down. Temperature can be taken by mouth, rectally or in the armpit (axilla).

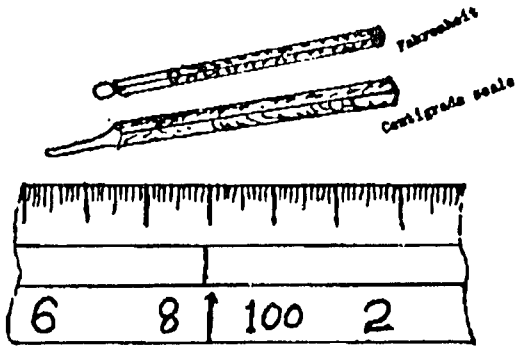


Fig 4.48 Thermometer scale and normal temperature.

Oral temperature:

- The thermometer should be clean and dry and the temperature should register at least two degrees below normal. Normal is 98.6 F or 37 C.
- Have the person sit or lie down.
- Place the bulb in the mouth under the tongue to one side.
- Ask the person to keep the lips closed, to breathe through the nose, not to bite on the thermometer and not to talk.
- Leave in the mouth for three minutes.
- Remove the thermometer and wipe off the saliva with a wipe containing a disinfectant using a firm rotary motion from the top downward. Discard the wipe in a waste container.
- Read by holding the thermometer to a good light and record the reading.
- Clean the thermometer and put it away in the case with the bulb end first.

Rectal temperature:

- Make sure the mercury is down to 95 F (35 C).
- Ask the adult or older child to lie down on his/her side.
- For small children, place on mother's lap or on the bed on the abdomen.
- Explain how you are going to take the temperature and the need to lie still.
- Lubricate the thermometer with vaseline, cold cream or even water so that it slides in easily.
- Separate the cheeks of the buttocks so that anus is visible.
- Insert the bulb of the thermometer gently about one inch into the anus and hold it in place for three minutes. Someone needs to stay with a very sick, restless or small child at all times. Some adults also need to be watched.
- Remove the thermometer, read the temperature and record it.
- Clean and put away the thermometer.

Note: The average normal rectal temperature is approxmately one degree higher than oral or 99.6 F (37.5 C).

Axillary temperature:

- Shake the mercury down to 95°F (35°C) or below. Do not moisten or lubricate the thermometer.
- Dry the area under the arm.
- Place the dry bulb end of the thermometer in the axilla and have the person put his hand on his opposite shoulder so that his arm is firmly against his body.
- Hold the thermometer in place until the temperature registers for about five minutes.
- Remove the thermometer, read and record.
- Clean and put the thermometer in its case.

Note: The normal axillary temperature is one degree lower than the oral temperature or 97.6°F (35.5°C).

How to clean the thermometer:

- Moisten a cotton ball with water and soap it well.
- Hold the thermometer with left index finger and thumb over a kidney dish or waste container. The mercury bulb should be down.
- Beginning at the top, using an antiseptic, wipe down with a firm rotary motion all the way to the end of the bulb.
- Discard wipe.
- Rinse under low running water using the same downward rotary motion.
- Dry with a clean wipe or cloth. Put the thermometer in its case.

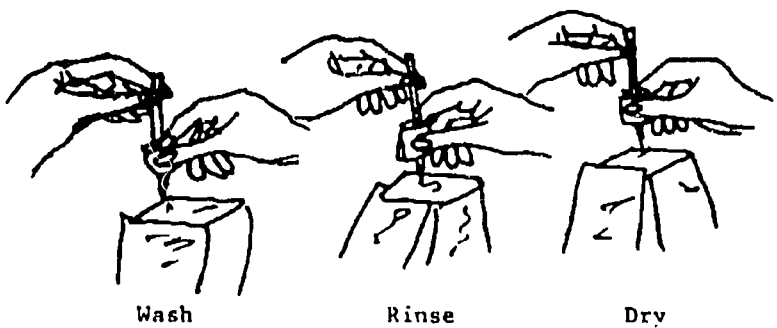


Fig. 4.49 Cleaning a thermometer.

4.18 PROCEDURE FOR TAKING THE PULSE AND RESPIRATION

Pulse. The pulse is the throbbing felt in the blood vessels from the contraction of the heart muscles as they force blood through the vessels.

Respiration. This is the act of breathing. It consists of inspiration, when the body takes in oxygen from the air, and expiration, when the body gives off waste products (carbon dioxide) from the lungs. For taking the pulse and respiration, a clock or watch with a second hand is needed.

How to take the pulse:

- Have the person sit or lie down with his arm and hand in a relaxed position, with the thumb up.
- The arm and hand should be supported on a table or bed if possible.
- Place your fingers, but not your thumb, on the side of the wrist and feel for the pulse.
- Once you feel the pulse, look at the watch and count the beats for one minute.
- When you are counting, pay attention to the quality of the pulse noting:

Rhythm	(1)	regular
	(2)	irregular
	(3)	missed beats
Strength	(1)	weak
	(2)	strong

- If you have any question about rate or strength of the pulse, count again.

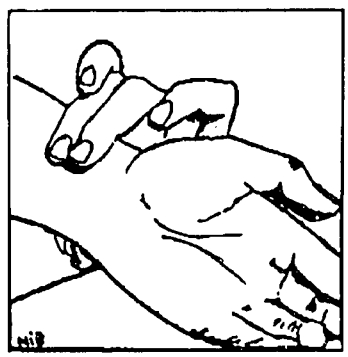


Fig 4.50 Taking the pulse.

How to measure the respirations:

- Keep your fingers on the wrist after counting the pulse and observe the person's respiration.
- Count the rise and fall of the chest for one minute.
- Record your reading.

Note: Temperature, pulse and respiration vary with age, sex and the level of physical and emotional activity. The normal range is:

	INFANTS	CHILDREN	ADULTS
Pulse	120-140	100-130	60-100
Respiration	30-40	20-25	14-18
Temperature	96-99.5 F 35.5-37.5C (Rectal)	98.6-99.7F 37.0-37.7 C (Oral)	98.6 (oral)

4.19 PROCEDURE FOR TAKING THE BLOOD PRESSURE

Blood pressure is the force of blood through the vessels from the heart's contraction. The systolic pressure is the pressure in the arteries when the ventricles contract and pump blood out of the heart. The pressure is at its peak force. The diastolic pressure is the pressure in the arteries when the ventricles relax. The pressure is at its lowest point. Normal blood pressure is 120 systolic and 80 diastolic, or 120/80.

Very high and very low blood pressure are both signs of disease. Several factors affect blood pressure. These factors act together and influence each other.

The blood pressure drops when the volume of blood in the body decreases.. The blood pressure rises when the volume of blood increases.

If the blood vessels swell, or dilate, the space in the vessels increases. The blood pressure then drops. If the blood vessels narrow, or constrict, the space in the vessels decreases and the blood pressure rises.

How to take the blood pressure:

- Have the person sit or lie in a comfortable position.
- Have the person rest his/her arm on the bed or table.
- Remove clothing from the upper arm if it is heavy or tight.
- Apply the blood pressure cuff to the upper arm with the rubber tubes over the brachial artery.
- Wrap and secure the cuff around the area.
- Feel for the pulse.
- Inflate the cuff to 30 mm of mercury above the level where the pulse is no longer felt.
- Place the stethoscope over the brachial artery on the inside of the elbow.
- Begin deflating the cuff very slowly.
- Listen for the return of the pulse beat. Note the reading. This is the systolic pressure.
- Continue to deflate the cuff and listen for the disappearance of the pulse beat. Note the point where the pulse beat disappears. This is the diastolic reading.
- Record the systolic/diastolic reading. Normal range for an adult is 95 - 140 systolic, 60 - 85 diastolic.
- Deflate the cuff and put it and the stethoscope away.
- Explain your findings.

Note: Decreased blood pressure could be due to bleeding, shock and abnormalities in the functioning of the heart.

Increased blood pressure may be due to tension, decreased blood volume and constricted blood vessels.

An increase or decrease in one's blood pressure needs to be watched over a period of time and diagnosed medically.

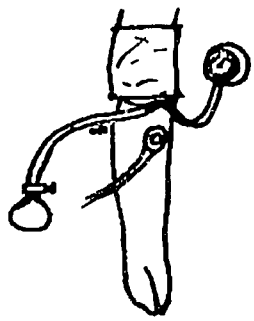


Fig.51 Taking the blood pressure.

4.20 PROCEDURE FOR AN ABDOMINAL EXAMINATION

- Ask the person to empty the bladder.
- Ask the person to lie down in a comfortable position on his/her back.
- Pull the clothing up (shirt) and down (pants) to expose the abdominal area only.
- Look at the abdominal area and note the condition of the skin: colour, rash, scars, stretch marks, dilated veins, etc.
- Feel the four quadrants with the hand and pads of the fingers, superficially and deep.
- Identify the liver, spleen, kidney and bladder.
- Observe for signs of tenderness and pain as you are examining.
- Listen with the stethoscope for frequency and type of bowel sounds. Bowel sounds should be present.
- Listen for the presence of any fluid.

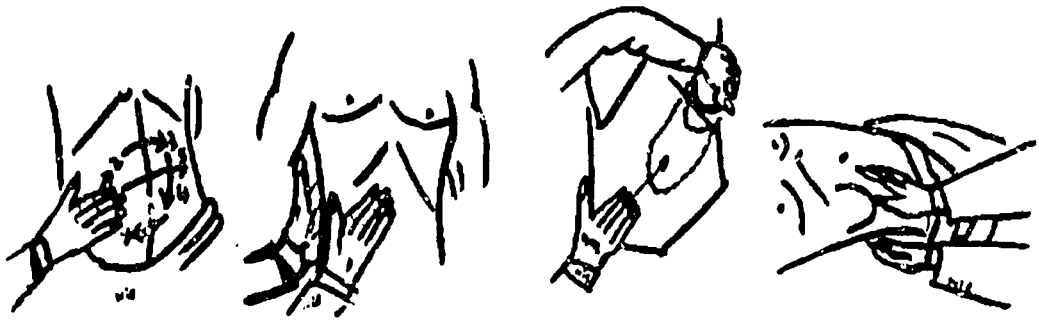


Fig. 4.52

The following are abnormal findings:

- Any mass.
- Tenderness.
- Enlargement.
- Absent bowel sounds.

If any abnormal findings are noted, the person should be told about them and referred for a medical diagnosis.

4.21 TECHNIQUES FOR ASSESSING RESPIRATORY FUNCTION

The sounds of inspiration and expiration should be like normal breathing, almost soundless. To listen with your ear, place your ear on the patient's chest and listen. Sometimes, if breathing sounds are abnormal, they may be heard as you observe the patient. If you listen with a stethoscope, you may be able to hear more sounds.

Place the stethoscope on the front, back and sides of the chest:

- Ask the patient to take in deep breaths by mouth and then let them out.
- Put the stethoscope to the chest and listen at each point for quality and intensity of breath sounds.
- Abnormal breath sounds include wheezes, coughing and rales.

Using the hands for a manual exam:

- Stand or sit in front of the person.
- Place your hands on his chest. Your thumb should be on the lower ribs in the front.
- Ask the person to take a deep breath.
- Watch and feel the chest expand during inspiration.
- Watch and feel the chest decreasing in size during expiration.
- The two sides of the chest should expand and deflate at the same rate and amount.
- If one side is expanding less than the other, this indicates some problem.
- If patient complains of pain during breathing, gently palpate the area of pain and identify the tenderness.

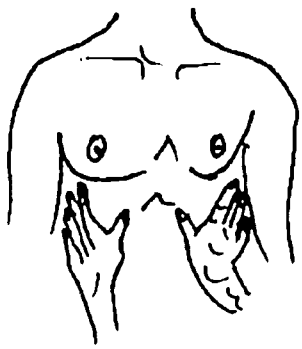


Fig 4.53 Manual chest exam.

Normal findings:	Abnormal findings:
Regular shape of the chest	A pigeon chest, barrel chest, a flat or compressed chest.
Chest movements during respiration are equal on both sides.	Chest movements are unequal, breathing is painful.
Breathing rate for adults is 16 - 20 movements in one minute.	Breathing rate below 12 (slow breathing) or above 24 (fast breathing).
Breathing is regular.	Irregular breathing. Any sound different from your normal breathing sounds, like wheezing. Deep breathing.

GLOSSARY

Adrenal glands: These glands are located in the region of the kidneys. They produce essential secretions.

Absorption: To take in, to combine or merge.

Alveoli: Tiny, bulb-like air sacs in the lungs where oxygen and carbon dioxide are exchanged.

Anaemia: Condition where haemoglobin blood content is below the normal level.

Anus: The opening at the lower end of the intestine through which the solid refuse of digestion is ejected.

Aorta: The large artery with thick elastic walls into which blood flows from the ventricle.

Artery: Vessel which carries blood away from the heart.

Atrium: An upper chamber of the heart.

Auscultation: Listening to sounds in the body cavities with a stethoscope, for example, for sounds or murmurs in the chest or abdomen.

Axillary: Relating to the armpit.

Bladder: The muscular organ which stores urine and releases it when full.

Brachial: Pertaining to the arm.

Bronchi: Medium sized airways between the trachea and the bronchioles.

Bronchioles: The smallest airways between the bronchi and the alveoli.

Capillary: Thin-walled vessels through which blood nutrients, gases and wastes pass to and from the cells. The last branches of the arterial circulation which joins the arteries to the venous circulation.

Carotid: The principle artery on each side of the neck, which carries blood from the heart to the head and brain.

Carpal: Wrist bone.

Cell: The simplest structural and functional unit of life.

Cerebellum: The back portion of the brain. It controls muscular coordination and equilibrium. Also called the little brain.

Cerebrum: The front and main part of the brain.

Conjunctiva: Interior lining of the eyelid.

Coordinate: To work together harmoniously.

Deformity: Malformation, a deformed part of the body.

Deviation: Departure from normal.

Diabetes: A metabolic disease in which blood sugar level is high. Sugar may appear in the urine.

Digestion: A process by which food is converted in the body into simpler substances for absorption and utilization.

Disc: Substance between two vertebral bones.

Elimination: The act of removal from the body.

Epigastric area: The upper-middle region of the abdomen just below the chestbone.

Epiglottis: The valve in the throat below and behind the tongue which cuts off the air passages during swallowing to prevent food and liquid from entering the lungs.

Excretion: Expulsion or removal from the body.

Expiration: Act of breathing out.

Femoral: Pertaining to the thigh bone.

Femur: A thigh bone extending from the pelvis to the knee.

Fibula: The outer and smaller bone of the leg below the knee.

Gallbladder: The storage organ for bile which helps in digestion. It is located below the liver.

Gullet: Oesophagus.

Haemoglobin: Iron containing protein in the red blood cells.

Humerus: The bone of the upper arm which extends from the shoulder to the elbow.

Inspiration: Breathing in.

Intercostal: Between the ribs.

Joint: The point where two bones meet.

Kidney: The organ of the urinary system which actively forms urine and thus eliminates waste products and regulates the amount of water and minerals in the body.

Larynx: Commonly called the voice box, it is located at the upper end of the trachea.

Ligament: A band of strong tissue that helps bind the bones together.

Lumbar: Area in the back of the body between the ribs and pelvis.

Lungs: The cone shaped spongy organs in the chest made up of alveoli and the airways leading to them.

Lymph: Fluid in the lymph system, containing no red blood cells.

Lymph nodes: Glands in the lymph system that assist in fighting infection by producing and filtering out harmful material.

Marrow: Porous centre of bone where blood cells are manufactured.

Medula: A portion of the brain continuous with the spinal cord.

Metacarpal bones: The five long bones of the hand found between the wrist and the finger bones.

Metatarsal bones: The five long bones of the foot found between the ankle and the toe bones.

Motor: Pertaining to messages from the brain to the muscles/organs that result in movement.

Mucous membrane: The membrane lining all bodily channels that communicate with the air, such as the respiratory and alimentary tracts, the glands of which secrete mucous.

Neonate: A newborn child, up to the age of one month.

Oesophagus: The muscular tube which transports chewed food from the mouth to the abdomen.

Palpatation: Examination with the hands.

Pancreas: A gland situated beneath the stomach which secretes a digestive fluid and the hormone insulin.

Patella: Knee cap.

Pelvis: The cavity within the hip bone where organs of the reproductive system, part of the urinary system and part of the digestive system are found.

Peripheral: Pertaining to the outermost part of the body and the nerves which connect to that part of the body.

Phalanges: Bones of a finger or toe.

Pituitary gland: The master gland situated at the base of the brain. It secretes a number of hormones which regulate many body processes, e.g., growth, reproduction and metabolic activities.

Plasma: The liquid part of lymph and blood.

Protection: Defence, safeguard, shelter.

Pubic bones: Bones forming the front of the pelvis.

Pulmonary: Pertaining to the lungs.

Quadrant: Any of four parts.

Radial: Relating to the bone on the outer or thumb side of the lower arm.

Radius: The bone on the outer or thumb side of the lower arm.

Regulate: To adjust to a requirement; to control.

Regulation: Adjustment.

Rib: One of the 24 long, flat, curved bones forming the wall of the chest.

Saliva: The fluid secreted by the salivary glands which serves to moisten and soften food, keep the mouth moist and convert starches to sugars.

Scapula: The shoulder blade.

Sensation: A feeling or awareness caused when nerves are stimulated.

Sensory: Pertaining to sensation; describes nerves which convey impulses from the sense organs to the brain.

Spinal column: The vertebral column, consisting of the vertebrae, the discs and associated ligaments.

Sternum: The breastbone.

Subcutaneous: Just below the skin.

Suprapubic area: The region of the abdomen immediately above the external genitalia.

Sweat glands: Glands that secrete fluid called sweat.

Symphysis pubis: The point at which the two pelvic bones join together at the front of the body.

Systemic: Pertaining to the circulatory system that carries materials to body cells and tissues.

Tarsal bones: Ankle bones.

Temporal: Relating to the temple.

Tenderness: Softness or painfulness.

Tendon: The strong cord of fibres joined together at the end of the muscle which attaches to the bone.

Thyroid: A gland in the front of the neck that secretes chemicals necessary for body functioning.

Tibia: The inner and larger bone of the leg below the knee.

Tissue: Units of cells grouped together to perform specific functions. The four basic tissues include muscle tissue, nerve tissue, epithelial tissue and connective tissue.

Tubules: Small tubes.

Ulna: The inner of the two bones of forearm on the side of the little finger.

Umbilical area: Area around the depressed scar in the middle of the abdomen, marking the point of entry of the umbilical cord.

Ureters: The large vessels through which the urine passes the kidney to the bladder.

Urethra: The final tube-like structure through which urine passes out of the body.

Vein: Vessels which carry blood towards the heart.

Vena cava: Either of the veins which empty into the right atrium of the heart: the superior vena cava drains blood from the upper portion of the body, and the inferior vana cava brings blood from the trunk and limbs towards the heart. These veins are the largest in the body.

Vertebrae: Small, orderly arranged bones which make up the spine.

Ventricle: A lower chamber of the heart.

Wheezing: Produce a hoarse whistling sound.

SUGGESTED LEARNING ACTIVITIES

1. Identify the major organs of each system using a chart.
2. Identify the major parts of various organs.
3. Using a chart or model, describe what happens in each of the following systems and trace its course:

   - respiratory system
   - circulatory system
   - digestive system
   - urinary system

4. Do a health examination on each other in the classroom and in the hostel.

REVIEW QUESTIONS

1. What are the major systems of the body?
2. List the major organs of each system and their functions.
3. Why do you as Health Technicians need to learn about anatomy and physiology?
4. What is blood pressure and pulse? How is each measured?
5. How do you measure a person's respiration?
6. What is the normal range of respiration for an adult?
7. List the organs of respiration and their functions.
8. Trace the process of respiration from inspiration to expiration and state what happens to the inhaled air?
9. What would you do if you found a person whose respiration was more than 18 per minute?
10. Describe what happens to food from the time it enters the mouth until it is excreted as waste.
11. What is the reason for diarrhoea and constipation?
12. How does the kidney help in getting rid of waste products from the body?
13. Describe the characteristics of normal urine.
14. Describe the production and transportation of urine.
15. Describe the parts and functions of the brain.
16. What is the function of the fluid that surrounds the brain and spinal cord.
17. What is the function of the lymph glands and what changes occur in them during an infection?
18. Describe the procedure for doing a health examination.
19. After completing a health examination, what would you discuss with the person?

LEARNING ACTIVITY RECORD

Name of student:_____

Conduct 20 health examinations.
Five of these can be on your classmates.

In each box put the date of the health examination and the name of the person examined.

EVALUATION FORM

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of Presentation	[ ]	Simple to understand
	[ ]	Difficult to understan(
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 5

HEALTH OF THE FAMILY

Objectives: After completing this chapter you will be able to:

1. Define a family.
2. Describe why Health Technicians need to be concerned about the family as well as the individual.
3. List six principles used in working with families.
4. List and describe four major factors which affect family health.
5. Describe how family size and composition determine its needs.
6. Describe the importance of a balanced diet.
7. Figure out the nutritional requirements for different family members from a newborn to an aged person.
8. Describe the role carbohydrates, proteins, fats, minerals, vitamins and water play in maintaining one's health.
9. Describe how Health Technicians can help families identify and meet their nutritional needs.
10. Describe how Health Technicians can help families maintain a health promoting environment in and around the home.
11. Describe the role of Health Technicians in the control of communicable diseases.
12. Assess a family's immunization needs and status.
13. Describe the Health Technician's role in helping the sick, aged and disabled.

CHAPTER 5

HEALTH OF THE FAMILY

WHAT IS THE FAMILY AND WHY DO HEALTH TECHNICIANS NEED TO BE CONCERNED ABOUT IT?

A family consists of related members of one generation or more, living together under one roof or within a compound. This means that a family is made up of individuals of different ages and sexes. Each member has a specific role to play within the family and the community.

In the past, health programmes were not as effective as they could have been; services were planned and delivered separately and by a number of specialized workers. Experience has shown that providing integrated services with the family as the focus of attention has resulted in better use of existing services as well as improving the health status of individuals in the family. For example, when family planning services are delivered separately, the services are not used frequently. This may be because people do not like to be seen entering a family planning clinic; there is a stigma associated with it. Their need for help in family planning does not overcome the stigma they feel.

Another reason for not attending a family planning clinic is that the need to control the size of the family is not felt strongly enough. As we said earlier in Chapter 2, if a family does not feel a need, they are not motivated to satisfy that need. Realizing this, family planning clinics are including immunization services. Parents feel the responsibility to immunize and protect their children from communicable diseases. Therefore, when they come for immunization services they can usually be motivated to learn about family planning services and make use of them. This approach of combining services has provided better results. As Health Technicians, you are being prepared to provide a "package" of integrated services.

In Pakistan many kinds of health services are provided to the people by governmental and nongovernmental agencies. These services are: maternal and child health, nutrition, family planning, diarrhoeal disease control, immunization programmes, control of communicable diseases and specialized medical and surgical services. Even though all or most of these services are provided from one hospital or institution, they are all provided as separate services. There exists very little coordination and cooperation among the service providers.

With the concept of the Integrated Rural Health Complex, the aim is to provide all of these services as an integrated package. For example, BHUs provide only basic and limited health services, while the RHCs provide more varied services and the district headquarter hospitals and teaching hospitals provide basic as well as more specialized and complicated services. Even though BHUs and RHCs will continue to provide only relatively simple and limited services, the staff will have the necessary training to know where and how other services required by an individual, a family or the community may be acquired. In this way you will be able to help the family get the services it needs.

As members of the health team, Health Technicians promote the delivery of integrated services by:

- Informing the public about all the health and related services available.
- Assessing their health needs.
- Helping them properly utilize available health services to meet their needs.

5.1 WHY FOCUS ON THE FAMILY IN DELIVERING HEALTH SERVICES?

To achieve Health for All by the Year 2000, Health Technicians must work with the family to improve the health status of each member from birth to death.

A family acts as a unit and a member's behaviour is affected by others in the family. Therefore decisions on the care given to one member are often made by others. For example, in providing maternal and child health services to a young mother, you must work with and through the mother-in-law and the husband. The health of one person in the family affects the health of others. For example, if one member has a communicable disease others may also get it or if the father is sick or not working, this will have an effect on the health and welfare of the rest of the family.

5.2 PRINCIPLES AND GUIDELINES IN WORKING WITH FAMILIES

In order to effectively work with the family the following principles and guidelines need to be followed:

TABLE 5.1 PRINCIPLES AND GUIDELINES

Principles	Guidelines for Health Technicians
Establish a good working relationship with family members.	- Greet them properly. - Speak to them with respect. - Do not get involved in controversial family issues. - Listen to them and their concerns patiently and sympathetically.
Collect only necessary information on family size, occupation, education, customs and traditions.	- Collect information by observation and inquiry and explain the purpose of information collected.
Identify the health needs of the family.	- List first the health needs and problems as given by the family, then add to this list your own observations.
Plan with the family actions to to be taken to solve identified needs.	- Discuss each need or problem with the family. - Suggest possible ways to meet these needs. - Give alternative suggestions when possible. - Find out how they want to handle the situation. - Suggest necessary actions. - Give the family a time period in which to proceed with the planned activities.
Help the family carry out their plan of action.	- Determine with the family which activities they can handle themselves and for which activities they need your assistance. - Provide assistance if needed.

TABLE 5.1 PRINCIPLES AND GUIDELINES

Principles	Guidelines for Health Technicians
Encourage the family to be self-reliant in meeting their needs.	- Assist them by doing the procedure they are most uncomfortable with. - Provide necessary knowledge or skills so that family members begin to feel comfortable in assuming planned activities. - As members of the family gain confidence and skill, give them more responsibility in meeting their needs. - Evaluate the family's progress in their health maintenance activities.

5.3 FACTORS AFFECTING FAMILY HEALTH

Traditionally, the medical system only treated individuals who were sick and so only disease treatment was included in training programmes. However, Primary Health Care focuses on keeping individuals and families healthy. Therefore, we need to look at those factors which determine our level of well-being. Some of these factors are:

1. Income and other economic resources.
2. Size and composition of the family.
3. Education.
4. Customs, habits and home remedies.

Income. Income is a very important factor in determining one's level of well-being. This is because income determines the ability to buy the necessities of life which builds the foundation for a healthy person or family.

Income does not necessarily have to be cash. It can also be in the form of payment in kind. For example, payment for service in the form of food, housing and clothing should be seen as income. In determining total income both cash and kind should be considered.

It has been proven all over the world that poor people suffer from illness. This is not because being poor makes one ill but because the poor do not have enough resources to meet the basic needs of proper food and shelter to build resistance against disease. They become prey for diseases and disabilities.

In order to maintain one's health, one has to maintain a certain standard of living in terms of adequate food, personal hygiene and good environmental conditions in and around the home area. To maintain this standard, resources are also needed. However, if families do not have adequate resources, the Health Technician's suggestions for improving the standard of living cannot be followed. To be more effective as Health Technicians, you need to first learn what income and other resources the family has to work with.

Once you have the information on income and other resources, you may need to determine whether the family is getting maximum use out of them. If not you may need to help them make better use of their resources by showing them how to do such things as budgeting and/or changing their buying habits.

If a family has a very low income and does not have any other resources to meet their basic needs, then Health Technicians need to identify available community resources for which the family may be eligible. Examples of some of these are: the World Food Programme, income generating activities for men and women or the Zakat fund in the community.

As Health Technicians, you might find it difficult to deal with family income information. But if you look at it from the point of view of helping them, it may become easier for you. You will find it helpful if you first identify your own income and other resources and expenditures to determine whether or not you are making maximum use of them. Doing this exercise will give you more confidence and skill in dealing with families.

Size and composition of the family. Size and composition of the family are two important factors that determine family needs as well as how income and resources are utilized in meeting these needs. Size refers to the number of individuals in the family. The greater the number, the greater and more varied will be the needs. Composition refers to how the family group is formed. The family can be composed of sexes, ages or generations.

The characteristics and needs of the family are determined by two important characteristics or variables: sex and age. These two variables also determine the individual's role in the family and community. For example, it is generally accepted that the role of Pakistani women is to be responsible for the cooking, cleaning and general welfare of the children. Their sex makes the physiological and psychological needs of women in the family different from those of men.

The differing needs of family members are best understood if we look at how a human being grows and develops. Once born, a baby continues to grow and develop until death. Growth refers to a physical or biological increase in size. Development refers to gaining knowledge and skill in survival and success. This growth and development occurs in stages. At each stage of development certain needs become more important and if some of these needs are not met, the individual may not be able to function at the optimum level. Therefore, as Health Technicians you need to know the various stages an individual goes through and the various needs that become important at each stage (see Table 5.2).

Education. Experience has shown that people who are literate and educated are more often open to new ideas than those who are not. People who cannot read will obviously not be well informed on what is happening in the community or the country. Consequently, they may not know about existing health services and the Health Technician's role.

Determining a family member's level of understanding will provide you with clues as to what they may know, what you can then tell them and what method you should use to do so. For example, in a certain family it may be that the only educated person is the head of the household and he may not be available or interested in talking to the Health Technician, while the wife and mother-in-law are. In this situation, if the information you wish to convey is in writing, tell the women the information and repeat it so that they understand. Just because a person cannot read, does not mean they cannot understand verbal instructions. To imply that an illiterate person is stupid is to insult that person. You may want to ask them to repeat what you said to determine if they understand it. In a family where the wife can read, giving her a pamphlet to read may be enough. Use illustrations and demonstrate the procedure rather than describe it because, as you have learned, these techniques enhance learning.

It is important to assess educational levels to determine levels of understanding and how to deal with a family. Another important reason for this assessment is to refer the family to an educational programme (formal or non-formal) in the community if they are interested and eligible.

Customs. The customs of a society have a great influence on the health and welfare of individuals and families. When customs, ideas, habits and ways of behaviour passed on from one generation to another or established by a community are repeated they become traditions. They are very difficult to change and not all of them

need changing. As Health Technicians you will have to become familiar with different behaviours so that you may relate your activities to them. For example, working with a poor family where the traditional marriage feast results in a heavy debt may mean helping the family on a low budget to plan a feast that will not make them feel inferior. Suggesting that they ignore this tradition may lower their status and be unacceptable to them, so instead of suggesting they not hold the feast, try to help them minimize the cost as much as possible.

If the composition of the family is balanced between sex and age and income and resources, then they can cope. If there is an imbalance such as more old people or females draining the family's resources, a situation is created where the family or a family member cannot cope.

The differing needs of family members are best understood if we think of our own families and how their needs change with their change in age. As you have learned, changing needs must be met in order for individuals to function at their optimum level.

Habits. These are developed by individuals and families and may become customs. Habits and customs are formed by repeating certain actions frequently so that these actions are carried out without conscious effort. Some family habits and customs in managing health conditions and illnesses are passed down from one generation to the next.

You as Health Technicians also want individuals to develop such health promoting habits as:

- Visiting or contacting the Health Technician from the BHU or RHC when indicated.
- Bringing the children to the immunization clinic.
- Taking steps to hydrate a sick dehydrated child with fluids.
- Coming to the RHC or BHU at the early signs of illness rather than waiting until it becomes serious.
- Contacting Health Technicians about their concerns and fears.
- Making use of available antenatal care.
- Keeping the living and working environment clean and safe.
- Eating an adequate diet to stay healthy.

Home remedies. These are the ways a family manages their own health conditions or illnesses. As Health Technicians you need to be aware of the family's general habits as well as their home remedies. The remedies may relate to eating, sleeping, rest, recreation and other activities. First you need to identify them, list and describe them, then from the list and description classify them as being health promoting, endangering or harmless. Then encourage the family to maintain the health promoting habits, change the health endangering ones and ignore the harmless ones.

As stated earlier, not enough is known about how people maintain health. Contribute to your pool of new knowledge by carrying out the exercise suggested below.

1. You should identify, list and describe the habits, customs and remedies used by families you have contacted. The areas you want to focus on are:

   - Food for the newborn, infant and young child.
   - Food for pregnant women, sick and older members of the family.
   - Remedies used for various illnesses, injuries and other situations.

2. Categorize these into health promoting, health endangering and harmless groups.

3. Make plans for what to do with each category of customs and habits.

5.4 THE SEVEN STAGES OF DEVELOPMENT

As has been discussed in Chapters 1 and 2, a person is made up of bio-psycho-socio parts. In the following section, therefore, needs are discussed in terms of these three parts of a person. You are encouraged to discuss the following stages in class as well as to read suggested references for more details.

The seven developmental stages and the biological, psychological and social needs of each stage are outlined in Table 5.2.

You should remember that the concept of these developmental stages was born in the Western hemisphere and the division of the stages reflects this. For example, children there are expected to be in school from 5 to 13 or 14 years of age. Therefore, this stage is called the school age. In Pakistan children of this age may not be in school. School may be attended either earlier or later. But you should remember that in school or not, children at this age are

ready for group activities and for following basic rules and regulations under guidance. If Health Technicians have some understanding of the developmental stages, they will be better able to guide parents and family members to be realistic in their expectations of ability and performance and therefore in this way help the family reach their optimum level of functioning. Your training covers some of the stages in more detail than others. If you feel you need more information in areas not as well covered, consult your teaching staff and seek their help.

TABLE 5.2 THE SEVEN STAGES OF DEVELOPMENT

Developmental stage	Biological needs	Psychological needs	Social needs
Newborn (up to (30 days)	Survival and growth. Nutrition. Protection from infection.	To be protected and totally cared for.	Dependent.
Infant (up to 1 year)	Nutrition. Immunizations.	To be protected and cared for. To play games with adults.	Develop mother/baby attachment and adult/baby attachment within the family.
Early childhood (one to four years)	A variety of foods and physical activities.	To be allowed to explore yet feel protected.	Relate to other children and adults in the community.
School age (4 to 13 years)	Increase in amount and variety of nutrition, physical activity, increased need for rest.	To learn under guidance and caring supervision.	To be able to mix and play with friends.

TABLE 5.2 THE SEVEN STAGES OF DEVELOPMENT

Developmental stage	Biological needs	Psychological needs	Social needs
Adolescense (13 to 19 years)	Need for increased nutrition and rest continues.	To experiment, to be accepted as an individual.	To be one of the group but different from the family.
Adult	To procreate.	To be considered important in providing and caring for the family.	To be an important, respected member of the community.
Old age	To slow down due to change in life style and body functions.	Reassurance that (s)he is still an important member of the family and community.	To be considered a wise and experienced member of the community.

5.5 HEALTH SERVICES FOR THE FAMILY

As Health Technicians making home visits in the community you need to consider all family members and their needs in the following areas:

- Nutrition.
- Environment in and around the home.
- Control of communicable diseases.
- Immunization.
- Service to the sick, aged and disabled.
- Mental disorder and drug abuse.

Once their needs have been identified, family members will have to identify their resources. The family members and Health Technicians will then jointly work out a plan for how to meet the identified needs.

NUTRITION

Food is required by the human body for a variety of purposes. Eating the right kinds of food in adequate amounts is important for individuals to maintain their well-being. When inadequate food is eaten, an individual may suffer from:

1. Hunger.
2. Malnutrition.
3. Illness.
4. Complications of illness.
5. Delayed recovery from illness or childbirth.
6. Stunted growth/subclinical malnutrition.
7. Psychological disturbances.

As Health Technicians, you need to gain some knowledge of nutrition so that you may help individuals and families meet their nutritional needs. Nutrition is a particularly important topic for Pakistan. The National Nutrition Survey in 1985-1987 found that 48% of the children under five years of age were malnourished and that 65% had anemia. Pregnant and lactating women were also found to have nutritional problems. Thirty-four percent were underweight and 45% were anemic. These rates indicate that they and their babies are more likely to have health problems which could result in preventable deaths. Low birth weight and goitre are two other common nutritional problems. Many of these nutritional problems and related deaths could be prevented by teaching families a few important facts. As you have already learned, in order to assist people in changing behaviors you must first have the correct information to teach and then make the learning experience relevant to them.

This requires some understanding of the science of nutrition and the techniques to learn about people's food intake. In this chapter, general nutritional needs will be described and discussed. The nutritional needs of pregnant and lactating women, infants and children will be described in their respective chapters. Let us start the discussion with a question.

What is nutrition? Nutrition is the study of food and the way our body uses it for the production of energy, protection against disease and growth and maintenance of organs and tissues. The study of nutrition requires an understanding of the physiological value of food, that is its value in the functioning and vital processes of the organs and tissues. Food also has sociocultural values and as Health Technicians you must be aware of this aspect of nutrition and use your awareness to help individuals and families meet their food requirements.

What are nutrients? Nutrients are the substances in food that are responsible for the functioning of the body and protect it from disorder. Foods contain six main groups of nutrients. These are:

1. Water.
2. Carbohydrates.
3. Proteins.
4. Fats and oils (lipids).
5. Minerals.
6. Vitamins.

In discussing dietary adequacy, the first consideration is usually the total energy supply needed, that is the quantity of food necessary. Energy production from food is essential for the maintenance of life. Energy is produced from food for respiration, circulation of the blood, digestion, absorption and excretion of waste products.

In addition, energy is produced from food for all movements of the body and to maintain daily activities. The quality of food should be such that all of the individual's nutrient requirements will also be met. The less food eaten, the more critical is the quality of the food supply to avoid nutritional deficiencies.

A 'calorie' is a unit of energy and food is measured by the amount of energy it supplies. Most foods are energy producing. For example, carbohydrates supply 4 calories per gram of food, proteins supply 4 calories and fats supply 9 calories. An individual's energy requirement is calculated in terms of the number of calories required per person per day based on his/her condition. The WHO/FAO table in this chapter (Table 5.3) gives the necessary levels of nutrients required for an individual's optimum level of functioning. You are to use this table as a guide in determining the nutritional needs of an individual.

If the amount of energy in the food that is eaten is greater than required, then the body will store the excess carbohydrates as fat. But if the amount of energy in the food eaten is less than required, then the body uses fat or body protein for energy. The importance of each nutrient group and its major food source are now discussed.

Water. Water makes up two-thirds or almost 70 percent of our total body weight. Man can survive for only a few days without it. Water serves the following functions:

- Regulates body temperature.
- Transports food and waste products.
- Holds nutrients and allows chemical reactions to take place.

Water is consumed in the form of drinking water and liquid drinks and is found in prepared foods, fruits and vegetables. The daily intake of water should be a little more than the body output of waste products, sweat and evaporation. Approximately 6 to 8 glasses/day of liquid is essential for an adult.

Carbohydrates (energy foods). A motor car needs diesel or petrol to do its work. When the engine is turned off, it does not need any fuel because it has stopped working. Our body is similar to the motor car in that it needs fuel in the form of food to move and work. It is different from a motor car in that the engine of a motor car can be turned off, but our body must keep working to stay alive. For example, when you are in the sleep state a certain amount of energy is required. The total energy requirement of a person is given in calories and is determined by the following:

- Level of physical activity. Energy requirements increase with an increase in activity level.
- Body size and composition. Energy requirements increase with an increase in body surface area.
- Physiological condition. Energy requirements increase during peak growing periods (infancy, childhood and adolescence), pregnancy, lactation and illness.
- Age. Energy requirements decrease with age starting from middle age to old age.

One food component that supplies energy is called carbohydrates. The principle carbohydrates in foods are sugar, starches and cellulose. The sugars are the monosaccharides or disaccharides found in refined sugars, jams, "guda" honey, fruits and soft drinks. These simple sugars are quickly absorbed into the blood stream. They provide energy but provide no vitamins and minerals. The starches are the polysaccharides of cereal grains such as wheat, maize, "bajra" rice, legumes and sweet potatoes. Starches also contain important vitamins and minerals. Carbohydrates are converted into glucose by the digestive enzymes. Glucose is carried to the body cells through the blood and used for fuel.

Fibre is the undigestible component of carbohydrates and includes cellulose, gums and pectin. These nondigestible fibres

have no nutritional value but they provide bulk in the diet and aid elimination.

Dietary fibre, by slowing the absorption of food in the stomach and intestinal tract, may play a preventive role in diabetes and cardiovascular disease, and by providing bulk, may help reduce the risk of colonic cancer and other intestinal diseases. The consumption of fresh fruits and vegetables and whole grain cereal products is desirable since they contain dietary fibre as well as other important nutrients.

Fats and oils (lipids). Fats and oils are just as important as proteins and carbohydrates for the proper functioning of the body. Fats serve the following purposes:

- Provide heat and energy and cushion the delicate organs in the body.
- Help with absorption of vitamin D, vitamin A and other fat soluble vitamins.
- Help make calcium and phosphorous available to the bones teeth and tissues.

Fats are consumed as butter, oil and ghee and are found in meat, milk and various dairy products.

Fat itself is relatively tasteless, but it absorbs and retains flavours. In combination with other nutrients it provides a texture that improves the taste of food. It also delays gastric emptying and contributes to a feeling of being full. Because fats provide 9 calories of energy per gram, they produce twice as much energy as carbohydrate or protein foods eaten in the same quantity. High energy fats and oils are essential dietary components for infants and small children, who cannot eat large amounts of bulky cereal grains to meet their energy requirements because of their small stomach capacity. The 1985-1987 National Nutrition Survey found that virtually all adults consumed oils on the survey day but only one third of the children 12-17 months did.

Any extra calories in the body, whether derived from dietary carbohydrates, fats or proteins are stored as fat (fatty) cells. Deposit of adipose (fatty) tissue represent stores of energy and also serve to insulate the body and protect against mechanical stresses. However, large stores of fat from overeating leads to increased risk (in adults particularly) of cardiovascular disease. Fats which are saturated, such as ghee, palm oil and milk, dairy products, and meats are unhealthy if consumed in large quantities.

Excessive fat intake results in the depositing of plaque on the lining of the arteries causing them to narrow and loose their

elasticity which can result in blood clots, heart attacks and strokes. As health technicians, you should encourage adults to eat more healthy, unsaturated oils such as soybean, sunflower, cottonseed, corn oil or fish oils.

Proteins. Protein is a Greek word meaning "first place in life." As the name implies, proteins are essential for the growth and repair of the body.

Dietary protein is needed:

1. To replace the unavoidable loss of nitrogen resulting from the turnover of tissue protein.
2. To provide for the synthesis of new protein in developing tissues during growth and pregnancy.
3. To form part of the hormones and enzymes that control biological functions.
4. For the formation of blood transport molecules such as haemoglobin (haema = iron and globin = protein) and antibodies.

Protein is found in foods such as cereals, legumes, nuts, meat, dairy products, and eggs. For the body to use proteins adequately, they must be broken down during digestion into their basic component nutrients, the amino acids. There are about twenty kinds of amino acids. Many of these amino acids can be made in the body as long as nitrogen is available. However, there are nine essential amino acids that cannot be synthesized in the body and these have to supplied to the body in our food. Proteins containing all of the essential amino acids are said to be complete proteins. Proteins lacking one or more of the essential amino acids are considered incomplete proteins.

Animal proteins are obtained in the form of meat, milk, cheese, yogurt, fish and eggs and contain all of the essential amino acids. Plant proteins are obtained from grains and seeds and are considered incomplete because one or more of the essential amino acids are either completely absent or present in such small amounts that the body can not make protein from them efficiently. Nevertheless, it is possible to make plant proteins complete by eating them with other foods. Rice, dal or roti by itself has incomplete proteins. But when rice and dal or roti and dal are eaten together the protein becomes complete and meets the body's protein requirement for growth and repair.

To be sure that the body's protein requirement is met, it is advisable for people to consume both plant and animal proteins. This applies especially to those who are following a vegetarian diet. They must be careful to include items such as milk, cheese

and curd in their diet.

Diets rich in animal protein, which are common in much of North America and Europe, probably have a relative protein utilization value of about 80%. In contrast, diets based on a single cereal staple with few other sources of protein, such as the rice diets consumed in some parts of Asia, may have a relative value as low as 60%. In between are the more common mixed cereal and legume diets, such as the chappati and dal diet consumed in Pakistan, perhaps with small amounts of animal proteins included. Such diets have a relative utilization value of about 70% which is adequate as long as the quantity and balance of foods is reasonable.

However, data from recent surveys show that the diets of people in Pakistan are changing. Consumption of legumes, an important protein source that is less expensive then animal protein, has decreased. Only about a third of the population ate any legumes on the day of the survey. Children under three were rarely given pulses with 1% reporting eating them under one year and only 16% during the third year.

Protein-energy interactions. Protein is both a source of energy and a source of amino acids (nitrogen). When the carbohydrate intake is low, dietary proteins and tissue proteins are broken down and metabolized as energy sources resulting in a protein deficiency at the tissue level. This is termed protein-energy malnutrition. At low levels of protein intake, the demands for body protein make its synthesis a priority.

When protein intake is above requirement, the excess is metabolized for energy purposes (either for immediate energy or for energy reserves).

Minerals. Minerals and salt make up about five percent of our body weight. Minerals are found as part of bones, teeth, soft tissues, muscles, blood and nerve cells. Minerals help maintain the water balance and acidity and alkalinity of body fluids. The body requires more than a dozen minerals; these cannot be synthesized within the body and must be supplied in our foods. A very small quantity of each is required. These minerals are present in varying amounts in fruits and vegetables. Some of the more important minerals are calcium, phosphorous, iron, iodine, sodium and potassium.

Iron. Normally people loose only a small amount of iron every day. However, women have large losses associated with menstruation and childbirth. Iron absorbed from the diet must replace the losses, maintain body stores of iron and meet the needs of growth in infancy, childhood and pregnancy. Iron is found in small amounts

in many foods. Muscle and organ meat is rich in iron, and grains and legumes also contain appreciable amounts. Cereal grains, although containing little iron, still contribute substantially to iron intakes owing to the large quantities consumed in developing countries.

The availability of iron to the body depends on the efficiency with which it is absorbed from the foods eaten. Iron, present in animal protein (meat) is more easily absorbed than plant sources (grains) of iron. The addition of a good source of Vitamin C in a meal with plant sources of iron or mixed sources will raise the absorption of iron.

The recommended intake of iron (see Table 5.3) is set sufficiently high to meet the predicted requirements of nearly all individuals, including menstruating women. The iron requirements of women during pregnancy and lactation are so important that they are discussed in the related chapter. They are too high to be met by dietary intake alone and therefore a supplement should be given.

Calcium. The major function of calcium is as a component of bone and hard tissues. Bone mineralization is the function most probably affected by inadequate calcium intake. Calcium is also critically involved in the proper functioning of the nerves and for blood clotting. Good food sources of calcium are milk and dairy products, vegetables, nuts and seeds.

Trace elements. There are 14 trace elements essential for human life. One of these is iodine. Iodine deficiency syndrome is an important public health problem in certain regions of Pakistan, particularly the Northern mountainous regions. Endemic goitre (the name given to an enlargement of the thyroid gland) occurs in a significant number of people living in any restricted area, such as a mountain valley. Foetal iodine deficiency is very serious since the baby may be born a cretin or a deaf-mute.

Saltwater fish and shellfish are extremely rich sources of iodine; fresh water fish are poor sources. In most Pakistani diets the common sources of iodine are milk, meat and cereals. In the mountains, the iodine content of soil and water is low, hence the iodine content of the food grown there is low. Therefore, fortification of salt with iodine, administration of iodine tablets or solution and administration of iodized oil are ways to meet the iodine requirements.

Vitamins. Vitamins are not components of body structure like minerals. They serve the following purposes:

- Help regulate metabolism.
- Help increase body resistance to infection.
- Help convert carbohydrates and fats into energy.

Vitamins are classified into two groups:

Fat soluble vitamins : Vitamins A, D, E, K.
Water soluble vitamins : Vitamins B Complex and C.

Vitamin A is fat soluble and can be stored in the liver. Unless liver stores are depleted or blocked and the serum level is low, clinical signs are not seen. Recent studies however, have shown increased mortality and morbidity risks for children with deficient serum levels. This risk is especially associated with problems in the epithelial lining of the respiratory and gastrointestinal tracts. Vitamin A deficiency specifically affects the eye causing dysfunction of the rod cells in the retina (night-blindness) and drying and ulceration of the conjunctival and corneal epithelia.

Vitamin A intakes are highest in countries where animal products are freely available and vegetables and fruits form a regular component of the daily diet. The best sources of vitamin A (retinol) are milk, butter, cheese, egg yolk and liver. Vegetable and fruit sources are also very important, particularly those red, orange, yellow and dark green in colour. Dark leafy greens such as spinach and mustard, carrots, leek, peppers, mango, papaya, apricots, and persimmon are good sources of vitamin A in Pakistan.

Intakes of vitamin A are lowest on a staple diet of cereal with few vegetables. Seasonal vegetables, fruits and green leafy vegetables need to be added to the small child's diet. While almost half the adults ate vegetables during a recent survey, only 8% of the children 12-17 months ate vegetables on the survey day.

Ascorbic acid (vitamin C) is found in a number of fruits and vegetables. Citrus fruits such as lemons, oranges and grapefruit are particularly rich in this vitamin. Other good sources include leafy greens, cabbage, potatoes, peppers, guava, lokat, mango and melons, persimmon, and papaya.

The functions of vitamin C in the body are not fully understood. In severe deficiency, scurvy develops. This is characterized by swollen and bleeding gums, subcutaneous haemorrhages and changes in the zone of calcification of growing bones. Wound healing is also delayed. Vitamin C aids the absorption of iron.

TABLE 5.3 RECOMMENDED INTAKES OF NUTRIENTS*

Age	Body weight	Energy		Protein	Vitamin A	Vitamin D	Thiamine	Riboflavine	Niacin	Folic acid	Vitamin B_{12}	Ascorbic acid	Calcium	Iron
	Kilograms	Kilocalories	Microjoules	Grams	Micrograms	Micrograms	Milligrams	Milligrams	Milligrams	Micrograms	Micrograms	Milligrams	grams	Milligrams
Children														
< 1.....	7.3	820	3.4	14	300	10.0	0.3	0.5	5.4	60	0.3	20	0.5-0.6	5-10
1-3.....	13.4	1360	5.7	16	250	10.0	0.5	0.8	9.0	100	0.9	20	0.4-0.5	5-10
4-6.....	20.2	1830	7.6	20	300	10.0	0.7	1.1	12.1	100	1.5	20	0.4-0.5	5-10
7-9.....	28.1	2190	9.2	25	400	2.5	0.9	1.3	14.5	100	1.5	20	0.4-0.5	5-10
Male adolescents														
10-12.....	36.9	2600	10.9	30	575	2.5	1.0	1.6	17.2	100	2.0	20	0.6-0.7	5-10
13-15.....	51.3	2900	12.1	37	725	2.5	1.2	1.7	19.1	200	2.0	30	0.6-0.7	9-18
16-19.....	62.2	3070	12.8	38	750	2.5	1.2	1.8	20.3	200	2.0	30	0.5-0.6	5-9
Female adolescents														
10-12.....	38.0	2350	9.8	29	575	2.5	0.9	1.4	15.5	100	2.0	20	0.6-0.7	5-10
13-15.....	49.9	2490	10.4	31	725	2.5	1.0	1.5	16.4	200	2.0	30	0.6-0.7	12-24
16-19.....	54.4	2310	9.7	30	750	2.5	0.9	1.4	15.2	200	2.0	30	0.5-0.6	14-28
Adult men (moderately active).	65.0	3000	12.6	37	750	2.5	1.2	1.8	19.8	200	2.0	30	0.4-0.5	5-9
Adult women (moderately active)	55.0	2200	9.2	29	750	2.5	0.9	1.3	14.5	200	2.0	30	0.4-0.5	14-28
Pregnancy (later half).....		+350	+1.5	38	750	10.0	+0.1	+0.2	+2.3	400	3.0	50	1.0-1.2	14-28
Lactation (First 6 Mon)		+550	+2.3	46	1200	10.0	+0.2	+0.4	+3.7	300	2.5	50	1.0-1.2	14-28

*From a report of a joint FAO/WHO expert group, 1972.

What is a balanced diet? A balanced diet is a diet that is necessary for the maintenance of health and contains the required quantities of essential nutrients, namely proteins, carbohydrates, fats, vitamins and minerals. Some of the factors which make a balanced diet are:

1. Sufficient calories to furnish heat and energy (carbohydrates and fats) to the body.
2. Adequate structural material to repair and provide for growth (proteins).
3. Food containing adequate amounts of protective foods (vitamins).
4. Minerals like iron, calcium, phosphorous and iodine.
5. Roughage or indigestible fibre.
6. Water.

A balanced diet is needed by all to be healthy and happy. Daily nutritional needs of family members vary according to:

- Age.
- Physical state (pregnancy, illness etc.).
- Activity level.

You as Health Technicians need to develop knowledge and skills in determining an individual's nutritional needs and helping families meet this need. Guidelines for determining requirements for various nutrients have been developed by FAO/WHO and are given in Table 5.3. Nutritional requirements for infants, children and pregnant and lactating women are given in respective chapters that follow.

Using the basic food groups and the Pakistani eating habits, a sample of a recommended diet to meet the daily requirements is presented in Table 5.4 for you to use as a guide in determining whether nutritional needs are met.

TABLE 5.4 DAILY FOOD GUIDE FOR PAKISTAN

FOOD TYPE	WOMAN	PREGNANT WOMAN	LACTATING WOMAN	MAN	FEMALE 10-19	MALE 10-19	CHILD 7-9	CHILD 4-6	CHILD 1-3
STAPLE: Rice or chappati	5 Roti	6 Roti	7 Roti	8 Roti	5 Roti	7 Roti	6 Roti	5 Roti	2 Roti
VITAMIN & MINERAL: Fruits	3	3	3	2	3	3	2	2	2
Vegetables	1/2 cup	1 cup	1 cup	1 cup	1/2 cup	1 cup	1/2 cup	1/2 cup	1/2 cup
PROTEIN RICH: Legumes	1/2 cup	1/2 cup	1 cup	1 1/2 cup	1 cup	1 cup	1 cup	1 cup	1/4 cup
Meat OR 1 Egg	1/4 cup	1/4 cup	1/4 cup	1/4 cup	1/4 cup	1/4 cup	1/4 cup	1/4 cup	1/4 cup
Milk or Yogurt	2 cups	3 cups	4 cups	2 cups	3 cups	3 cups.	2 cups	2 cups	3 cups
Breastmilk									On demand until 2 years
ENERGY RICH: Oils or Fat	8 teasp.	8 teasp.	8 teasp.	8 teasp.	6 teasp.	6 teasp.	4 teasp.	4 teasp	2 teasp.
TOTAL CALORIES	2113	2606	3050	2956	2342	2917	2201	1898	1328

Equivalents

1 roti = 3/4 cup cooked rice
1 small fruit = 1/2 cup juice
1/2 cup cooked vegetables = 1 cup raw vegetables
1/2 cup cooked dal = 1/4 teacup of meat = 1 egg

The Individual Daily Food Guide. Table 5.4 on the previous page is to be used as a guide to determine if the family members are eating enough calories and the right types of food. This chart does not include infants under one year of age. Advice on infants' diets are found in Book Two.

To use this chart first note that the diet is broken into four groups of food: the staple, vitamin and mineral rich, protein rich and energy rich. All four groups are important each day. Within the group many different foods can be eaten. If the amount required to eat is different, substitutions or equivalents are on the chart and are given below. For example, some people eat rice or corn instead of chappati. For the two or three servings of fruit, one small piece of fruit or 1/2 cup of juice can count. The recommended serving for vegetables is cooked. If uncooked vegetables are eaten, then 2 times the amount should be eaten. In the protein group, legumes, meat and milk products should be eaten in the amounts specified each day. However, an egg can substitute for meat. If neither egg or meat is eaten that day then additional legumes (dal) should be consumed.

Oil or fat should be added to the food during cooking. It is an important source of calories for family members. Since the health technician will find it difficult to determine the amount of oil one person ate, they snould determine the amount that the entire family used. The procedure can be found in the section how to do a food recall.

A specific amount of sugar is not recommended. While sugar can be an important source of energy, it contains no vitamins and minerals, and can contribute to tooth decay. Sweet beverages and snacks are often expensive. Sugar and sweets should be used in moderation.

The table below should be used to guide the serving size to substitutes within a group. Foods can substitute for all or part of a serving.

Staples:

1 cup of atta	=	2 chappatis
2 chappatis	=	1 1/2 cups cooked rice

Protein Rich Foods:

33 gms of meat	=	1/4 teacup meat = 4 small pieces
1/2 cup cooked dal	=	1/4 cup meat
1 egg	=	1/4 cup of meat

Vitamin and Mineral Rich:

1 cup cooked = 2 cups raw vegetables

Health Technicians need to be knowledgeable and skillful in using the following factors in helping the family meet their nutritional needs:

1. Social customs.
   Who buys the food and plans the meals?
2. Family habits.
   Does the child get their own plate of food? Does the child get the same food as the adults or their siblings?
3. Family's knowledge of nutrition (what they know as well as do not know).
   What foods do they believe are harmful for pregnant women or young children?
4. Foods that are available.
   Know the agricultural patterns: check the bazaars and look in the kitchens.
5. Foods the family can afford.
   Do they have a family garden or raise hens?
6. Family members' likes and dislikes.
7. Possible nutritional needs of the family.
8. Family's food intake and distribution among family members.

In helping families, Health Technicians should consider three approaches to identify and meet nutritional needs. These are listed in Table 5.5.

TABLE 5.5 MEETING NUTRITIONAL NEEDS

Approach	Health Technician's Activities
Nutrition education	After considering the above eight factors, assess the family's actual nutritional needs, provide appropriate counseling, and demonstrate handling, preparation and storage of food.

Approach	Health Technician's Activities
Supplementary feeding	Provide iron and folic acid to pregnant women.
	Refer them to the World Food Programme if available and if the family is eligible.
Personal Hygiene	After assessing their practices, identify areas of need and instruct them on the washing of hands before serving and eating food.

Steps in determining nutritional needs. How do Health Technicians go about determining the actual nutritional needs of an individual or family and helping them to meet those needs?

First determine which family members are at risk of nutritional problems. Health Technicians should consider all pregnant or lactating women at risk as well as, all infants and children to age 5. Others, the elderly, the sick or the very thin, are also at risk.

Conduct a diet recall on the past 2 days (2-day diet recall). Use a separate recall sheet for each at-risk person, for each day, write down exactly what the individual has eaten, including all food and drinks during meals and in between meals.

In assessing the nutritional status and needs of infants and children, the best tool to use is the growth chart. A growth chart is a graph on which an infant and child's expected weight is given up to five years of age. As Health Technicians you should periodically record the weight of each child in your case load. Instructions for filling out the growth chart are covered in the chapter on the health of children.

Tips to get an accurate record of food intake:

1. Start with the current day and work backwards. Mention the day of the week and any other special events to help them remember what they ate. Try to interview the person who prepared and served the food.

2. Keep in mind the information you learned about their likes and dislikes, social customs and food beliefs. If you get conflicting information, ask for clarification.
3. Important questions to ask:

   - What was added to the food during preparation or when served?

   - How much was served; was it all eaten? Use examples of plates, bowls or cups to estimate amount eaten. Remember the amount eaten determines the nutritional value.

   - What else have they eaten away from home, at tea shops, school or while visiting?

   - What beverages did they drink and what was added to it?

   - Did everyone eat the same foods? Remember foods prepared for the family may not be served to all family members.

   - Were these days typical? If not, how are they different?

TABLE 5.6 DIET RECALL FORM

DIET RECALL

Name Age Day

Put One Food Item Per Line

Mealtime	Amount	Food / Drink	FOOD GROUP ANALYSIS: STAPLE		VITAMIN MINERAL		PROTEIN RICH				ENERGY RICH		
			rice	chappati	fruits	vegetables	legumes	meat	egg	milk products	breastmilk	oils	fat	sugar
Morning														
Snack														
Afternoon														
Snack														
Evening														
Snack														
		TOTAL:												

INDIVIDUAL FOOD NEEDS ASSESSMENT	Recommended Intake	Actual Intake	Additional Needs
Staple:			
rice			
chappati			
Vitamin/Mineral:			
fruits			
vegetables			
Protein Rich:			
legumes			
meat			
egg			
milk products			
breastmilk			
Energy Rich:			
oils			
fat			
sugar			

How to Use the Diet Recall Form:

1. Use one form for each person, for each day. Write down the person's name and age for children only on each form.

2. In the section marked mealtime, amount and food/drink, write down the foods and drinks, including the amounts eaten by the family member at risk. Remember, put only one food per line.

3. In the column labeled Food Group Analysis in the food recall section, for each food item that you wrote, mark the amount eaten under the appropriate food group listing. For example, if a pregnant woman had 2 chappatis, 1/2 cup of yogurt, a banana, and tea with milk in the morning, you would mark a 2 under the chappati column, a 1 in the fruit column, and in the milk column 1/2 for yogurt and 1/2 for milk (a milk serving is one cup). See completed example food recall sheet, Table 5.7, on pregnant Rushna.

   Do this for each food item except oil and then total each food group listing.

4. In the Individual Food Needs Assessment section, found on the bottom portion of the Diet Recall form, write down the amounts recommended for that individual for the day.

5. Add together the total amount of oil recommended for each family member to determine the total amount of oil needed for that day. For example, all adults need 8 teaspoons of oil each, teen age children 6, etc. For a family of 6:

2 adults need	16 teaspoons,
a male teenager needs	6 teaspoons,
a child, age 7, needs	4 teaspoons
a child, age 5, needs	4 teaspoons
and the, 2 year old needs	2 teaspoons
Total	32 teaspoons oil each day

Since one teaspoon equals 5 ml, and 3 teaspoons are in a tablespoon and 16 tablespoons are in a cup, the correct measure of oil for the family food preparation is 160 ml or 2/3 of a measuring cup. That is equal to a tea cup.

Once you know the recommended amount, ask the food preparer to show you in a cup or jar how much oil she uses each day in food preparation. Determine if all family members are eating the foods that the oil is in and counsel accordingly. If some members of the family are particularly malnourished, a little more oil can be added to the cooking pot for their serving after the other family members' food has been served.

6. Transfer the totals to the Individual Food Needs Assessment section marked actual intake and subtract it from the recommended intake.

7. Discuss with the family what foods need to added and be sure to explain why the additional foods are important. Help them figure out ways to provide the foods to the family. Give them specific tasks to improve their nutritional status. Teach them methods of new preparation, plan a garden, etc. Discuss supplemental nutrition programs and personal hygiene instructions.

8. If the child is breast-feeding, on their Diet recall under the breast-milk recommended amount section, write whether the feeding should be exclusive (only breast-milk and no other fluids) and the frequency. In the actual intake section, write the frequency and in the recommended intake section, write the advice. For example, night feed to increase frequency, stop bottle feeding, feed two more times during the day or feed longer from each breast.

TABLE 5.7 EXAMPLE DIET RECALL FORM FOR PREGNANT RUSHNA

DIET RECALL

Name Rushna Age 24 Day Sunday

Put One Food Item per Line pregnant

Mealtime	Amount	Food / Drink	STAPLE: rice	STAPLE: chappati	VITAMIN MINERAL: fruits	VITAMIN MINERAL: vegetables	PROTEIN RICH: legumes	PROTEIN RICH: meat	PROTEIN RICH: egg	PROTEIN RICH: milk products	PROTEIN RICH: breastmilk	ENERGY RICH: oils	ENERGY RICH: fat	ENERGY RICH: sugar
Morning	2	Chappatis		2										
	1/2	yogurt								1/2				
		banana			1									
	1 cup	tea with milk								1/2				
Snack	1 cup	tea with milk												
		apple			1					1/2				
Afternoon	2 cups	rice	2 1/2											
	1/2 cup	potato curry				1/2								
		water												
Snack														
	1 cup	tea with milk								1/2				
		rusk		1										
Evening														
	2	Chappatis		2										
	1 piece	meat kabab						1/4		1/2				
	1/2 cup	lassi												
Snack														
TOTAL:			2 1/2	5	2	1/2		1/4		2 1/2				

INDIVIDUAL FOOD NEEDS ASSESSMENT	Recommended Intake	Actual Intake	Additional Needs
Staple:			
rice	6	7 1/2	none
chappati			
Vitamin/Mineral:			
fruits	3	2	1
vegetables	1 cup	1/2 cup	1/2 cup
Protein Rich:			
legumes	1/2 cup		1/2 cup
meat	1/4 cup	1/4	none
egg			
milk products	3 cups	2 1/2	1/2 cup
breastmilk			
Energy Rich:			
oils	8 teaspoons		more
fat			
sugar			

Nutritional Counseling. Once an individual's additional food needs are determined they must be discussed with them. Here is an example of how pregnant Rushna could be counseled.

- You are doing a good job in choosing the right foods. But there are some areas that you need to pay attention to. During pregnancy you have additional needs, and eating right will help you have a healthy baby.

- You are eating the right amount of rice and chappati. Remember to have 6 chappati each day or when you have rice each 3/4 cup of rice replaces one chappati. You should add some oil or ghee to the atta and make paratha frequently, to make sure you are getting enough calories. The rusk was analyzed as a chappati because it contains similar ingredients and is not sweet. Even though a woman is eating a little more in the staple category, as long as she is not overweight, additional amounts of food can be eaten in any category.

- Do you like dal? Dal is an important source of protein, iron, vitamins and calories. You can eat it with animal protein or it can substitute for the 1/4 cup serving of animal protein by adding 1/2 cup of cooked dal to your meal. When you cook dal what do you put in it? Do all family members like dal? Even if your husband doesn't like dal, you can cook it for the rest of the family and give him an egg or a little more meat. Dal is an excellent, inexpensive source of protein. Don't forget to add some oil to it.

- During pregnancy milk is especially important. You used 2 1/2 cups of milk during the day. The lassi was only counted as a half a cup because the yogurt was diluted with a lot of water. Three cups are recommended. Ask her how she could add milk to her diet. If she has problems answering make some suggestions. For example, could you drink another cup of tea with milk during the day, only add a little water to your lassi, or add some yogurt to your curry?

- Are you taking an iron supplement? Here is a_____months supply and when you go to the MCH clinic be sure to get some more.

- Do you have questions? Tell me what foods you need to eat more of. I will see you in two weeks to see how you are doing.

THE ENVIRONMENT IN AND AROUND THE HOME

How can Health Technicians help families maintain a health promoting environment in and around their home?

As Health Technicians, you have been taught to use the problem solving approach. The first step in this approach is to gather information on possible needs and resources and then evaluate a family's environment in and around the home for safety and cleanliness. You need to make certain observations to assess the needs.

For simplicity, areas to be assessed and suggested activities are listed in the table below.

TABLE 5.8 ENVIRONMENTAL ASSESSMENT AND SUGGESTED ACTIVITIES FOR HEALTH TECHNICIANS

Observation area	Suggested activities
General appearance of cleanliness and order	- Observe outside and inside the house to see if things commonly used are orderly or haphazardly placed. - Look for signs of routine care of the courtyard, hallways and rooms, for example, plastering of cracked walls and floors. - Look for presence or absence of stains and stickiness on floor, walls and furniture surfaces. - Observe for where and how dishes are washed and stored. - Look for flies and other insects in excess.
Light and ventilation	- Observe the working and studying area for adequate light (natural/artificial). - Note the number of doors and windows and whether they are open or shut.
Cooking area	- Note the kind of fuel used. - Identify the location of the stove in relation to the entrance.

TABLE 5.8 ENVIRONMENTAL ASSESSMENT AND SUGGESTED ACTIVITIES FOR HEALTH TECHNICIANS

Observation area	Suggested activities
	- Observe for adequate ventilation. - Note if children are allowed in and around the cooking area. - Observe if utensils are protected from flies and pests.
Food preparation	- Determine if fruits and vegetables are washed adequately. - Determine if the hands of food handlers are washed before the preparation and handling of food. - Determine if foods, especially meats, are well cooked.
Food storage	- Determine if foods are stored in pest-proof containers. - Determine if foods are covered to protect from flies. - Determine if milk and other food that can spoil are stored in cool places or placed in water.
Drinking water	- Determine from where the drinking water is obtained: river or well.
Refuse disposal	- Determine where all refuse is disposed.
Drainage water	- Determine what happens to water used for washing and cleaning. Is there an open drain or a pool of stagnant dirty water?
Poultry and animal shed	- Determine the condition of the shed. - Determine if it is cleaned regularly. - Determine the distance from residential area.
Safety hazards	- Identify safety hazard areas such as an open well, a broken or unstable stairway, children playing near the stove.

Once you have gathered information on the family environment and resources, identify positive and negative factors. Compliment the family on the positive ones and encourage them to maintain them. Provide assistance in correcting the negative factors by:

1. Providing information on ways to change the negative ones.
2. Demonstrate the preparation and storage of food and water.
3. Refer to the Municipal Corporation for water supply, vector control, refuse and garbage disposal in urban areas and to private businesses or persons who are experts in this area. In the rural areas, contact community leaders.

CONTROL OF COMMUNICABLE DISEASES

The control of communicable diseases is of central concern to you as Health Technicians working in the village because you are in a position to observe increases in the number of such cases and can alert health centres as well as people in the community so that appropriate preventive actions can be taken.

There are two major types of communicable diseases. The first type is acute and spreads rapidly in a short time affecting a large portion of the population within days and may even result in deaths. Prompt reporting and a request for preventive services by Health Technicians and community members can therefore save many lives and minimize unnecessary suffering. All the childhood diseases such as measles, diphtheria, mumps, whooping cough and polio and some diarrhoeal diseases such as typhoid, cholera and malaria are acute diseases.

The second type is chronic, meaning symptoms develop over a long time and the disease may not become obvious until a person is very ill and develops many symptoms at the same time. Death does not occur in a short time and the disease spreads first to those closest to the sick person, usually family members.

In the course of their work, Health Technicians have many opportunities for disease control. For example, during a visit to a village, a Health Technician may notice larger numbers of children than usual at home. Further questioning may provide clues that an increasing number of children in school are ill. Further questioning on the nature of the illness and the symptoms will provide more information. This should be relayed to the Medical Officer at the BHU or RHC who will then begin to assess the need to plan and implement necessary programmes.

Health Technicians do not need to make or know the exact diagnosis. A prompt reporting of the following information will aid the higher authorities in planning to deliver appropriate services:

1. How many persons have become ill over the past week, the past 15 days or the past month?
2. What is the characteristic of the population being affected in terms of:

   - Location
   - Age
   - Sex
   - Occupation?

3. What are the symptoms and its patterns? (Temperature, diarrhoea, sore throat, headache, rash etc.)
4. How severe are the symptoms?
5. What is the longest duration of symptoms?
6. Any deaths from the disease? If so, how many?

Providing prompt and adequate care is the responsibility of the Medical Officer Incharge but Health Technicians have the responsibility of notifying him of the situation. Therefore, it can be said that Health Technicians may serve as advance intelligence officers in controlling the spread of communicable diseases by alerting concerned authorities early so that prompt and adequate service can be provided.

The spread of communicable diseases can be prevented through the provision of:

- Health education.
- Immunization services.
- Treatment and rehabilitation.
- Prevention and early treatment of common conditions.

The above topics will be covered later in detail but the immunization schedule is listed below for a quick review in assessing the immunization status of all family members.

Information on immunization is given in Chapter 12. However, Health Technicians need to be sure that all members of the family are fully protected with available immunization. So during home visits, the Health Technician needs to assess the immunization status of all family members. The target groups and required immunizations are given here as well.

TABLE 5.9 IMMUNIZATION SCHEDULE

Target group	Recommended immunization and activities
Infant (birth to 1 year)	BCG; DPT; Polio; Measles
Pre-school	If all of the above immunizations were given, then give a booster of polio and DPT. OR If all of the above immunizations were not given in the first year, complete the series first, even during pre-school, and then plan the booster.
School age children	If the immunization series was not completed, start the DT and polio series and complete. Do not give pertussis to children above 5 years of age.
Women of child bearing age	Two doses of tetanus toxoid.
Antenatal mothers	Two doses of tetanus toxoid during pregnancy if not already immunized.
A person with an injury	A booster dose of tetanus toxoid or the series if not already immunized.
A person bitten by an animal suspected of having rabies	Anti-rabies vaccine.

SERVICES TO THE SICK, AGED AND DISABLED

When making a home visit Health Technicians should take inventory on who is living in the house and compound. If there are any aged, sick or disabled people you should show an interest in meeting them. Once you meet them, make an individual assessment to identify needs. If these persons are adjusting well to their needs brought on by age, illness or disability, you have no further responsibility at that time. You may want to end your visit with these individuals by saying "I was interested in learning how you were coping with the demands made on you. It seems like you are

doing very well. I have learned a great deal by talking to you. If there is anything I can do for you please contact me."

If you find a sick or disabled person in the home who is not coping well or if you have been summoned to see someone who is sick or disabled, talk to family members to find out what they think the problem is and how you can help them. Then talk to the sick/disabled individual and assess the possible needs and resources of the family based on information given to you.

Collect more information by asking or observing so that you can further determine needs in the following areas:

1. Nutritional.
2. Personal hygiene.
3. Self-care activities.
4. Sleep and rest.
5. Bowel and bladder care.
6. Treatment.

Find out if the above needs are being met either partially or fully and identify the person or persons mainly responsible for caring for the sick. Also determine how much the patient is able to do and what he is allowed to do.

Once you have enough information on needs and resources then you can proceed to plan with the sick person and the family various ways to meet their identified needs. If you feel that you lack some knowledge or skill to help the family, inform the family of this and say that you will discuss the situation with the staff at the BHU/RHC or with a Training Specialist and arrange for them to help the family. Inform them of when you will return. Keep your commitments.

Care of the aged and care by the aged. In Pakistan, people's health is generally improving and people are living longer. This is termed "a longer life expectancy" because there will be more older people in the community. Older people traditionally are given a respected position in the family. However, because of changes in values, life styles and attitudes an older person with no income may be viewed as a burden.

Retired or aged persons need not be a burden. As a matter of fact, they can be of great help to the family once their limitations and potentials are identified. The following are some potentials and limitations.

Potentials:

1. They have time, so some time-consuming duties can be given to them.
2. They want to be useful and are willing but may be slow.
3. They are tolerant and understanding and amusing. They like children so having children under their care will not only make them feel good but as the children get closer to them they will learn more about family values and traditions.
4. They have lived a long life and so have a lot of experience which young families can make use of.

Limitations:

1. They may be slow in their movements, so be patient.
2. They may have difficulty in seeing, hearing and walking.
3. They may require special foods because of few or no teeth.
4. They may be set in their ways.

Consider the above factors in identifying what contributions the older members of the family are able to make so that while taking care of the elderly the family sees them as a resource and not just a liability.

MENTAL DISORDERS AND DRUG ABUSE

As you make your home visits, you will easily notice severe cases of mental illness and drug abuse but the milder cases will not be so easy to identify. You will be most helpful if you are skilled enough to detect mental disorder and drug abuse in the early stage of development so that individuals and families are able to get timely and appropriate help.

You are not expected to make a diagnosis of various types of mental disorders. What you need to do is identify individuals with the following symptoms and encourage the family and the individual to seek early medical help for diagnosis and treatment:

- General and vague symptoms that do not improve.
- Lack of appetite.
- Difficulty in sleeping or sleeping too much.
- Not talking normally; saying strange and inappropriate things.
- Seeing or hearing things which other people do not.
- Ignoring personal hygiene and not taking care of self.

- Not knowing who he is, where he is or where he should be.
- Crying or laughing inappropriately.
- Becoming angry.
- Running away from home, refusing to work or eat.
- Keeping to himself and talking to himself.
- Always tired or full of energy.
- Usually depressed.

As Health Technicians, your training is of 18 months duration and you will be given general information on how to help a family meet their identified needs. After training, you will have to gradually gain knowledge and skill in handling specific situations through reference material and work experience.

GLOSSARY

Amino acids: Essential constituents of protein.

Assess: To evaluate a condition or situation.

Behaviour: Manner of action.

Communicable diseases: Diseases that are transmitted or spread.

Environmental sanitation: Condition of one's surroundings affecting health.

Enzyme: By-products of cells causing chemical changes in substances such as the breakdown of food into simpler form during digestion.

Follow-up: The act of pursuing or continuing a course of action.

Handicapped: A physically or mentally disabled person.

Immunization: Chemical preparation that protects individuals from certain childhood diseases.

Interaction: The way in which two or more things or people react with each other or work together.

Lactation period: The period during which a mother is producing milk and breast-feeding her infant.

Limitation: A point beyond which something may not proceed.

Malnutrition: A condition due to improper nutrition.

Monosaccharide: Simple, refined carbohydrates in the form of sweets or sugar.

Motivate: Prompt a person to act.

Nutrients: Constituents of food.

Psychological: Emotional or mental attitude of an individual or group.

Stigma: Non-accepting attitude of a group; a mark of shame or discredit.

Stunted: Smaller size than normal.

Supplementary nutrition: Additional food.

Synthesize: To combine into a single entity.

SUGGESTED LEARNING ACTIVITIES

1. Learn about the nutrition practices and customs in a village you are not familiar with.
2. Conduct at least three nutritional assessments on each of the following utilizing the "Two Day Diet Recall." Analyze the diet and provide advice to the mother.
3. Conduct an assessment of the environment in and around five homes.
4. Determine the immunization status of one person in three families.
5. Develop skills in home visiting by role playing.
6. Develop a menu for a balanced diet for a week for yourself.

REVIEW QUESTIONS

1. What is a family?
2. Why are Health Technicians concerned with the family?
3. List and briefly describe which factors have an impact on the health of the family.
4. List the seven stages of human development and state why you need to know this information.
5. Why do you need to be knowledgeable about nutrition?
6. What are the six main groups of nutrients? Briefly describe the function of each.
7. Why do you need to know about calories?
8. Should fat be included in our daily diet? Give explanations for your answer.
9. What are the main nutritional problems in Pakistan?
10 List four good food sources of iron, vitamin A and Vitamin C.
11 What is the difference between animal and plant protein?
12. Is it true that a vegetarian diet is an inferior diet? Give reasons for your answer.
13. Why are vitamins and minerals required by our body?
14. What is a balanced diet?
15. Why is the Health Technician concerned about the environment in and around the home? Give three to five reasons why the family is the focus for delivering Primary Health Care Services.
16. List six to eight environmental health areas you need to pay attention to.
17. Once you have gathered information on a family's environment, what is your next step? Please explain.
18. What is the difference between an acute and chronic condition?
19. What is the GOP recommended immunization schedule?
20. When you locate a sick and/or disabled individual in a village what should you do to help him or his family?
21. How would you help an individual complaining of persistent vague and generalized symptoms?

LEARNING ACTIVITY RECORD

Environmental assessment:

	Name and Address of family	Teacher's Signature
1.		
2.		
3.		
4.		
5.		

Nutritional assessment:

	Name and address	Name and address	Name and address	Name and address	Teacher's signature
Infant					
Preschooler					
Child-bearing woman					
Pregnant woman					
Lactating woman					
Person over 50					

Immunization status:

		Teacher's Signature
Family 1		
Family 2		
Family 3		

EVALUATION FORM

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of Presentation	[ ]	Simple to understand
	[ ]	Difficult to understand
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

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HEALTH DIVISION
GOVERNMENT OF PAKISTAN

PRIMARY HEALTH CARE PROJECT

HEALTH TECHNICIANS TRAINING GUIDE

BOOK II
(Revised)

The National Basic Health Services Cell
Health Division, Government of Pakistan
In Collaboration with the
Health Departments of
Baluchistan, Punjab, NWFP
and Sind Provinces

1990

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PREFACE

This revised curriculum has been prepared for the training of health technicians who are very important members of the health team in the rural health services.

Known as **"TASK ORIENTED TRAINING"** the revision is based on:

(i) Needs of the community related to health improvement and reduction of maternal and infant mortality;

(ii) Training objectives related directly to the tasks;

(iii) Tasks required to meet the health needs of the population served;

(iv) Learning activities that will enable the students to perform the tasks in terms of the objectives, and;

(v) Evaluation of the students's training.

The training material is presented in three books containing a total of twenty chapters and is developed by a Pakistani Consultant, Prof. Mohammad Iliyas and the Federal Training Advisor for the Primary Health Care Project, Dr. Tara S. Upreti.

In developing the chapters, six modules previously prepared with the assistance from University of Hawaii Medical School during 1977 - 1980 have been used with variations to suit new requirements where appropriate. Besides these volumes, additional material has been obtained from the following sources:

- Werner, D: **Where There is no Doctor.** Palo Alto, The Hesperian Foundation, 1985.

- World Health Organization: **Immunization in Practice - A guide for health workers who give vaccines.** Module 1 - 7, Geneva, WHO, 1984.

- World Health Organization: **The Primary Health Worker.** Geneva, WHO, 1980.

The final product of the chapters is based on extensive discussions and inputs by Federal Health officials, Dr. Mushtaq Ahmad Chaudhry, Dr. M. Zafar Ahmed, and Mr. Abdul Sattar Chaudhry as well as Provincial Health officials especially including the Directors of Health Services from all four provinces. The guide represents a consensus of all concerned in training and supervising Health Technicians.

The revised curriculum has also taken the guidelines from the following documents:

- The Alma Ata Declaration of Health For All by the Year 2000.
- The Prime Minister's Five-Point Socio-economic Development Plan.
- The Sixth and Seventh Five-Year Plans for Pakistan (Health Components).
- Consultants' reports on curriculum requirements from 1982 onward.

The entire revised curriculum aims at strengthening the role of Health Technicians as a vital link between the community and the health facilities. As such the manual focuses mainly on preventive and promotive health technology applied to communities.

The revised portions of the chapters were completed during the workshop held in the four provinces where the participants were the Project Directors, Provincial Basic Health Services Cell, Senior District Health Officers, Programme Training Officers, Tutors, Medical Technicians, Health Inspectresses, and Principals of Schools of Public Health. Their names are shown separately on the attached sheets following the acknowledgement.

Considerable contributions have been made by the Advisory Committee members, the composition of which is shown on the list that follows. Rural Health Centre staff, health educators, and health administrators from the provinces also contributed to the curriculum development.

Significant contributions have also been made by specialists in Paediatrics, Expanded Programme for Immunization, Malaria Control Obstetrics, Nutrition and Health Education. Their names are shown on the list of Subject Specialists.

In order to ensure that the curriculum remains up-to-date, action-oriented, and appropriate to the community's needs, the Federal Advisory Committee has developed a monitoring plan. All the components of the Health Technicians' Training Programme in the classroom, hospital and the community will be monitored by the Advisory Committees constituted at the provincial level, the Primary Health Care Project Training Specialists, and the Federal Primary Health Care Training Advisor. For one full training cycle, progress reports will be submitted by these provincial committees to the Directors of Health Services. Based on such reports, the materials in the various chapters may be updated by the authors in future. In this way, the training programme will continue to be pertinent in the provision of health services to the communities in the years to come.

It is our hope that all these efforts will prove to be a major step in assuring success in the Health System.

ACKNOWLEDGEMENT

The Ministry of Health gratefully acknowledges the help, advice, and constructive criticism of dozens of people in the preparation of the Health Technician Training Guide.

We are indebted to the Provincial Directors of Health Services and Project Directors of Basic Health Services for their invaluable contributions.

We are also most grateful to all those who attended the three Curriculum Workshops in each province. They include the Medical Superintendents, the District Health Officers, the Inspectresses of Health, the Medical Officers of Rural Health Centres, the Programme Training Officers, and the Tutors of Health Technician Training Schools. All of them read the chapters line by line and suggested improvements for simplicity of language, accuracy of material and applicability of the contents.

The untiring efforts of the Advisory Committee members are laudable. The committee was responsible to provide guidelines and direction on the format and content of the revised curriculum. The committee was mostly the first body to review the draft chapters. It also helped in identification of experts and materials available in the country which could be used in the revision of the curriculum.

Thanks are due to the Specialists from the fields of paediatrics, Health Education, Expanded Programme for Immunization, Malaria Control, Nutrition and Obstetrics. The comments of these experts have been very helpful in the improvement of the respective chapters.

We appreciate the helpful suggestions of many colleagues in the Ministry of Health and other departments. Particular mention is justified for the hard work done by Dr. Mushtaq Ahmed Chaudhry, Dr. M. Zafar Ahmed and Mr. Abdul Sattar Chaudhry - the three musketeers of Primary Health Care Project in the Basic Health Services Cell who developed the original curriculum and are responsible for this necessary revision. They identified the needs for the revision, initiated the revision, monitored the progress, provided needed guidance at every step, read the revised chapters, and in some cases, even wrote certain chapters themselves.

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This revision of the Curriculum could not have been completed without the untiring and persistent hard work of months together by Professor Mohammad Iliyas and Dr. Tara S. Upreti. They have together woven into Health Technician Training Guide the work of a large and diverse group of people.

We acknowledge with thanks different ideas, materials and designs, borrowed and/or adapted from a vast body of available knowledge around the world, the source of which is not acknowledged by name.

We are indebted to the technical and financial assistance provided by the United States Agency for International Development without which the revision could not have been completed.

To everyone who worked as a team in completing the revised curriculum successfully, we again express our appreciation for their contribution to improved training of health workers who deliver essential health services and minimize suffering in rural Pakistan.

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INFORMATION ON HOW TO USE THE THREE BOOKS

This training guide is written for those students who are participating in Health Technician's Training Programme in Pakistan. It consists of three books. The first book has five chapters, the second book consists of chapters six through twelve and the third book contains chapters thirteen through twenty.

Each book has a Table of Contents for all three books to inform the reader of the location of other topics. In addition, a Tutor's Workplan is provided for each book following the contents. References for each book are provided at the end of the book. Chapters in the books are organized in the following order:

1. List of objectives.
2. Contents of the chapter.
3. Procedures related to the subject.
4. Glossary.
5. Suggested learning activities.
6. Review questions.
7. Record of learning activities.
8. Evaluation sheet.

TUTOR'S WORK PLAN
CHAPTER 6 THROUGH 12

Chapter/Topic	Time in hours							Venue of Experience	Person Responsible	Support and other material
	1st Sem		2nd Sem		3rd Sem		TOTAL			
	P	T	P	T	P	T				
6. Health of the Mother: Antenatal Care.	10	40	23	12	23	12	120	Out-door (female) Home visits	Lady Medical Officer Lady Health Visitor Female Health Technician	
7. Health of the Mother: Labour, Delivery and the Postpartum Period.	5	40	26	12	25	12	120	Maternity Ward Home visits	Lady Health Visitor Nurses Medical Officer	Type II LHV kit
8. Complications of Pregnancy, Labour, Delivery and the Postpartum Period.	0	40	26	12	30	12	120	Outdoor Maternity Ward Home visits	Lady Medical Officer	Kit
9. Health of the Newborn and Infant.	5	30	21	12	20	12	100	Ob/Gyn Ward Labour Room Home visits	Pediatrician Lady Medical Officer	Kit, Scale
10. Health During Early Childhood.	10	30	30	12	26	12	120	Outdoor Labour Room Home visits	Lady Health Visitor Senior Health Technician	Scale/Kit Arm band
11. Common Problems of Newborns, Infants and Children.	5	30	30	12	36	12	125	Pediatric Ward RHC/BHU Home visits	Pediatrician Nurses Medical Officer Senior Health Technician	Kit
12. The Health Technician's Role in Family Planning.	5	20	21	12	20	12	90			F.P. Kit
							795			

CHAPTER 6

HEALTH OF THE MOTHER: ANTENATAL CARE

Objectives: After completing this chapter you will be able to:

1. Identify the anatomical structures associated with reproduction.
2. Describe the menstrual cycle.
3. Describe the changes that occur in a woman during pregnancy.
4. Describe signs and symptoms observed and experienced by the pregnant woman.
5. Describe foetal growth and development over a 40 week gestation period.
6. List and describe the Health Technician's activities in providing antenatal care.
7. Describe ways to identify pregnant women in a community.
8. Describe and carry out the procedure for a health assessment and examination.
9. Describe and carry out a record keeping exercise.
10. Identify the needs of the family and the expectant mother's needs due to pregnancy.
11. Determine nutritional needs and ways to help meet these needs.
12. Determine personal hygiene needs and ways to meet these needs.
13. Determine needs for activity, rest and exercise and ways to meet these needs.
14. Determine the health service needs and ways to meet these needs.
15. List and describe the discomforts experienced during pregnancy and ways to relieve these discomforts.

CHAPTER 6

HEALTH OF THE MOTHER: ANTENATAL CARE

The health of the mother strongly influences the health of the family because the mother plays an active role in:

- Planning and preparing the meals.
- Maintaining the cleanliness of the family and home.
- Teaching personal hygiene habits to the children.
- Making maximum use of limited family resources.

In addition, a woman has direct responsibility for carrying the foetus in her uterus for nine months. So her general health determines the health of the developing baby as well as her ability to care for the child. Females who are reaching the age of puberty should understand that maintaining good health while young will not only help make healthier babies but will also make them stronger for labour, childbirth and child rearing.

In meeting the health needs of the mother it is essential to involve other family members (husband, children and others) during pregnancy. This is important because women who are not in good health develop complications during pregnancy or delivery. Complications may lead to serious illness or death for the mother or the baby.

In Pakistan approximately 8 women out of 1000 die during pregnancy or delivery. Many more suffer from complications which could be prevented. As Health Technicians, you will learn the signs and symptoms of pregnancy and provide guidance to pregnant women so that complications and deaths during pregnancy are reduced.

In this chapter you will learn what a normal pregnancy is and how you can help pregnant women and their families cope with needs arising from this situation.

Traditionally, maternal health services were limited to the periods of pregnancy, delivery and up to six weeks after delivery. This period covered about eleven months. However, you should not limit yourself to providing care and support only during this time. Consideration should be given to the mother and the family for as long as they need your services in attaining an optimum level of functioning.

In order to understand pregnancy, it is important to have some understanding of the structure and function of the male and female reproductive organs. This will be discussed first, followed by a description of the signs and symptoms of pregnancy and the activities of Health Technicians in helping pregnant women attain their optimum level of functioning.

6.1 THE STRUCTURE OF THE MALE REPRODUCTIVE SYSTEM

The male reproductive system includes the testes, vas deferens, seminal vesicles, prostate gland, ejaculatory tube, urethra and penis.

The testes. These two oval structures produce the male reproductive cells called sperm and the male hormone testosterone. The testes lie in a sac of skin called the scrotum. The scrotum hangs behind and below the penis in the groin as illustrated.

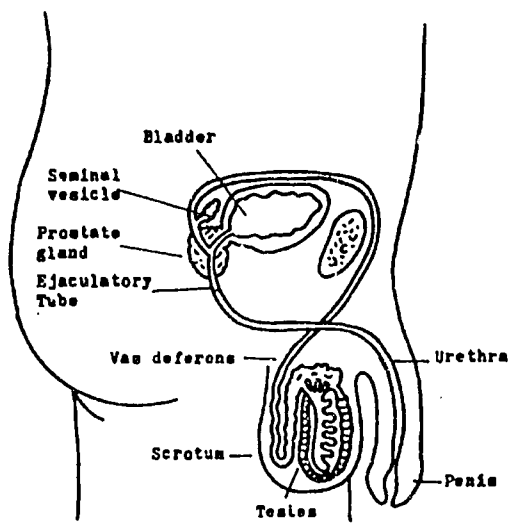

Fig. 6.1 The structure of the male reproductive system.

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The vas deferens. This is a coiled tube which runs up from the testes into the pelvis. The vas deferens enters the abdomen as part of the spermatic cord. It then passes over the bladder to enter the prostate gland.

The spermatic cord. This structure contains the vas deferens as well as blood vessels, lymph vessels and nerves.

The seminal vesicles. The two seminal vesicles lie near the prostate gland and the bladder. They secrete a fluid which forms part of the semen.

The prostate gland. The tube from the seminal vesicles joins the vas deferens inside the prostate gland to form the ejaculatory tube, which discharges the sperm. The prostate gland also secretes a fluid which becomes part of the semen. The ejaculatory tube joins the urethra just below the bladder.

The urethra. This structure is part of both the urinary system and the reproductive system because urine and sperm cells pass through it. The urethra goes through the penis and opens at its tip.

The penis. This is a long shaft of spongy tissue which contains many blood vessels. A piece of skin called the foreskin covers the end of the penis. The foreskin is often removed by circumcision, so that the pink portion of the penis is visible. This pink portion is known as the glans.

6.2 FUNCTIONS OF THE MALE REPRODUCTIVE SYSTEM

The functions of the male reproductive system are to produce sperm cells to fertilize the female egg and to produce the male hormone testosterone. Millions of sperm cells are made in the testes. The sperm cell consists of a head and a tail. The tail enables the sperm to swim to the egg once it is inside the female body.

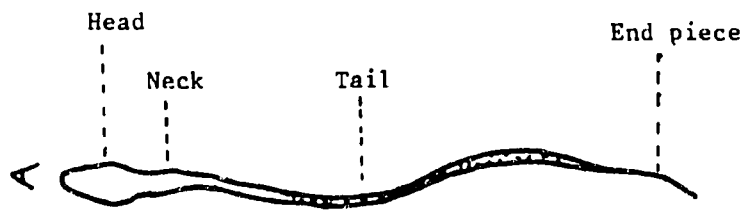

Fig. 6.2 A sperm cell.

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When a male becomes sexually excited, the blood vessels in his reproductive organ swell. As more blood enters the tissues of the penis, it enlarges and hardens. Sperm cells pass through the vas deferens and into the ejaculatory tube.

Seminal fluid. Mucous from the seminal vesicles and milky fluid from the prostate gland get mixed with the sperm. This combination of mucous, milky fluid and sperm is known as the seminal fluid or semen. When a man ejaculates, semen is released through the urethra and sperm cells enter the vagina.

The male hormone testosterone. This is the main hormone of the reproductive system in males and is produced by the testes. Testosterone plays a part in the production and development of sperm cells and is responsible for the development of male sex characteristics.

When a boy is between the age of ten and fifteen, his testes begin to produce increased amounts of testosterone. His reproductive system starts to function and his body begins to change. This period of development is called puberty. During puberty a boy's body begins to grow rapidly. Hair develops on his face, under his arms and around his penis. His testes grow and begin to produce sperm.

6.3 THE STRUCTURE OF THE FEMALE RLPRODUCTIVE SYSTEM

The female reproductive system consists of the external genitalia and the internal reproductive organs contained in a bony pelvis. The external genital organs of the female, known as the vulva, consist of the labia majora (major), labia minora (minor), clitoris and Bartholin's glands.

The labia majora. This is formed from two elongated folds of tissue and fat covered with skin and hair.

The labia minora. The labia minora are two thin folds of skin lying between the inner surfaces of the labia majora. In front, the labia minora unite and enclose the clitoris.

The clitoris. This is a very vascular and sensitive structure above the urethral opening.

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Bartholin's glands. These glands are embedded in the posterior region of the labia majora. Their ducts open on either side of the vagina to secrete a lubricating fluid.

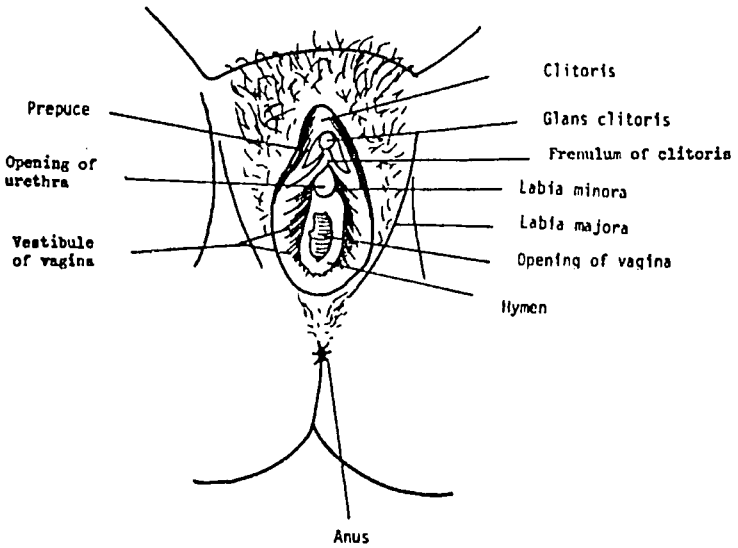

Fig. 6.3 External female genitalia.

The internal reproductive organs include the vagina, uterus, fallopian tubes and ovaries.

The vagina. The vagina is a cavity that lies between the urethra and the rectum. It forms part of the birth canal. The walls of the vagina are lined with mucous membranes and are normally pink and moist. The vagina produces increased amounts of mucous when a woman becomes sexually excited. The vaginal opening is surrounded by the labia.

The uterus. The uterus is located in the pelvis above and behind the bladder. It lies just above the vagina. The lower end of the uterus that opens into the vagina is called the cervix. Normally the uterus is about the size of a woman's fist. The uterus is lined with mucous membranes that change with the menstrual cycle. Strong muscles allow the uterus to expand during pregnancy and to contract during delivery.

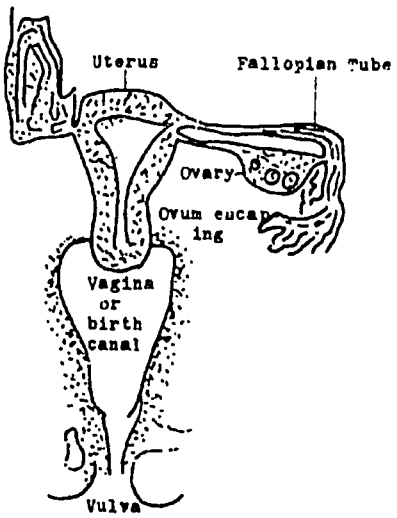

Fig. 6.4 The internal female reproductive organs.

The fallopian tubes. The fallopian tubes are two muscular canals which lie on either side of the uterus. One end of the fallopian tube opens into the uterus while the other end opens near the ovaries. This end of the fallopian tube has finger-like fimbriae that sweep over the ovaries in search of ova (female egg cells). Each fallopian tube is about 11 cm long.

The ovaries. The ovaries are two small organs lying on each side of the uterus which produce the female egg cells known as ova. They secrete two hormones.

The female hormones. The ovaries produce progesterone, a hormone that prepares the lining of the uterus for the implantation of the egg and estrogen, which is responsible for the development of female sex characteristics.

Breasts. The rise in estrogen during puberty begins breast maturation. At the beginning of puberty there is only a slight elevation of the nipples. With the production of estrogen and progesterone, breast buds develop with a notice-

able areola. The nipples and areola further increase in size. The increase in breast tissue is due to an increase in connective tissue and the deposition of fat. The glandular tissue of the breast, necessary for successful breast-feeding, does not develop until pregnancy.

The structure of the female pelvis. The pelvis is a ring formed by four bones. Two hip bones curve from front to back on either side and the sacrum and coccyx of the spinal vertebrae are at the back. The hip bones are divided into three parts: the ilium or upper back portion, the ischium or lower portion, and the ischial tuberosities, the lowest portion of the ischium and the part on which we sit. The front part of the hip bones form the pubis and the symphysis pubis is the junction at the front of the two hip bones.

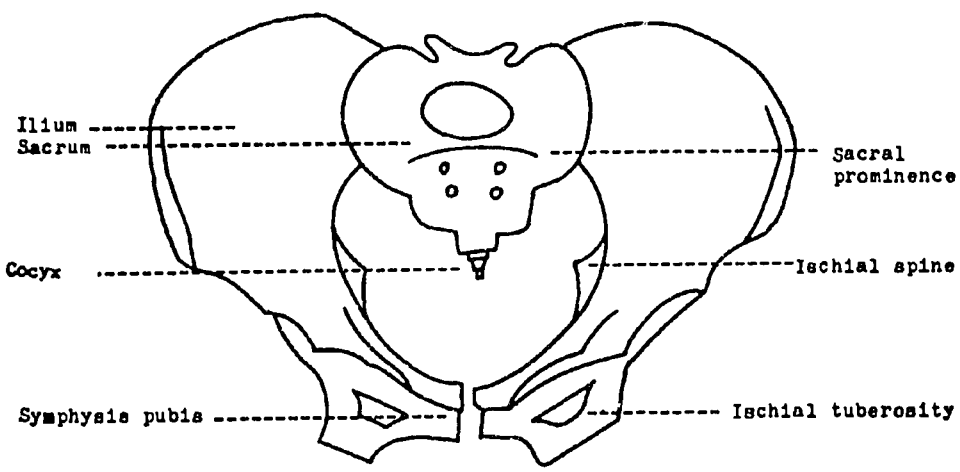

Fig. 6.5 The female pelvis.

The shape and size of the pelvis are important factors during childbearing because the foetal head and body have to pass through it during birth. A contracted pelvis or narrow birth canal causes complications during labour and delivery and a caesarean section may be needed to deliver the baby. This is because the foetus is too large for the birth canal.

A contracted pelvis may result from a congenital deformity or from having rickets or other diseases that affect bone

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formation in early childhood. It is not possible to know anything about the size and shape of the birth canal just by looking at a woman. For this reason, every woman who is pregnant for the first time should have pelvic measurements taken before the 24th week of pregnancy.

6.4 DESCRIPTION AND FUNCTION OF THE MENSTRUAL CYCLE

In order to understand how fertilization and the growth of a new human being takes place, it is important to understand the physiology of the menstrual cycle and the process that precedes fertilization.

When girls reach puberty, growth of axillary and pubic hair, broadening of the hips, breast development, changes in endocrine functions and menstruation occur. The four structures involved in the physiology of the menstrual cycle are the hypothalamus, the pituitary gland, the ovaries and the uterus.

The hypothalamus regulates the secretions from the pituitary gland, an endocrine gland which regulates the ovaries. The pituitary gland produces two hormones that act on the ovaries. These hormones are follicle stimulating hormone (FSH) and luteinizing hormone (LH).

FSH acts early in the menstrual cycle, causing the maturation of the ovum in the ovary. LH becomes active at the middle and last part of the cycle inducing the secretion of estrogen and progesterone.

Menstruation usually occurs at 12 or 13 years of age but it may occur as early as 9 or as late as 17 years. The length of the menstrual cycle differs from woman to woman. The average length is 28 days with a range of 20 to 45 days. Ovulation occurs approximately two weeks before menstruation. For a person with a 28 day cycle, ovulation occurs on the 14th day and menstruation occurs on the 28th day. For a person with a 31 day cycle, ovulation occurs on 15th or 16th day and menstruation on the 31st day. The length of average menstrual flow is 5 to 7 days.

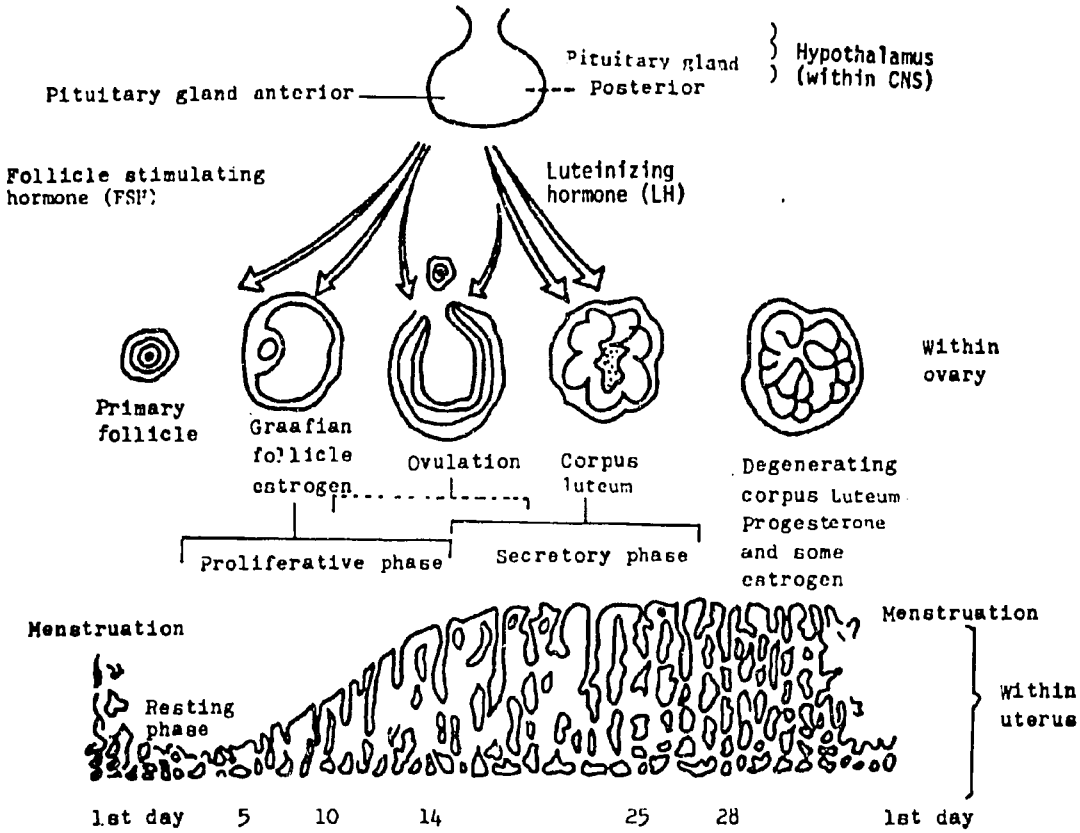

Fig. 6.6 Hormonal control of the menstrual cycle.

At the time of ovulation an ovum is released by an ovary and gets swept by the finger-like fimbriae into the fallopian tube. If conception occurs, the ovum then proceeds down the fallopian tube and is implanted in the wall of the uterus. If conception does not occur, the unfertilized ovum disintegrates, menstruation takes place and the lining of the uterus sloughs off in the menstrual flow. The cycle repeats itself every month unless an ovum is fertilized, in which case pregnancy results.

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The menstrual cycle continues until the age of forty or fifty when menstruation becomes irregular due to changes in estrogen and progesterone production and finally menstruation stops permanently. This is called menopause. During menopause some women go through other physical and sometimes emotional changes. Symptoms such as headaches, muscle pains, sudden feelings of warmth ("hot flashes") or depression occur during this stage. After menopause, a woman can no longer become pregnant.

6 5 FOETAL GROWTH AND DEVELOPMENT

It is easy to observe and measure the growth of the uterus after twelve weeks of pregnancy but it is not possible for Health Technicians to see what is happening inside the uterus and to measure it. Sophisticated scientific tools are available in some hospitals for this. However, Health Technicians need to understand normal growth and development of the foetus according to the weeks of pregnancy. This information is provided in the following table, not only for your own knowledge, but for you to be able to explain to an expectant mother about the growth of the baby according to its age in weeks. The weeks of age are counted from the start of the last menstrual period.

TABLE 6.1 FOETAL GROWTH AND DEVELOPMENT BY WEEKS

Weeks of pregnancy	Foetal development
First month:	
Week 3	Unfertilized ovum to fertilized egg, implanted in the uterus.
Week 4	Primitive villi formation, yolk sac prominent, digestive system forming, germ layers differentiated, primitive blood cells present.

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TABLE 6.1 FOETAL GROWTH AND DEVELOPMENT BY WEEKS

Weeks of pregnancy	Foetal development
Second month:	
Week 5	The brain, nervous system and heart are forming and beginning to function. The reproductive system is forming. The embryo is susceptible to teratogenic effects. Length: 3 mm (1/8 in).
Week 6	Facial features are forming, circulation starts. Susceptible to teratogenic effects. Length: 4-5 mm (3/16 in), weight: 0.46g.
Weeks 7 to 8	Brain begins to develop as well as other organs. Arm and leg buds are present, bones and features begin to form. Susceptible to teratogenic effects. Length: 14 mm (1/2 in).
Third month:	
Weeks 9 to 12	Eyelids are forming, genital ridge is visible but sexless as yet. Resembles a human and becomes a foetus. Tooth buds are forming, kidney begins secretion of urine, bile is present in the intestines. External genitalia now show definite signs of male and female sex. Fingernails and toenails are forming.

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TABLE 6.1 FOETAL GROWTH AND DEVELOPMENT BY WEEKS

Weeks of pregnancy	Foetal development
Fourth month:	
Weeks 13 to 16	All organs are well formed. Foetus is less susceptible to teratogenic effects from now on. Growth continues primarily by hypertrophy (increase in cell size).
	Sex is easily distinguishable. Thyroid and liver are functional. Blood is forming in the bone marrow; hair on body and scalp are forming; skin is transparent; blood vessels are visible. Length: 16 cm (6 1/2 in), weight: about 100 g (4 oz).
Fifth month:	
Weeks 17 - 20	Skeleton visible on anteroposterior x-ray film, a positive sign of pregnancy. Vernix caseosa forming on skin; meconium collecting. Foetal heart tones (FHTs) may be heard with a foetoscope. Foetal movements (quickening) are felt by many women now. Onset of rapid growth. Iron starts to be stored, enamel and dentine deposited.
Sixth month:	
Weeks 21 - 24	Eyebrows and eyelashes are visible, scalp hair is forming. Skin is less transparent and is wrinkled. If born, infant will attempt to breathe. Length: 30 cm (12 in), weight 600 g (1 1/4 lb).

TABLE 6.1 FOETAL GROWTH AND DEVELOPMENT BY WEEKS

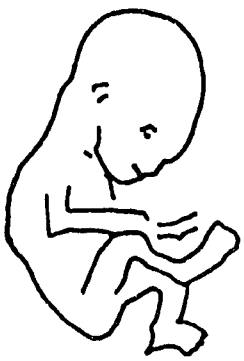
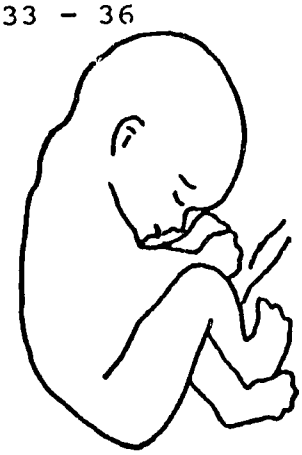
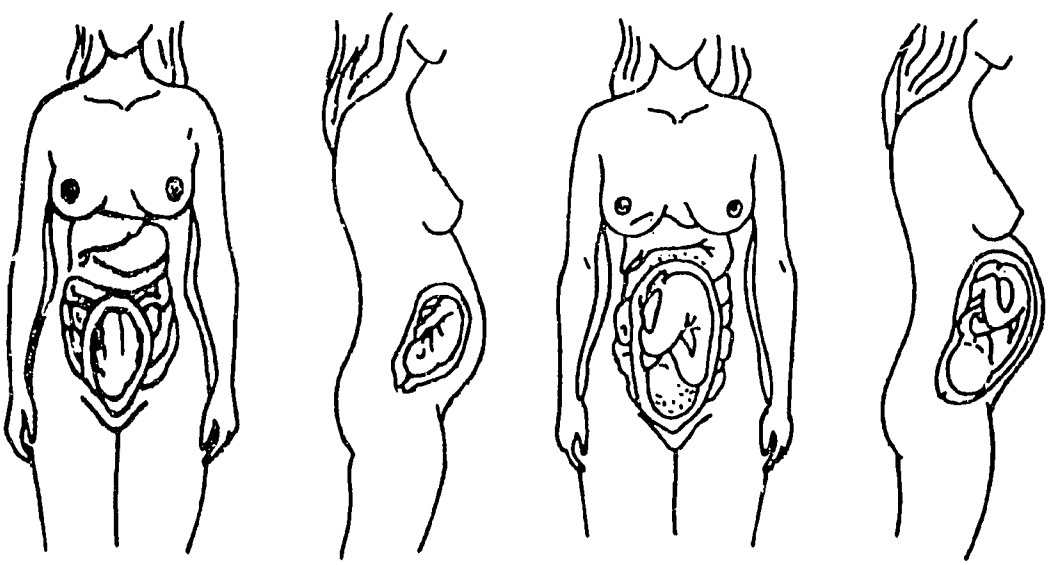
Weeks of pregnancy	Foetal development
Seventh month:	
Weeks 25 to 28 	Foetal outline may be felt abdominally, another positive sign of pregnancy. Much iron is stored. Storage of subcutaneous fat begins. Testes begin to descend in the male, eyelids open, fingerprints set. If born, infant can move energetically and cry weakly. Viable with appropriate environmental support. Length: 35-37 cm (14 in), weight 1000 g (2 1/2 lb).
Eighth month:	
Weeks 29 - 32	More rapid growth starts. Start of considerable calcium deposits and storage. Length: 40-42 cm (16 in), weight: 1700 to 1800 g (4 lbs).
Ninth month:	
Weeks 33 - 36 	Storage of considerable iron, nitrogen, calcium and other nutrients. Subcutaneous fat storage continues. Vernix covers body. Skin thicker and less wrinkled as subcutaneous fat stores accumulate. If born, infant has excellent chance for survival. Length: 45-47 cm (18 in), weight 2000 to 2500 g (5 lb).

TABLE 6.1 FOETAL GROWTH AND DEVELOPMENT BY WEEKS

Weeks of pregnancy	Foetal development
Weeks 37 to 40*	High haemoglobin level. Body well formed. Foetus is now considered full term. Transfer and storage of maternal immunoglobulins. Body contours plump, decreased amount of vernix; scalp hair 2 to 3 cm long; cartilage in nose and ears is well developed. Male: testes within well wrinkled scrotum. Female: labia well developed. Length: 45-55 cm (18 to 22 in), weight: 3400 g (7 1/2 lb). *Since a month is longer than 4 weeks, 40 weeks is the end of nine months of pregnancy.
Post-term: over 41 weeks	Vernix, lanugo absent, skin dry, thick, desquamating with superficial or deep cracks.



Foetus at 6 1/2 months. **Foetus at 9 months.**

Fig. 6.7 Size of the foetus in the uterus.

Adapted from: Jensen, Bensen and Bobak, Maternity Care: The Nurse and the Family. St. Louis, The CV Mosby Co, 1981.

Figure 6.7 shows how fast the baby grows inside the mother. The growth of the baby causes women to experience certain symptoms which vary with the stage of pregnancy. Health Technicians have a very important role in helping women get relief from some of these symptoms.

6.6 SIGNS AND SYMPTOMS OF PREGNANCY

Most woman do not know the signs of a normal pregnancy. Health Technicians therefore need to know what is normal and abnormal to provide adequate information and assistance. During the 40 weeks of foetal growth, a woman's needs become more prominent due to the anatomical and physiological changes that occur.

When an ovum or egg is fertilized, it moves towards the body of the uterus through the fallopian tube and implants itself in the uterine wall. The uterine wall, instead of shedding as in menstruation, continues to grow in thickness and vascularity. The product of conception (the embryo) begins to grow rapidly as can be seen in the following illustration.

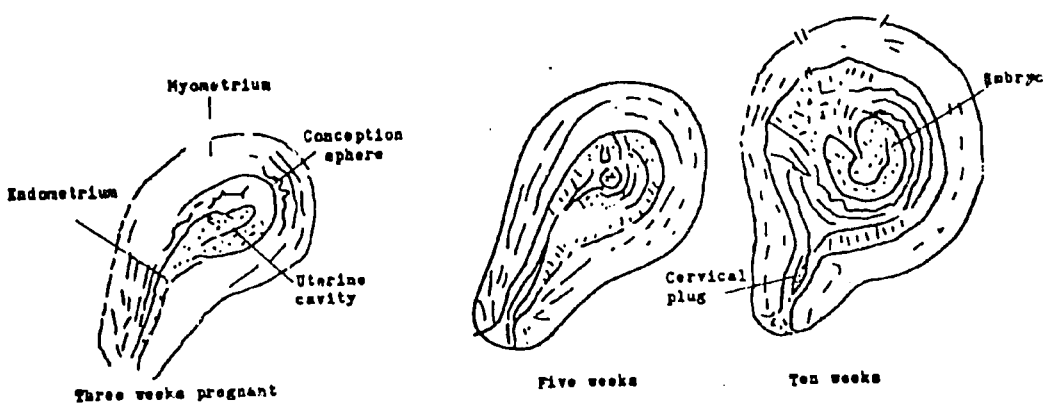


Fig. 6.8 Growth of the embryo.

Along with the growth of the foetus, the uterus also begins to grow in size. At first, this growth is not noticeable externally. As the uterus and fertilized egg continue to grow many physiological and psychological changes occur in the woman.

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As the pregnancy progresses, the uterus continues to grow and expand beyond the pelvic bones and can be felt abdominally by the 12th to 13th week. By the 34th week, the uterus fills the abdomen, reaching up to the breastbone. One rough way to estimate the length of pregnancy is by measuring the height of the uterine fundus. The following figure illustrates the growth of the uterus at different weeks of gestation. The height of the fundus is measured with your fingers using the symphysis pubis or the navel as reference points. After twelve weeks, the uterus gets higher by two finger's width each month.

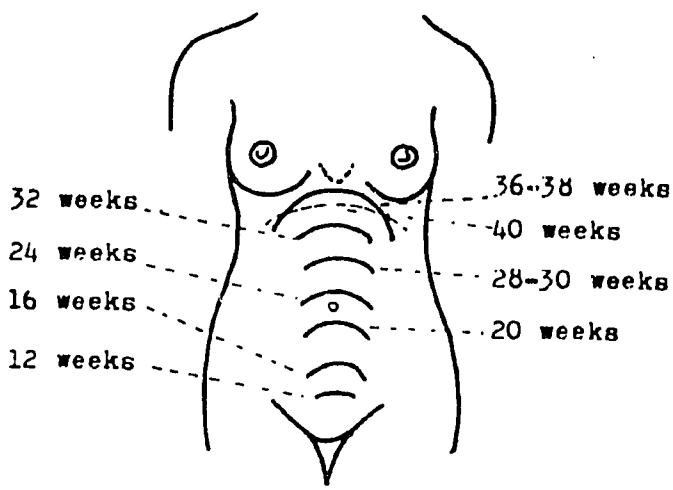

Fig. 6.9 Fundal height by weeks of pregnancy.

For simplicity and brevity the signs and symptoms of pregnancy are presented in Table 6.2. The table is divided into three columns: the pregnancy in weeks, associated signs and symptoms and the Health Technician's activities in helping the pregnant woman.

TABLE 6.2 SIGNS AND SYMPTOMS OF PREGNANCY AND THE HEALTH TECHNICIAN'S ACTIVITIES

Weeks of Pregnancy	Signs and symptoms	Health Technician's activities
4 to 8 weeks	Monthly period stops, breasts become tender, nipples become darker. Nausea and vomiting occurs in the morning or evening. The vaginal mucosa is bluish in color and there may be whitish vaginal discharge. There may be increased tiredness and sleepiness. Other symptoms may indicate a problem.	- Establish a good relationship with the pregnant woman and her family. - Take her obstetrical and general health history to determine her needs. Advise her on proper nutrition and good personal hygiene habits. Advise her to eat frequent small meals and explain that nausea and vomiting are temporary conditions and will disappear in 2 to 3 months' time. Advise her to eat solid dry snacks (nan/biscuits) in the morning. - Do a health exam. - Start a prenatal card. - Explain what happens during pregnancy. - Advise mother to rest during the day if she feels tired and sleepy. - Talk with the Medical Officer to find out if she needs extra care.

Fig. 6.10 Vomiting during pregnancy.

TABLE 6.2 SIGNS AND SYMPTOMS OF PREGNANCY AND THE HEALTH TECHNICIAN'S ACTIVITIES

Weeks of pregnancy	Signs and symptoms	Health Technician's activities
8 to 13 weeks	Increased urination, bluish-purple vagina visible in internal examination.	- Inform her that increased urination is normal and she should continue to drink plenty of fluids.
13 to 16 weeks	Tiny lumps appear around the nipples. The uterus rises out of the pelvis. Mother may feel foetal movements (quickening).	
16 to 20 weeks	Fluid (colostrom) begins to come from the breasts. The uterus may be felt at the level of navel.	- Explain that breast care is important. Breasts need to be washed and dried frequently with particular attention to the nipple for successful breast-feeding.
	Foetal movements are felt and foetal heart sounds heard. This is a definite sign of pregnancy.	- Let the mother listen to the foetal heart tones and explain the foetal development to her.
	Mother begins to notice weight gain.	- Inform mother that weight gain is normal. With good nutrition and exercise the weight will be lost after delivery. Take the weight and blood pressure on every visit especially from the 20th week to detect any abnormality.

TABLE 6.2 SIGNS AND SYMPTOMS OF PREGNANCY AND THE HEALTH TECHNICIAN'S ACTIVITIES

Weeks of pregnancy	Signs and symptoms	Health Technician's activities
20 to 24 weeks	Dark patches may appear on the nose and cheeks. The fundus is above the umbilicus. Stretch marks may show on the abdomen.	- These are normal and will disappear sometime after delivery.
25 to 28 weeks	The uterus is 4 to 5 fingers above the navel. Foetal movement will be felt more frequently. There may be shortness of breath as well as increased urination.	- If the mother experiences difficulty in sleeping on her back, suggest that she sleep on the side with the upper knee bent. - Drink plenty of fluid during the day and limit fluids in the evening to avoid having to get up frequently during the night. - Examine the abdomen and determine the position of the foetus. Listen for the foetal heart sounds by putting the foetoscope on either side of the abdomen below the umbilicus near where you feel the back. The heart can be heard from 16 to 20 weeks of pregnancy. The normal rate is 120 to 140 beats/min - Observe the mother for signs of irritation, infection and other abnormalities. Note the colour of vaginal discharge, the presence of varicose veins, warts or sores. - Refer the woman to a doctor if any abnormality is observed.

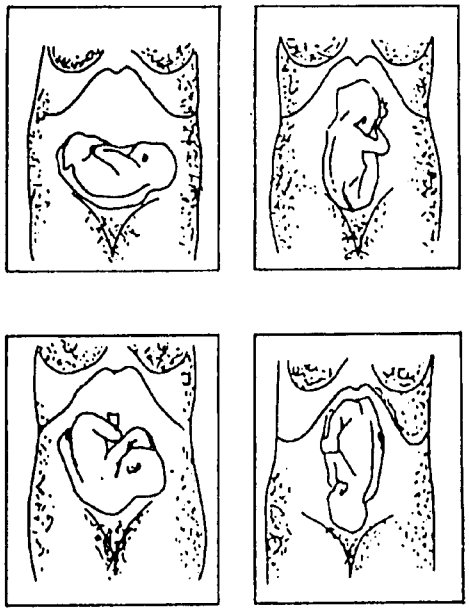

Fig. 6.11 Position of the foetus in the uteru

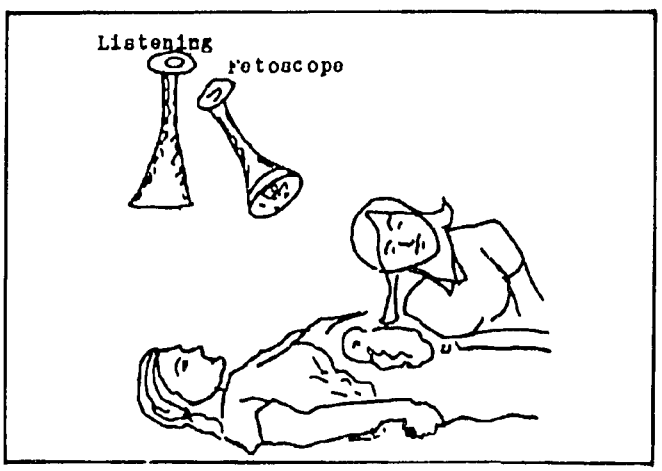

Fig. 6.12 Listening to the foetal heartbeat.

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TABLE 6.2 SIGNS AND SYMPTOMS OF PREGNANCY AND THE HEALTH TECHNICIAN'S ACTIVITIES

Weeks of pregnancy	Signs and Symptoms	Health Technician's activities
29 - 36 weeks	Weight gain is rapid. There may be some swelling of the ankles. The uterus is almost under the breastbone. Mother may experience heartburn. When the uterus drops into pelvis, breathing becomes easier. Sitting and walking may become difficult. There may be increased vaginal discharge.	- Advise mother to elevate legs when sitting or lying down. - Prepare expectant mother and family for labour and delivery. - Suggest eating small portions but frequently. - Advise to continue routine activities as long as possible.

6.7 THE FEMALE HEALTH TECHNICIAN'S ROLE AND RESPONSIBILITIES IN PROVIDING ANTENATAL CARE

Female Health Technicians are expected to provide the following antenatal health services:

1. Identify the pregnant women in the community.
2. Provide a health assessment and examination.
3. Determine the frequency of antenatal visits or contacts.
4. Identify the needs due to pregnancy of:
   - The family.
   - The expectant mother.
     . Nutrition.
     . Personal hygiene.
     . Activity, rest and exercise.
     . Health services.
     . Discomforts experienced during pregnancy.

6.8 IDENTIFICATION OF PREGNANT WOMEN IN THE COMMUNITY

Rural communities in Pakistan have not made adequate use of locally existing health facilities. As Health Technicians one of your responsibilities is to identify individuals in the community who could benefit from the services of the health team at the RHC or BHU. Identifying pregnant women in the community is one of your most important activities. A guideline for identifying pregnant women is provided below.

TABLE 6.3 IDENTIFYING PREGNANT WOMEN IN THE COMMUNITY

Identification source	Health Technician's responsibilities
1. Some women may come to the BHU or RHC on their own.	- Ask them first what they came for? They may have come for a reason other than pregnancy. Try to meet their identified needs first. Do not assume they have come for antenatal services. - Describe available maternal resources and tell them how they can use these services. - If the mother comes for antenatal care do a physical assessment including blood and urine tests. Inform her of your findings.
2. TBAs, CHWs, other Health Technicians.	- Maintain a good relationship with all Health Workers and inform them that you are seeking their help in identifying pregnant and lactating women. Let them know you want to coordinate your activities with theirs.
3. Your own friends, relations and neighbours.	- Inform them that you are interested in locating and identifying pregnant women and need their help.
4. Friends, relatives and neighbours of women coming to you for antenatal, postnatal or other services.	- Ask them to inform friends, relatives and neighbours of your services and have them encourage pregnant women to come to you.

TABLE 6.3 IDENTIFYING PREGNANT WOMEN IN THE COMMUNITY

Identification source	Health Technician's responsibilities
5. During your community or home visits.	- Ask if there are any pregnant women in the house or in the neighbourhood.
6. Other sources.	- Referral from other agencies.

Once you identify the pregnant women in your community, you must visit them to explain the services available through the RHC and BHU. Encourage them to use these services. When they come for antenatal care, a health history and an assessment of each individual's needs must be made.

6.9 PROCEDURE FOR A HEALTH ASSESSMENT AND EXAMINATION DURING PREGNANCY

In order to help a woman remain healthy during pregnancy and to assure a safe delivery, it is important to make some periodic observations:

- Write down the relevant health history, past and present.
- Do laboratory tests as indicated.
- Counsel the woman on how to have a healthy pregnancy.

Relevant health history:

Family status and history	Purpose
Number and relationship of family members.	- To determine their needs as well. - To assess congenital abnormalities.
History of tuberculosis, heart diseases, diabetes or other diseases.	- To estimate risk factors early and provide proper care.
Tendency to have twins.	- To rule out or anticipate twins.

Individual history	Purpose
Age of expectant parents (mother and father).	- To rule out or estimate risk factors.
Number of previous pregnancies and living children. Experience with previous labour and delivery.	- To help determine the type and amount of service. For example, a woman in her first pregnancy may be given general information while a woman who has delivered before may need specific or different information to meet her needs.
Date of last menstrual period.	- To determine the expected date of delivery. Start with the first day of the last menstrual period and then add 7 days and nine months. For example, if the first day of the last menstrual period was April 4, 1990, add 7 days which will make April 11, and add nine months. This will be January 11, 1991, the expected date of delivery.

Health examination

Observe her general health status, appearance, build (small, large, medium framed), height and movements.	- The health examination should begin with the Health Technician washing her hands before touching the woman.
Physical assessment is done by using your eyes and ears and by sense of touch and smell.	- To determine her health status more specifically, an examination of the face, breasts, abdomen, vulva, arms and legs is necessary. Provide a private, screened area to perform the examination and explain what you are doing. Have the woman empty her bladder prior to the health examination.

Health Examination	Purpose
Examine the face.	- Look at the colour of the face. Is it healthy or pale? Is there any swelling?
Examine the eyes.	- Inspect the eyes for discharge from the conjunctiva. Describe the colour: are they pale, bluish, white, clear or yellowish?
Examine the lips and mouth.	- Describe the colour of the lips: pale, bluish or normal. - Any sores or cracks at the corners of the mouth? - Is the inside of the mouth moist and healthy or dry? Is the tongue coated? Is a rash observed?
Examine the neck.	- Look for any swelling or bulging veins.
Examine the chest and breasts.	- Does the woman have a cough? Is she congested or breathing normally? - Observe for expected pregnancy changes and explain them to the mother. - Observe for any abnormalities in the nipples, inverted or sore. Give advice as needed. - Examine the breasts with your hands to check for any lumps or tenderness.
Examine the abdomen and pelvis.	- Follow the procedure for this exam as described later.

Health Examination	Purpose
Test the blood and urine.	- Follow the procedure for these tests as described later. After the examination is completed, the mother should get up and get dressed. The Health Technician should then wash her hands again.
Take the weight and blood pressure.	- The weight and blood pressure should be taken on every visit.

Either during or after the examination, the mother should be informed of your findings. If any abnormality is noted, a referral to the Medical Officer should be given. The mother should receive specific advice on the following:

- Personal hygiene.
- Diet, rest and exercise.
- Need for tetanus vaccination.
- Need for taking iron and folic acid tablets.
- Plan for follow-up antenatal care.

6.10 RECORD KEEPING

In addition to filling out the antenatal record (see Figure 6.13), detailed notes must be kept in your diary of your findings and recommendations. This makes it easier to provide follow-up care. The antenatal record allows you to see at a quick glance how the woman is progressing each month.

Directions for completing the prenatal record:

- Write down the expectant mother's name, age, number of previous births and ages of living children. If any children have died, note this on the back of the sheet as well as the cause of and age at death. Include the date of the last pregnancy or childbirth.
- Date of last menstrual period. Use this information with the formula given earlier to determine the probable date of birth and write that down.
- Problems with other pregnancies. Information includes no problem, low weight gain, etc.

ANTENATAL CARE RECORD

NAME _____ AGE _____ NUMBER OF CHILDREN _____ AGES _____ DATE OF LAST CHILDBIRTH _____

DATE OF LAST MENSTRUAL PERIOD _____ ESTIMATED DATE OF CONFINEMENT _____ PROBLEMS WITH OTHER BIRTHS _____

MONTH	DATE OF VISIT	COMMON PROBLEMS	GENERAL HEALTH AND MINOR PROBLEMS	ANAEMIA (How severe?)	DANGER SIGNS	SWELLING (where? how much?)	PULSE	TEMP.	WEIGHT (estimate or measure)	BLOOD PRESSURE #	PROTEIN IN URINE #	SUGAR IN URINE #	POSITION OF BABY IN WOMB	SIZE OF WOMB (how many fingers above (+) or below (-) the navel)		
1														-		
2		tiredness, nausea, and morning sickness												-		
3														-		
4		womb at level of the navel.												0		
5		baby heart-beat and 1st movement. some swelling of of feet.												+	TETANUS VACCINE	
6														+	1st	
7														+	2nd or booster	
8		constipation												+	3rd	
9 1st week		heartburn varicose veins												+		
2nd week		shortness of breath												+		
3rd week		frequent urination												+		
4th week		baby moves lower in belly												+		
														+		
														+		
BIRTH																

Adapted from D.Werner's "Where there is no Doctor."

Fig. 6.13 Antenatal Record.

- Date of visit. Enter the first date of the visit next to the month of pregnancy. For example, if you see a pregnant woman on June 2, 1990 and she is six months pregnant you enter the date on the sixth month line. If she returns two months later, you enter the date of that visit on the eighth month line.

This form also lists some symptoms the mother may be expected to experience at various times. This information is provided as a reminder to ask about these symptoms and how the woman is adjusting to them.

On each visit, the female Health Technician is to inquire about and record the following, and offer help or suggestions as indicated:

- General health condition.
- Any minor problems or discomforts.
- Signs of anaemia.
- Swelling.
- Blood pressure, pulse, respiration and temperature (if indicated).
- Baby's heartbeat.
- Woman's weight.
- Size of the womb.
- Position of the baby.

6.11 FREQUENCY OF ANTENATAL VISITS OR CONTACTS

In order to be sure that the pregnant mother has as normal a course of pregnancy as possible, a Health Technician must have periodic contact with her throughout the pregnancy to evaluate her condition and identify any problems. The pregnant mother's condition may be evaluated by herself, the Health Technician or by members of the family. In order for the expectant mother and her family to evaluate her condition, they must be informed of what a woman should normally experience during pregnancy. The family, therefore, should be told that if the mother experiences any signs or symptoms that are not normal, the Health Technician should be informed. Descriptions of normal signs and symptoms were given earlier.

Although your time may be limited by other services you provide, it is important to follow the pregnant woman throughout her pregnancy. Therefore, the following schedule of antenatal contacts between the pregnant woman and a member of the health team is suggested. This suggestion applies only to normal pregnancy cases. Any abnormal case should be dealt with according to the identified needs in consultation with the

family and the Medical Officer. Health Technicians may see the pregnant woman in the home, the BHU/RHC or in any other location that has been prearranged, for example, the school or the home of a village leader.

TABLE 6.4 SCHEDULE FOR ANTENATAL VISITS

Weeks of pregnancy	Number of visits	Female Health Technician's activities
First 12 weeks	Once	- Assess general health status. - Do a complete history. - Conduct a health examination. - Take weight and blood pressure, do urine and blood tests. - Determine the estimated day of confinement (EDC). - Provide counseling on nutrition and breast-feeding. - Provide health education. - Find out about foods that are given or taboo for pregnant women.
12 to 24 weeks	Once or twice or as required	- Take blood pressure, weight. Do blood and urine tests and compare to the first tests. Provide explanation of results. - Check for swelling of ankles, face, etc. - Discuss personal hygiene and breast care. - Discuss minor discomforts experienced by mother and give suggestions. - Discuss spacing of children. - Discuss signs of labour and plans for delivery. - Give first dose of tetanus toxoid. - Listen and let mother listen to foetal heart.

TABLE 6.4 SCHEDULE FOR ANTENATAL VISITS

Weeks of pregnancy	Number of visits	Female Health Technician's activities
24 to term	Three visits.	- Assess general health status. - Take blood pressure, weight, do a urine test and compare with previous results. - Note any changes. - Discuss discomforts experienced by mother and offer suggestions. - Listen for foetal heart tone; determine size and position of foetus. Estimate delivery time. - Discuss her knowledge of and concerns about labour and delivery. - Make plans for delivery.

You need to plan your home visits in the community based on the time available to you. Refer to the section on Home Visiting in Chapter 1 for general information. Use the following guidelines for planning your visits and look for:

1. Those who have abnormal signs and symptoms of pregnancy.
2. Those who have an illness likely to cause complications.
3. Those who do not attend the clinic. Find out why.
4. Those who want a home delivery.
5. Those who request other health services.
6. Other problems.

6.12 IDENTIFICATION OF FAMILY NEEDS DURING PREGNANCY

In Chapter 5, the seven developmental stages one goes through in life were described. In that section, it was also explained that during each stage certain needs become more important than others. When a woman is pregnant, it is not just her needs that are affected by the pregnancy but the needs of the developing foetus, the needs of her husband and the whole family. Due to the pregnancy, certain needs become important to each member of the family. Therefore, you must try to assess other people's needs as well and help meet them if

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possible, while focusing most of your attention on the mother. The pregnant woman's needs should be dealt with after briefly considering the needs of the family members. The following table identifies the possible needs of individual members of the family due to the pregnancy.

TABLE 6.5 FAMILY MEMBERS' SPECIAL NEEDS DUE TO PREGNANCY

Individual member	Needs
Husband	- Must bear the responsibility of father and husband.
Mother-in-law. Father-in-law.	- Must bear the responsibility of grandparents.
Sibling (brother or sister) of the expected baby.	- Must adjust status in relation to the expected baby, for example, be one of the children rather than the only child. - Must share family resources with the new baby. - Must adjust his/her role to the new baby.

So you see, in helping a pregnant woman go through a safe pregnancy, you also need to focus on other members of the family because every member will be affected in one way or another by the arrival of a baby.

6.13 NEEDS OF THE PREGNANT WOMAN

Once you have completed the physical examination and initial interview, it will be possible to identify the needs of the pregnant woman. Because of pregnancy, certain basic needs of the woman have changed and each will be discussed separately:

- Nutrition.
- Preparation for breast-feeding.
- Activity (rest and exercise).
- Personal hygiene.
- Health services.
- Discomforts.

Nutrition. In Chapter 5, the nutritional requirements of all family members were discussed. The nutritional requirements of pregnant and lactating women are greatly increased from those of other females because of the growing foetus and the production of milk. Table 6.6 shows the difference in nutritional requirements for a non-pregnant woman, a pregnant woman and one who is breast-feeding. You may also want to refer to Table 5.4 in Chapter 5 showing the caloric and food requirements of pregnant and lactating women.

TABLE 6.6 NUTRITIONAL REQUIREMENTS OF AN ADULT PAKISTANI WOMAN

Nutrient	Non-pregnant	Pregnant	Lactating
Calories	2100	2500	2700-3000
Protein (Gm)	62	70	80
Iron (mg)	14	18+	18+
Calcium (mg)	500	1150	1150

Source: Textbook for Family Welfare Workers, Population Welfare Division, Islamabad, 1984.

To help a pregnant or lactating woman meet her nutritional needs, ask her what she ate during the last two days. Write down the foods, when and how much food was eaten. Then compare her intake with the chart in Chapter 5 and determine the woman's nutritional status. It is not only what the woman eats that is important but how many calories she gets. Her requirement for liquids is also increased, especially during lactation. Iron needs are so high that food sources can not supply her requirement. Iron and Folic acid supplements should be given throughout pregnancy and during lactation. The additional caloric needs can be met by adding milk, a roti and a serving of vegetables.

What a mother eats during pregnancy is usually determined by:

- What the family eats and how much the family knows about the nutritional requirements of pregnancy.
- What foods are mainly prescribed or tabooed during pregnancy.
- What the mother likes and dislikes.

It is important to consider all of these points in order to get adequate information on the woman's nutritional status. Table 6.7 contains the major points that should be discussed with all pregnant and lactating mothers.

TABLE 6.7 STANDARD NUTRITION GUIDELINES FOR ALL PREGNANT AND LACTATING MOTHERS

Ministry of Health, Special Education & Social Welfare
Government of Pakistan

STANDARD **NUTRITION** GUIDELINES
FOR MOTHERS

ALL PREGNANT AND LACTATING MOTHERS

who visit a health facility for any reason
should be counselled to:

GIVE COLOSTRUM AND BREASTFEED

- Feed their babies colostrum because it contains life-saving antibodies and nutrients.
- Breastfeed immediately after delivery because it helps contract the uterus and prevents heavy blood loss.
- Suckle frequently to establish maximum milk production.

MAINTAIN AND INCREASE QUANTITY OF BREASTMILK PRODUCTION

- Continue feeding their babies FREQUENTLY until breastmilk secretion begins after 2–3 days.
- Breastfeed frequently NIGHT AND DAY from BOTH breasts until breasts are emptied.
- Breastfeed exclusively through the fourth month. Do not give water or other supplemental liquids such as ghutti, honey water, aniseed water, etc.
- Drink at least 8 glasses or more of fluids each day.

FEED THEIR BABIES CORRECTLY

- Start feeding soft foods to baby at five months of age.
- Feed appropriate quantities and types of food for age (see nutrition guidelines for children).
- Feed a child recovering from illness at least one more time than usual food such as choori, paratha, yogurt and dal.

PREVENT INFECTIONS

- Give liquids by breastfeeding or cup and spoon. Do not use bottles, nipples or soothers since they reduce breastmilk production and can cause diarrhoea and other illness if they are not clean.
- Wash utensils and hands before handling food.
- Use ORT for diarrhoea and vaccinate the child according to standard guidelines for diarrhoea and immunization.

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Activity, rest and exercise. Activity here refers to the various tasks a woman routinely engages in. Rest refers to being free of activity as well as getting sleep. Most pregnant women are able to carry out their routine activities throughout their pregnancy in the same way as usual or with some modification. By resting between activities or by changing activities, rest is obtained. For some women however, it becomes very difficult to cook or to clean or to wash.

Some women seem to require more rest while others are full of energy during pregnancy. This variation is normal within moderation. If the need for extra rest increases greatly or if the woman is so full of energy that she does not get her usual amount of sleep and rest, she may need to be referred to a Medical Officer. It is important for a woman to maintain her usual activity for a healthy pregnancy. Activity also means a certain amount of exercise. Exercise is important during pregnancy because it makes labour and delivery less painful and risky.

In different groups, certain activities are tabooed while other activities are followed. As Health Technicians you need to find out which activities are taboo and which are customary. From the list you obtain, evaluate the nature of the activities and how they affect the pregnancy. You can then encourage or discourage those practices.

Personal hygiene. During pregnancy physiological changes of all kinds occur in almost all body systems resulting in the need to pay more attention to personal hygiene. For instance, the pregnant woman may experience an increase in perspiration, vaginal discharge or secretion of fluid from the breast. Some women develop a vaginal yeast infection during pregnancy. Because of these changes, it is important to bathe daily, paying special attention during washing to the breasts and perineal area.

Regular washing, bathing and, if possible, frequent change of clothing will not only make a pregnant woman feel good, but will also reduce the chance of infection. Washing the feet before going to bed may also be soothing and relaxing.

In every community, there are rules for bathing and washing during pregnancy. You need to find out about these local customs so that you can help develop adequate personal hygiene habits in women.

Health services. There are many changes taking place in a woman and the developing baby during pregnancy which cannot be seen. If these changes are normal, there is no reason to worry. If abnormal or undesirable changes occur, they could result in complications for the mother and/or the baby. In order to minimize or prevent any complications, abnormal changes should be identified early. It is important to provide continuous health service throughout the pregnancy, labour and delivery periods.

The female Health Technician, therefore, should monitor the health status of all pregnant women. She handles all cases which seem to be progressing normally and refers all cases presenting abnormal signs to the Medical Officer. Record keeping helps the Health Technician keep track of each woman's health status. These records identify women who are likely to develop complications. Those women need to be followed more closely and referred to a Medical Officer so they can be managed early in the pregnancy. The complications of pregnancy are covered in Chapter 8. The curriculum emphasizes the need for Health Technicians to know what normal health is so that they can help people attain an optimum level of functioning by providing knowledge, skills and strengths. It is within the Health Technician's domain to help individuals to proceed on a normal course. When problems are detected, their main responsibility lies in referring that person for a medical diagnosis. If a medical diagnosis has been made, the Health Technician can work with the person to achieve certain goals, but Health Technicians have no responsibility in making a diagnosis themselves.

Minor discomforts experienced during pregnancy. All women experience some kind of discomfort during pregnancy. Discomforts in moderation are normal and expected. Expectant women should learn to adjust to them. These discomforts are usually temporary. If the discomforts become intolerable, last longer than expected or show signs of adversely affecting the mother's health, a referral to the Medical Officer must be made. Abnormal discomforts may develop into complications.

The minor discomforts experienced during pregnancy and ways the Health Technician can help the expectant mother deal with them are listed in the following table.

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TABLE 6.8 MINOR DISCOMFORTS OF PREGNANCY

Minor discomforts	Advice given by the Health Technician
Nausea and vomiting	- Eat dry carbohydrate foods before getting up in the morning. - Limit fluids at meal times. - Avoid fatty foods at the time of day when nausea occurs. - Suck on a clove or cardamom skin. - Eat smaller and more frequent meals.
Heartburn and indigestion	- Eat smaller, more frequent meals. - Use a small amount of fat and spice in cooking. - Avoid highly sweetened foods and drinks. - Avoid lying down and/or bending over for two to three hours after meals. - Antacids <u>should not</u> be taken.
Constipation	- Include foods with fibre such as vegetables, raw fruits and whole grains. - Drink plenty of liquids including water (6 to 8 glasses/day). - Include foods that have a laxative effect, such as lady's fingers, green leafy vegetables, salads, etc. - Do daily exercises such as walking or other forms. - Do not take enemas and mineral oils.
Flatulence (gas)	- Make sure bowels move every day. - Avoid gas producing foods such as cabbage, beans, fried foods, sweets and rich meethai.
Backache	- Maintain good posture. - Wear low heeled shoes. - Show how to sit in the Tailor's Style and how to do the pelvic rock two to three times a day.

TABLE 6.8 MINOR DISCOMFORTS OF PREGNANCY

Minor discomforts	Advice given by the Health Technician
Leg cramps (calf)	- Stretch your legs by pointing with your heel rather than your toes.
Shortness of breath	- Sleep with the head elevated with 2 or 3 pillows. - Lie on your back with arms stretched out above your head.
Urinary frequency	- Explain that frequency will stop at about three months of pregnancy as the uterus rises into the abdomen. It reappears again later in pregnancy.
Increase in vaginal discharge	- Bathe daily. - Wear cotton underwear, not synthetic.
Swelling of the feet and legs toward the end of the day	- Rest several times during the day with feet elevated.
Itching of the skin	- Bathe daily. - Take adequate fluid daily. - Use bland (unscented) soap.
Varicosities of the legs and of the anus	- Do not stand for long periods. - Sit with feet elevated when possible. - Lie down on the floor two to three times a day next to the wall, with your legs at a right angle against the wall. Elevate the hips on a pillow two to three times a day. - Socks or stockings with elastic bands around the calf should be avoided.

TABLE 6.8 MINOR DISCOMFORTS OF PREGNANCY

Minor discomforts	Advice given by the Health Technician
Variations in sleep patterns: tiredness and sleepiness are common during the first trimester and later in the pregnancy.	- Rest once or twice during the day. - The most comfortable position for sleeping is lying on the side with a pillow under the top leg which is bent at the knee. - Do daily exercises of some kind. - Bathe daily. - Drink warm milk at bedtime. - Avoid too much tea, coffee or coca cola.

6.14 THE ABDOMINAL EXAMINATION

By doing an abdominal examination, it is possible to ascertain:

1. The size of the uterus in relation to the weeks of pregnancy.
2. The size of the foetus.
3. The position of the foetus.
4. The relative sizes of the brim of the pelvis and the presenting part.
5. The presence of abnormal conditions, such as excess of fluid or more than one foetus (multiple pregnancy).
6. Whether the foetus is alive or not.

Inspection. The woman should empty her bladder before commencement of the examination and lie flat and be relaxed. Inspection reveals the general shape or size of the uterus. Foetal movements may also be noticed. In addition, the following information is obtained:

- If the occiput (the back of the head) is anterior and the back of the foetus is to the front, the abdomen will appear smooth and convex.
- If however, the occiput is posterior (behind), flattening of the abdomen may be seen above the symphysis pubis.
- If the lie of the foetus is transverse, the uterus will be wider than usual and the height of the fundus may be lower than with a lengthwise lie.
- In twin pregnancy, the uterus also appears wide but the fundus will be higher than normal.

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Palpation. The Health Technician stands on the mother right side and does the following:

1. Use your hand to feel the top of the abdomen to determi the size of the uterus and the position of the foetu This is more useful after 28 weeks of pregnancy but shou be done at each visit. The Health Technician's hand shou be clean, warm and relaxed. Use the palm of the hand a pad of the fingers, not the fingertips.

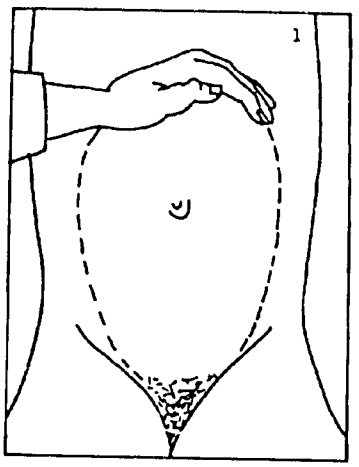

Fig. 6.14 Feeling the top of the uterus.

2. With both hands, palpate the lower pole of the uterus. Th head feels round and hard.

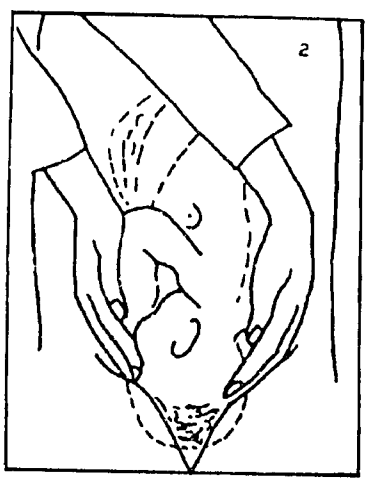

Fig. 6.15 Feeling for the head of the foetus.

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3. The Health Technician should stand facing the mother and palpate the upper portion of the uterus. You can feel the buttocks. The buttocks feel large and less hard and the back seems like a long hard ridge.

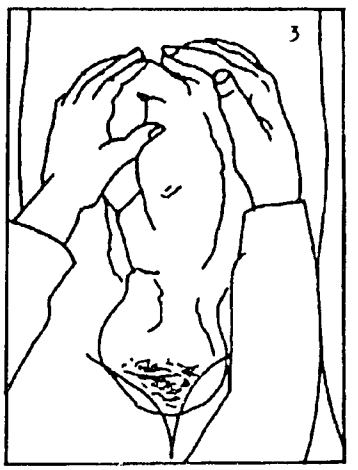

Fig. 6.16 Feeling for the buttocks.

4. The Health Technician stands in the same position as in step 3 and places one hand on either side of the uterus and feels the back of the foetus on one side and the limbs on the other side.

Fig. 6.17 Feeling for the back of the foetus.

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6.15 THE PELVIC EXAMINATION

The following materials are needed for the pelvic examination:

1. A good light (flashlight or lamp).
2. A clean speculum.
3. Clean rubber gloves.
4. Something for lubrication (vaseline, paraffin or water).
5. An examining table or bed.
6. A rubber sheet.
7. An antiseptic sponge.
8. Soap and water.

The procedure. The Health Technician should first explain to the woman what will be done during the examination. This will help put her at ease. Then the following steps should be taken:

1. Wash your hands with soap and water.
2. Have the woman empty her bladder and remove all clothing from the lower part of the body.
3. Have the woman lie on a table or bed.
4. Cover her with a sheet.
5. Ask her to bend her knees with the legs supported.
6. Wipe the external genitalia from the top down with an antiseptic sponge or with soap and water and proceed with the external and internal examinations.

The external examination. With the left hand, spread the labia apart and observe the genitalia, looking for the following and assessing for normal and abnormal signs:

- Discharge
- Blood
- Lacerations
- Swelling
- Irritations
- Growths

The speculum examination. Keeping the labia separated with the left hand, take the lubricated speculum in the right hand and gently insert it into the vagina. Move it into a position which will allow it to open easily and fix the screw so that the open position is maintained.

Arrange the light or have another woman hold the torch light, so that you can see inside the vagina. If the cervix is not visible, adjust the speculum by closing it and changing its position until the cervix becomes visible. Observe the cervix and the interior of the vaginal walls.

Unscrew the speculum and allow it to close. Remove it gently and put it in the appropriate place to be soaked and cleaned.

The bimanual examination. The Health Technician should wash her hands with soap and water, put on clean gloves and put some lubricant on the index and middle finger of the right hand. The lubricated fingers are inserted into the vagina until the cervix is located (it normally feels like the end of the nose).

In the center of the cervix there is a dimple. If the cervix is closed, the examination finger will not enter the dimple. If it is open, the fingertip will go inside the cervix. The examiner should not allow the finger to enter the uterus. The two inserted fingers are then placed under the cervix to keep it in place.

The left hand is placed on the lower abdomen and pressed downward. This locates the uterus between the two hands (bimanual). A normal non-pregnant uterus is about the size of a lemon. Note the size of the uterus.

Move the uterus. Normally, the uterus moves easily without causing pain. Keeping the left hand on the abdomen, move the inside fingers to either side of the cervix. This allows you to feel the sides of the pelvis that contain the fallopian tubes and ovaries.

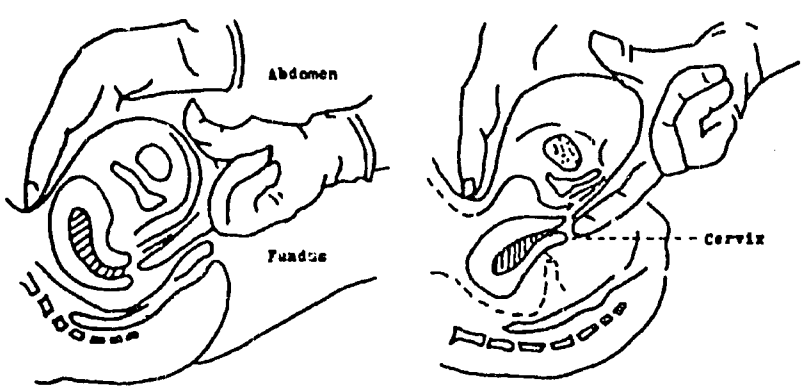

Fig. 6.18 Bimanual exam of the pelvis.

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The Health Technician should note any abnormalities during the bimanual examination such as:

- Tenderness when the uterus is moved.
- Enlargement of the uterus.
- A mass in the adnexal areas.

Mentally record any abnormalities. Remove the gloves and wash your hands. Have the woman get dressed. Discuss your findings with her and record them.

6.16 THE BLOOD TEST FOR HAEMOGLOBIN

Materials needed:

- Alcohol or spirit.
- Cotton swabs.
- Pricking needle.
- Tulloquis (Haemoglobin test) book.

Procedure. Dampen a cotton swab with alcohol and rub the upper surface of the thumb of the expectant woman to clean it. Allow a few seconds to dry. Prick the thumb quickly with the needle.

Squeeze the pricked thumb with your fingers and produce a drop of blood. Put the drop of blood on a sheet of Tulloquis paper. Allow it to dry.

Compare the colour of this sheet with the respective colour on the scale. Read the matching percentage for this person. Record the findings in the proper record.

Discard the used paper in the waste basket. Inform the individual of the findings. Put away the supplies and equipment in their usual place.

6.17 THE URINE TEST

Equipment

1. Two to four test tubes with necks.
2. One spirit lamp.
3. A 5cc syringe.
4. One dropper.
5. A box of matches.

Reagents

1. Acetic acid.
2. Benedict's solution.
3. Urine specimen: collected within one hour of testing.

Method of testing:

Albumin

1. Fill 2/3 of a test tube with urine.
2. Hold the test tube from the bottom in an oblique position.
3. Heat the top portion of the urine until it boils.
4. If the urine becomes cloudy add two or three drops of acetic acid.
5. Hold the tube at eye level to observe the result.

Sugar

1. Pour 5 cc Benedict's solution into a test tube.
2. Add 8 drops of urine.
3. Hold the test tube from the top and heat the bottom until it boils.
4. Wait for 3 to 5 minutes.
5. Read the result.

Reading and recording of results:

1. If there is no cloudiness in the urine, then it is normal.
2. If cloudiness is seen in the urine, then albumin is present.
3. (1) slightly cloudy + (trace albumin)
   (2) Cloudy ++
   (3) Very cloudy +++

1. If sugar is not present in the urine, then the color of Benedict's solution will not change.
2. If sugar is present, the color of Benedict's solution will change.
   (1) Pale green: normal
   (2) Yellow: sugar traces +
   (3) Orange: ++
   (4) Brick red: +++

Record the results on the chart. If albumin and/or sugar are present, underline the results in red and report this to the supervisor.

(Courtesy of Dr. Ms. Rabia Khalid, Obstetrician and Principal, Public Health School, Karachi)

GLOSSARY

Adnexal: Area surrounding the uterus.

Antiseptic: Substance capable of destroying germs.

Bartholin's glands: These glands are located inside the vagina and produce a lubricating secretion.

Bimanual: Using two hands to perform an examination of the internal genital organs of the female.

Bladder: The muscular organ which stores urine and releases it when full.

Bulging: Swelling.

Caesarean section: A surgical method of delivering a baby by cutting the abdominal and uterine wall.

Cervix: Mouth of the uterus located inside the vaginal canal.

Clitoris: A sensitive organ of the female genital system located at the top of two internal folds of labia.

Conception: Start of pregnancy.

Contracted pelvis: The female pelvic cavity which is smaller than the normal size and may cause obstructed delivery.

Discomfort: A state where a person is not comfortable.

Ejaculatory tube: A tube in the male through which semen is expelled.

Elevate: To raise.

Embryonic: An early stage of development before a recognizable form is reached.

Fallopian tubes: A pair of delicate tubes which connect the uterus to the region of the ovaries in the female reproductive system. The egg travels in this tube when released by the ovary and may be fertilized by the sperm.

Fertilization: A process of joining of the male cell called the sperm with the female cell, the egg.

Fimbriae: Fringed border.

Foetus: The later stage of development in the uterus from the third month to birth.

Follicle Stimulating Hormone (FSH): A hormone that regulates the development of the Graafian follicle in the female and stimulates the production of sperm in the male.

Fundus: Top of the uterus.

Fundal height: Height of the uterus during pregnancy, measured from the pubis to the top of the uterus.

Genitalia: External organs of the reproductive system.

Hypertrophy: Excessive growth.

Labia majora: External folds of the vagina.

Labia minora: Internal folds of the vagina.

Luteinizing hormone (LH): A hormone from the pituitary that stimulates the development of the corpus luteum and the secretion of progesterone.

Meconium: First faeces of a newborn infant. Dark in colour and almost odourless.

Menstrual cycle: Uterine bleeding which occurs approximately every four weeks during the reproductive period.

Midpoint: Middle point.

Occiput: The back of the head or skull.

Ovary: Female sexual organ which produces the egg cell called ova.

Palpation: Examining with the hands.

Pelvis: The cavity within the hip bone where organs of the reproductive system as well as the rest of the urinary and part of the digestive systems are located.

Penis: Male organ which is inserted into the female genital organ, the vagina, during intercourse and through which the sperm cells are released. The channel for urine is also in this organ.

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Perineal area: Area extending from the anus to the symphysis pubis.

Prostate gland: The gland which in the male surrounds the neck of the bladder and urethra and which secretes a milky fluid into the upper end of the vas deferens.

Rickets: A disease of children affecting growth, due to a deficiency of vitamin D and resulting in a body deformity of the chest.

Scrotum: The external sac on the male which contains and protects the testes.

Semen: A thick whitish secretion of the reproductive system in the male that is ejaculated from the penis after intercourse. It consists of sperm cells and secretions.

Seminal vesicle: A hollow structure which secretes semen into the upper end of the vas deferens.

Speculum: An instrument shaped like a broad spoon with a blunt edge that is used for examination of the interior of vagina.

Sperm cells: Male reproductive cells released with the semen.

Teratogenic: Capable of causing developmental malformations and deformed features in the foetus.

Testes: The two rounded structures contained in the scrotum which produce sperm.

Testosterone: The male hormone produced in the testes.

Urethra: The final tube-like structure through which urine passes out of the body.

Uterus: The hollow muscular organ in the female reproductive system which is the home and place of nourishment of the developing foetus.

Vagina: The canal in the female body into which the penis is inserted during intercourse and through which the baby passes out of the body.

Vas deferens: The long tube which conducts the sperm from the testes to the urethra where it is released from the body.

Viable: Capable of living, growing and developing.

SUGGESTED LEARNING ACTIVITIES

1. Male Health Technicians should attend antenatal clinic and conduct health education classes on nutrition and tetanus toxoid immunization whenever possible.
2. Female Health Technicians should complete the following antenatal exercises and have the teaching staff verify your work.

   - 25 histories and health examinations.
   - 20 abdominal examinations.
   - 20 nutritional and hygiene advice sessions.
   - 20 minor discomfort counseling sessions.
   - 5 health education classes for groups of expectant mothers.

3. Each student should maintain records of the above activities.

REVIEW QUESTIONS

1. How does the health of the mother affect the health of the family?
2. Why is it important to involve other family members in discussing the pregnant woman's needs?
3. For how long a period (in months) would you provide services to a pregnant woman?
4. Why do you need to learn about the structure and function of male and female reproductive organs?
5. What is the difference in structure between the fallopian tubes and the ovaries?
6. Describe the functions of hormones in the menstrual cycle and during pregnancy.
7. Describe the structure and function of the breasts and pelvis.
8. Why do Health Technicians need to know about foetal development by week or month?
9. Describe the Health Technician's activities in helping pregnant women during:

   - Four to 8 weeks of pregnancy.
   - Eight to 16 weeks of pregnancy.
   - Sixteen to 24 weeks of pregnancy.
   - Twenty-four weeks until delivery.

10. As Health Technicians, how would you identify pregnant women in the community?
11. How important are TBAs and CHWs in this process?

12. List the essential information you need to get from a woman in order to determine her health status. Identify which of the three methods (question and answer, examination and lab tests) you will utilize.
13. How would you end your visit with a woman who comes to the clinic for the first time wanting to know when her baby is due?
14. What kinds of records would you keep for antenatal services from a BHU?
15. What would you as a female Health Technician do for a pregnant woman who visits your BHU for the first time?
16. What would you do for this woman in subsequent visits?
17. Will there be a difference in what you do during the first and second visit of a pregnant woman who comes to the BHU?
18. During the course of one pregnancy, how many visits to the BHU would you expect a woman to make?
19. Why is it important to consider other family members' needs when a woman in the family is pregnant?
20. Describe what foods are prescribed and what foods are prohibited during pregnancy in your family.
21. What is the difference between a pregnant and non-pregnant woman's nutritional requirements?
22. Describe what activities are recommended and what activities are prohibited during pregnancy in your family.
23. Why does a pregnant woman need to pay more attention to her personal hygiene habits?
24. What is the role of a female Health Technician in providing antenatal services?
25. As female Health Technicians, what would you suggest to pregnant women who are suffering from:

    - Nausea and vomiting.
    - Heartburn and indigestion.
    - Constipation.
    - Backache.
    - Leg cramps.
    - Shortness of breath.
    - Urinary frequency.
    - Swelling of the feet and legs.
    - Sleeping problems.

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EVALUATION FORM

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of Presentation	[ ]	Simple to understand
	[ ]	Difficult to understand
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 7

HEALTH OF THE MOTHER: LABOUR, DELIVERY AND THE POSTPARTUM PERIOD

Objectives: After completing this chapter you will be able to:

1. List and describe the changes that occur in a woman during these three periods.
2. Identify and describe the three stages of labour and the Health Technician's activities in each stage.
3. List the signs and symptoms of each stage and describe what each means.
4. Describe the change in position of the foetus from just before labour starts to birth.
5. Describe the Health Technician's activities during the first and second stage of labour.
6. State how family members can be utilized to help you with maternal and baby care.
7. Describe how the placenta separates from the uterus and is expelled.
8. Describe what you would look for to be sure that the placenta has been expelled completely.
9. State what areas you would consider in assessing the mother's condition immediately after the birth of the baby.
10. List essential points you would review before leaving the house after delivery.
11. Describe the Health Technician's activities during the six week postpartum period.
12. Determine the nutritional needs of the mother and help the family meet these needs.

CHAPTER 7

HEALTH OF THE MOTHER: LABOUR, DELIVERY AND THE POSTPARTUM PERIOD

The health of the mother during pregnancy was discussed in Chapter 6. This chapter will cover labour, delivery and the postpartum (after delivery) period and discuss the changes that occur in a woman during these periods. The signs and symptoms of labour and delivery are presented in relation to the responsibilities of Health Technicians instead of following the traditional approach of just listing them. This chapter also deals with the needs of the mother during labour and delivery and the six weeks following delivery. The needs of the newborn are discussed in a later chapter.

7.1 THE THREE STAGES OF LABOUR

Labour and childbirth are natural processes in which the foetus, placenta and membranes are expelled from the uterus. Labour occurs in three distinct stages, first, second and third. Certain changes occur in the uterus distinguishing one stage from the other. The female Health Technician must be aware of the changes in each stage and be ready to take necessary action if there is a problem.

The first stage. This begins with regular contractions of the uterus which cause the cervix to dilate. This stage ends when the cervix is completely dilated or when the cervical opening is 10 cm wide. The contractions at first are short, far apart and not painful. The frequency, length and strength of the contractions increase with the progression of labour and become painful towards the end. A woman may require some medicine for pain. The first stage is the longest, lasting 6 to 8 hours.

The second stage. This stage begins when the cervix is completely dilated and ends with the birth of the baby. It lasts from 30 minutes to an hour. The second stage is longer for women giving birth for the first time (primipara) than for those who have given birth before (multipara).

The third stage. This stage of labour covers the period immediately following the delivery of the baby to the delivery of the placenta. This usually takes less than 30 minutes. The total time of a normal labour is less than 24 hours, but in some cases this period may become longer. In the following table, the three stages of labour and their duration are summarized for quick reference.

TABLE 7.1 THE THREE STAGES OF LABOUR AND THEIR DURATION

Stage	Changes in the uterus	Duration	
		Primipara	Multipara
First	Dilation of the cervix	12 to 18 hrs	6 to 12 hrs
Second	Delivery of the foetus	30 to 60 min	30 min
Third	Delivery of the placenta	3 to 6 min	4 to 5 min

Thus far you have been given general information about the three stages of labour. Let us now consider the specific physiological changes that occur within each stage and identify the responsibilities of the Health Technician in conjunction with these changes. The changes for each stage are described, followed by the Health Technician's related activities. For the first stage, in addition to these changes, other signs and symptoms are included.

7.2 PHYSIOLOGICAL CHANGES DURING THE FIRST STAGE OF LABOUR

During the first stage of labour:

- The uterus contracts and the cervix dilates and becomes thin.
- The first contractions usually occur every fifteen minutes then gradually become more frequent.
- Each contraction lasts about one minute.
- A contraction begins at the top of the uterus and spreads downward, causing the lower end of the uterus, the cervix, to open.
- The contractions also increase the pressure on the foetus and the bag of water surrounding it.
- The uterus stretches thin and the membranes of the bag of water start to separate from the uterine walls.
- The bag of water bulges toward the cervix.
- The cervix now expands under pressure from the water and the foetus.

- The cervix expands and becomes thin to allow the bag of water and the foetus to pass through.
- The bag of water may rupture at any time with either a slow trickle or a gush of water being expelled.

ABLE 7.2 THE FIRST STAGE OF LABOUR AND THE HEALTH TECHNICIAN'S ACTIVITIES

igns and symptoms	Health Technician's activities
ontractions	- Contractions may occur occasionally throughout any normal pregnancy. In the first stage of labour, when regular contractions begin, explain to the mother that the uterus is preparing itself for the delivery of the baby. - Contractions are necessary for opening the cervix and pushing the baby out. For contractions to be useful, they have to be strong and frequent. - Contractions alone may not be a sign of true labour. Rupture of the bag of water and "show" are other positive signs. Ask the mother about these two.
show" or slight bleeding	- Explain to the mother that the "show" is the expulsion of the mucous which had plugged the cervical opening and kept it closed, allowing the foetus to grow to term. Now that the baby is ready to be born, the mucous plug comes out and the cervix begins to open. Once the cervix is dilated to 2 cm, the mother may be informed that her labour has started and she needs to make preparations for the delivery. - The time from 2 cm dilation to full dilation of the cervix varies in individuals. It may take up to 12 to 18 hours. - Give an enema to evacuate bowel.

TABLE 7.2 THE FIRST STAGE OF LABOUR AND THE HEALTH TECHNICIAN'S ACTIVITIES

Signs and symptoms	Health Technician's activities
	- Assess the general condition of the mother and baby through observation. Take the mother's blood pressure, pulse, respiration and listen for the foetal heart rate.
Rupture of the water bag	- Explain to the mother that this is another positive sign of labour. Contractions increase in frequency, duration and pain. This is because the foetus is being pushed from a wide space into a narrow one before delivery. The pain is due to the adjustment of the body as the baby is being pushed through such a narrow tunnel. - Keep the mother well hydrated by giving plenty of liquids. - Have the mother empty her bladder often because a full bladder sometimes slows the labour process.
If the first stage is lasting longer than expected	- Check to assess the position of the foetus. If the foetus isn't in the normal head down position, accompany the mother to the RHC. - If there is a need for facilitating the delivery and the bag of water can be seen or felt, you may want to rupture the bag just by piercing it with a sterile forceps.

7.3 PREPARATION FOR DELIVERY

Prepare for delivery by assembling all materials required for delivery and the care of the infant. Then:

- Note the frequency of the contractions and how far apart they are. Note the duration of a contraction by feeling with your hands from the time it begins (hardening of the abdominal area) until it ends (softening of the abdominal area).
- Assess mother's condition.
- Encourage diversions such as walking, talking and listening to music.
- Give the mother frequent small portions of nutritious but light food and drink. Encourage her to take deep breaths during contractions and exhale through the mouth.
- Provide her with something to hold and grasp with her hands during strong contractions.
- Do not discourage her from crying or groaning. This may take her attention away from her pain.
- Make sure someone is with her at all times during labour and delivery.
- During the later part of the first stage of labour, prepare her for delivery. Wash the mother's lower abdomen, thighs and buttocks with soap and water. Dress her in clean clothes.
- The Health Technician should wash her own hands.

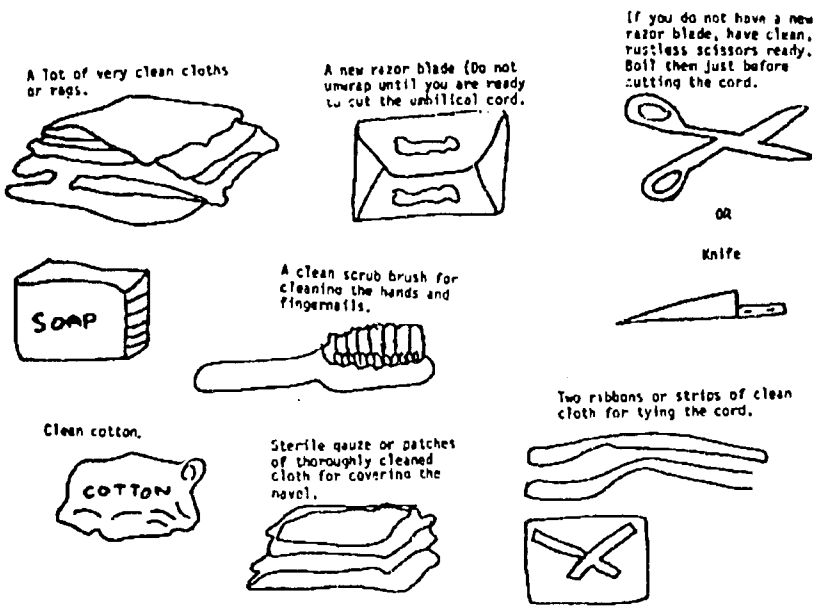

Fig. 7.1 Equipment required for a delivery.

7.4 PHYSIOLOGICAL CHANGES DURING THE SECOND STAGE OF LABOUR

The second stage of labour lasts about an hour in a primipara and less in a multipara. The pain during the second stage is less than that experienced at the end of the first stage because the cervix is fully dilated. The woman may complain of pain in the legs. This pain is due to pressure from the baby's head.

With each contraction, the presenting part or the head is forced down onto the pelvic floor. Initially, between contractions, the pelvic floor pushes the presenting part up only to have it pushed down again with the next contraction. Eventually, after being pushed down many times by the contractions and up between contractions, the presenting part remains stationary at the end of a contraction. In a primipara, the head is visible at the vulva for some time before it can come out. When the widest part of the head distends the vulva, it is said to be crowned.

From the time the head is seen at the vulva, the pain from the stretching of the perineum becomes severe and women cry out. It is better to let a woman cry out or take deep breaths to stop her from forceful pushing, which may push the head out suddenly and cause damage to the perineum. In order to prevent tearing in the perineal area, the female Health Technician needs to support the area below the birth opening (see Figure 7.11).

7.5 PRESENTATION OF THE FOETUS

In normal labour and delivery, the head is the presenting part and goes through the following positional changes in the birth canal as the foetus is being expelled.

Flexion. The neck of the foetus maintains a bended position or flexion, which allows the largest diameter of the head to pass through the birth canal. Flexion does not end until the contractions move the head down into the lower uterine segment. This position may begin two weeks before labour.

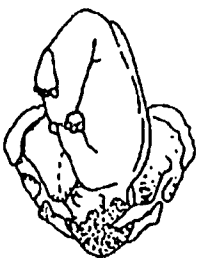

Fig. 7 .2 The neck in flexion.

Internal rotation of the head. This refers to a slight twisting of the neck so that the head turns forward as it meets the resistance of the pelvic floor as it is being pushed downwards.

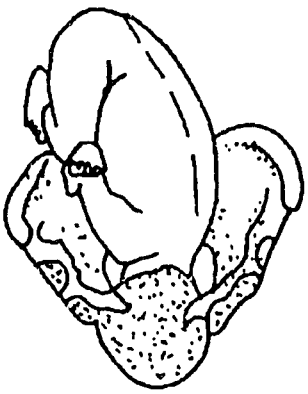

Fig. 7.3 Internal rotation of the head.

Crowning. Crowning occurs when the foetal head can be seen at the vulva as it passes under the symphysis pubis. It no longer goes back inside between contractions.

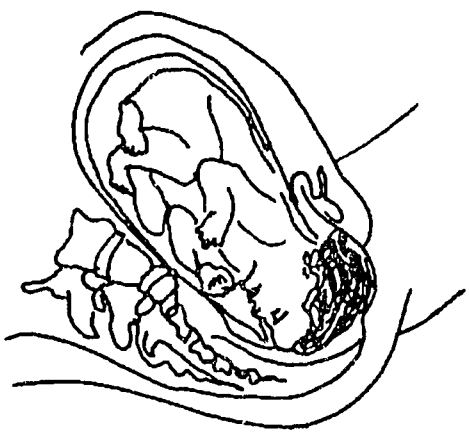

Fig. 7.4 Foetal head at crowning

When the crown of the head appears, the fontanelles and sutures can be seen. Fontanelles are the soft spots found at the top of the infant's head (see Chapter 4). There are two fontanelles, the front one is larger (2 to 4 cm long) and diamond shaped and the back one smaller and triangular in shape. A suture is a line of soft tissue which joins parts of the skull.

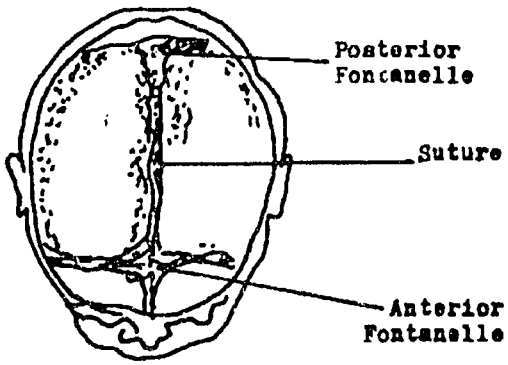

Fig. 7.5 The fontanelles seen at crowning.

Extension. This refers to the stretching of the back of the foetal neck as it rotates against the lower border of the symphysis pubis. As the back of the neck is stretched, the brow and face can be seen as the head emerges.

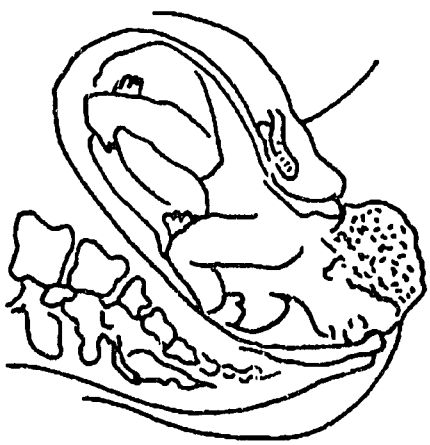

Fig. 7.6 Extension.

Restitution or external rotation of the head. This is the process whereby the foetal head returns to its natural position in relation to the shoulders. Remember, during internal rotation of the head this natural position was altered to facilitate the downward push of the head.

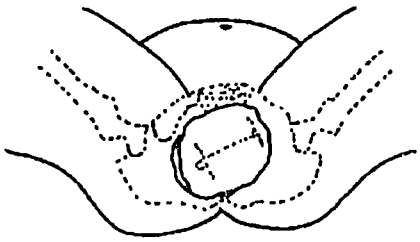

Fig. 7.7 Restitution of the head.

During extension the face is in a downward position but during restitution the face is to the side.

Lateral flexion of the body. This occurs when the body of the foetus positions itself on its side so that it fits the curve of the birth canal and continues in this position until it is completely out of the mother. The birth attendant then holds the baby and gently lifts it over the pubic area towards the mother's abdomen.

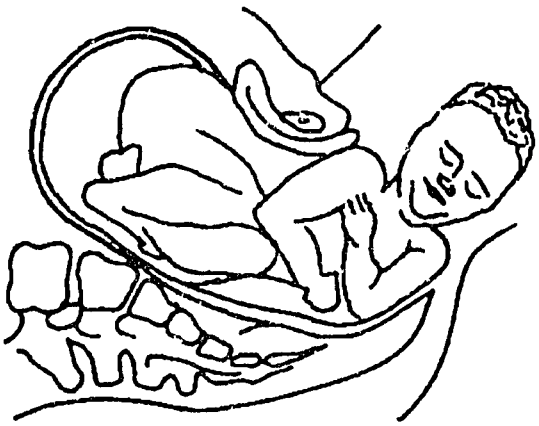

Fig. 7.8 Lateral flexion of the body.

Once the head and shoulders come out, the rest of the body usually follows without any difficulty because the diameter of the other body parts is less than that of the head and shoulders. When babies are delivered, the arms are usually folded on the chest with the hands under the chin.

7.6 THE HEALTH TECHNICIAN'S RESPONSIBILITIES DURING THE SECOND STAGE OF LABOUR

There are certain preparations for this stage of labour:

1. Be sure the bed is protected and has clean sheets. Have the mother lie on it.
2. Wash your hands well and be prepared to assist with delivery.
3. Count the foetal heart rate every few contractions to assess foetal distress.
4. Encourage the mother to relax by taking short and quick breaths when she feels the urge to push or bear down.
5. Wash down the vulva and observe the crowning.

Fig. 7.9 Wash your hands and forearms with soap and water.

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Fig. 7.10 Wash the perineal area.

6. Support the perineum to prevent tearing by placing one hand on the perineal floor and with the other hand gently prevent the head from coming out too fast.

Fig. 7.11 Support the perineal floor to prevent tears.

7. If the head takes too long to come out, you may want to apply warm compresses to the perineum as it stretches to lessen the severity of the pain.
8. Tell the mother to take short, quick breaths and not to push as the head is delivered.
9. Check for the cord immediately. Place your fingers on the baby's neck to see if the cord is wrapped around it. If a single loop is present, gently loosen and draw it over the foetal head. If it is too tight, cut the cord before the shoulder is delivered, otherwise it may interfere with the foetal oxygen supply. The head usually comes out face down and the body turns to one side as the shoulders and the rest of the baby come out. After the baby comes out, hold it upside down until it breathes. Rubbing the baby's back or giving a gentle slap on the buttocks will start it breathing.

10. If this does not produce any result, clean the mucous from the nose and mouth with a rubber bulb or catheter.
11. Put the baby on the mother's abdomen.

7.7 PHYSIOLOGICAL CHANGES DURING THE THIRD STAGE OF LABOUR

The baby is now born. After the birth the uterus continues to contract, causing the placenta to buckle and separate from the uterine wall. The placenta is then pushed into the lower part of the uterus and it slides down the vagina. The placenta is usually delivered within ten minutes after the birth of the baby, but may take longer in some cases. If it is not delivered within 45 minutes, the mother and the baby should be taken to the RHC.

The following signs will tell you when the placenta is separating from the uterus:

- The uterus will feel hard and round instead of soft and flat. Advise the mother to bear down while the female Health Technician applies gentle pressure to the fundus of the uterus.
- The uterus will rise to the umbilicus (navel). You will be able to see it just beneath the abdominal wall.
- The umbilical cord remaining at the vaginal opening will begin to lengthen as the placenta slides into the vagina.
- You will be able to see the placenta at the vaginal opening.
- There is often a small gush of blood when the placenta leaves the uterus.

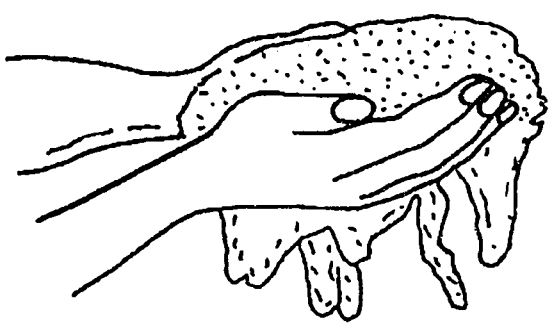

Fig. 7.12 The placenta.

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7.8 THE HEALTH TECHNICIAN'S RESPONSIBILITIES DURING THE THIRD STAGE OF LABOUR

Wash the vulva and look for tears. If a tear in the perineal area occurs, follow the procedure for suturing, but only if you have been taught, supervised and authorized.

- Take the placenta carefully in both hands.
- Examine it to make sure the whole placenta is delivered by checking to see that placental membranes are complete.
- Look for a possible twin foetus before giving any medication.
- Give two tablets of Ergot (if this is in your kit).
- Take the mother's blood pressure, pulse and respiration.
- Give her a drink of water or juice.
- Wash her face and hands, make her comfortable and let her rest.

7.9 IMMEDIATE CARE OF THE MOTHER AFTER DELIVERY

The period immediately after the birth of the baby is a very critical time for both the mother and the baby. Therefore, care of the mother and baby starts with an assessment of their conditions. Based on your findings, you have to take the necessary actions described below. Assessment of the newborn and the Health Technician's activity is covered in Chapter 9. The rest of this section will deal only with the care of the mother. The following table identifies the areas you need to consider and your activities.

TABLE 7.3 ASSESSMENT OF THE MOTHER'S CONDITION

Area to consider	Health Technician's activities
General appearance	- Assess the mother's general condition.
Colour, level of energy, alertness and attitude	- Determine her colour, level of tiredness and alertness. - Determine her attitude towards the baby.
Blood pressure, pulse and respiration	- Take the blood pressure, pulse and respiration every 30 min for two hours and record the findings.

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TABLE 7.3 ASSESSMENT OF THE MOTHER'S CONDITION

Area to consider	Health Technician's activities
Appetite and nutrition	- Have the family prepare and give her small, frequent feedings five times a day or less if she eats well, and approximately 10 to 12 glasses of liquid.
Breasts	- Check the condition of the breasts, clean or have the mother clean them and demonstrate how the baby should be put to breast or have the mother demonstrate to you how she holds the baby while breast-feeding. - Review the method of air drying the breasts after each feeding.
Uterus and lochea	- You need to assess the condition (height and firmness) of the uterus every 15 minutes for one hour following delivery. Immediately after delivery the fundus of the uterus should be firm and about two fingers below the umbilicus. It is not palpable after the 10th day. - The uterus should be felt only after emptying the bladder. - Following delivery, the lochea is bright red and the amount of bleeding is moderate. Assess the amount and colour.
Elimination, bladder and bowel	- Ask the mother when she last had a bowel movement and emptied her bladder. If an enema was given during labour do not be concerned with bowel elimination. - Mother should be instructed to drink plenty of liquids and empty her bladder at least every two hours.
Rest	- Assess how much rest the mother needs and how soon.

After you have assessed the general and specific needs of the mother, identify the person who is going to be responsible for her care and give them the following instructions:

- Wash or help the mother wash her hands and face and change her clothes. Cover her with a clean cover and make her comfortable.
- Give her something to drink and eat if she is up to it.
- Put the baby to breast to help the development of attachment and to teach the mother the proper and comfortable way of holding the baby while feeding.
- If the uterus is not firm, demonstrate gentle massaging which will help it contract and become firm.
- Allow the mother to sleep.
- Discuss the mother's blood pressure, pulse and temperature and decide if this needs to be watched.
- Frequently check the amount of bleeding for up to 6 to 12 hours after birth, even when the mother is sleeping. If bleeding is more than expected, call for help.
- Have the mother empty her bladder every two to three hours.
- Dispose of the placenta by burying it.
- Soak blood stained sheets or clothes in water and later wash clean.
- Soiled swabs or cloth used in cleaning the mother during the second stage should be wrapped in paper or leaves and burned.
- If the mother shows little or no interest in the baby, point out positive things about the baby to prevent rejection, especially of a baby girl.
- Ask the person watching the mother to repeat where and how to get in touch with you, a Traditional Birth Attendant or a Medical Officer in case of difficulty.
- Ask if there are any questions or concerns in her mind.
- Give the day and time of your next visit.
- Register the birth of the baby.

7.10 THE HEALTH TECHNICIAN'S ACTIVITIES BEFORE LEAVING THE HOUSE

After cleaning the room, making sure the mother and baby are resting and giving proper instructions to the person caring for the mother, you must review the following points to make sure you have covered all the essential items regarding the condition of the mother and baby.

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The mother:

1. The uterus is firm and at the level of the umbilicus.
2. The colour, blood pressure and pulse are normal.
3. The mother has emptied her bladder at least once since delivery.
4. There is no excessive bleeding.

The baby:

1. The colour is good and the skin warm.
2. The baby has cried well and sucked at the breast.
3. There is no bleeding from the cord.
4. The vital signs are within the normal range for a newborn.

7.11 THE HEALTH TECHNICIAN'S ACTIVITIES DURING THE POSTPARTUM PERIOD

The postpartum or puerperal period refers to the recovery period after childbirth. This period generally lasts for six weeks. Many changes occur in a woman during this period. These changes and the Health Technician's responsibilities in relation to them are described below. The development of complications during this time makes recovery more difficult. Therefore, appropriate care is a must from the beginning.

TABLE 7.4 THE POSTPARTUM PERIOD

Changes in the mother	Health Technician's activities
The cervix and the uterus	
The cervix should become firm within 24 hours and recovery should be almost complete within one week.	- Assess the colour and odour of of the lochea. If this is within normal range, you may assume that the cervix will heal normally.
The uterus begins to shed its lining immediately after the baby and placenta are delivered. It continues to contract and becomes firmer and smaller in size.	- Measure the height and firmness of the uterus each day to make sure it is returning to its normal size. - The height of the uterus is measured with the fingers in relation to the umbilicus. - If the uterus is soft, gently massage it. Do not push hard.

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TABLE 7.4 THE POSTPARTUM PERIOD

Changes in the mother	Health Technician's activities
Lochea	
The lining of the uterus is shed as a vaginal discharge for 2 to 6 weeks. It changes in colour from bright red to pink or brown.	
If the colour remains red beyond ten days, this may be a sign of infection or improper healing. A foul odour is an indication of an infection.	- Assess the colour and odour of the lochea.
The amount of lochea discharged should be close to menstrual flow. If the discharge is too heavy and the uterus boggy, this may be a sign of haemorrhage due to retained placenta.	- Determine the amount of lochea in relation to menses.
Return of menses	
When one resumes menstruating after delivery is an individual matter. A female who has delivered before should use her previous delivery experience as a reference in determining when menstruation should occur.	- Help women answer the question of when they will have their first menses.
Some women menstruate as early as a month after delivery and some as late as a year.	

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TABLE 7.4 THE POSTPARTUM PERIOD

Changes in the mother	Health Technician's activities
It is believed that women who breast-feed resume their menstrual cycle later.	- Health Technicians need to tell women that this is true for many but not all women. Exclusive breast-feeding and frequent feeding will help to delay the return of menstruation.
It is possible for a woman to get pregnant before getting her period again after the birth of the baby.	- Introduce the topic of child spacing and its health benefits. Discuss this with the couple, especially if they desire a longer interval between children.
Nutritional needs	
The nutritional requirements of a woman recovering from pregnancy and childbirth as well as producing milk increases. For more specific information, refer to the nutrition section in Chapter 5.	- A refreshing and nutritious drink should be provided for the mother immediately after delivery. - Give her a light meal. - Advise her that by the second or third day she should go on a regular diet with special attention to increasing calories, proteins, vitamins and fluid intake.
During breast-feeding, a mother feels very thirsty.	- Advise her to drink a glass of milk, lassi, juice or water while breast-feeding.
Blood pressure and pulse	
Decreasing blood pressure and increasing pulse may be an indication of bleeding	- For the first postpartum hour, blood pressure and pulse should be taken every 15 minutes.

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TABLE 7.4 THE POSTPARTUM PERIOD

Changes in the mother	Health Technician's activities
Urination	
Diuresis (elimination of urine) should begin almost immediately after delivery since the woman's bladder begins filling immediately. A full bladder puts pressure on the uterus and may interfere with effective uterine contraction.	- Encourage the woman to urinate one hour after delivery. - If voiding has not occurred within hours, encourage large fluid intake and use various techniques to encourage the mother to void such as pouring cold or warm water over the vulva or let the mother hear the sound of running water.
Evacuation of the bowel	
During the early postpartum days some women experience delay in evacuation of the bowel.	- In order to avoid constipation, encourage the drinking of fluids and include roughage in the diet. - If the bowels have not moved in four days, a simple enema or a dose of milk of magnesia may alleviate the situation.
Rest	
A new mother has worked hard during labour and delivery and her rest is often disturbed by the need to care for the infant.	- Help the family plan one or two rest periods during the day for the mother. - Encourage the mother to sleep during the day when the baby is sleeping (if she can) so that she gets some rest.
Personal hygiene	
A mother is vulnerable to infection during the early postpartum period. Therefore, in addition to adequate rest and she also needs to pay particular attention to personal hygiene.	- Assess the personal hygiene habits of the mother. - Emphasize the proper care of the breasts and perineal area. Wash the area well with soap diet and water. Pour water over the area after urination.

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TABLE 7.4 THE POSTPARTUM PERIOD

Changes in the mother	Health Technician's activities
Breasts	
Throughout pregnancy, breasts continue to develop. Towards the latter part of the pregnancy and automatically after the birth of the baby, milk comes out.	
The nutritional status and well-being of the mother determines her ability to produce adequate amounts of milk.	- Make sure mother is taking supplemental nutrition, drinking plenty of liquids and resting.
Full recovery	
The criterion for full recovery of the mother is the return of the uterus to its non-pregnant size and condition.	- Instruct the mother or the family to see a female Medical Officer for a six week checkup to make sure that recovery is complete.
The mother should be alert, active and interested in the baby.	- Assess the mother for her level of alertness, activity and interest in the baby. If this level is moderate to high then one or two visits in the first six weeks after birth is sufficient. Otherwise have the mother come to see you or make several home visits.
The level of coping on a daily basis may vary in different women.	- Assess the mother's level of coping. If she is coping well there is no need for frequent contact. If she is facing difficulty in coping with her new responsibilities, contact with her beyond the six week period may be necessary.

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TABLE 7.4 THE POSTPARTUM PERIOD

Changes in the mother	Health Technician's activities
The issue of child spacing is an important one after childbirth.	- If the couple is interested in child spacing, provide enough information and discussion opportunities to enable them to make a decision about this. - Refer them to the nearest and best facility or person to deal with it. - Follow up as indicated to see if the woman has any difficulties and proceed according to your findings.

Health Technicians play an important part in insuring a safe delivery and a healthy postpartum period. It is important for you to know what is normal for the woman to experience during these periods and what your related activities are. This chapter will help you deal effectively with labour, delivery and postpartum and help ensure a healthy mother and baby.

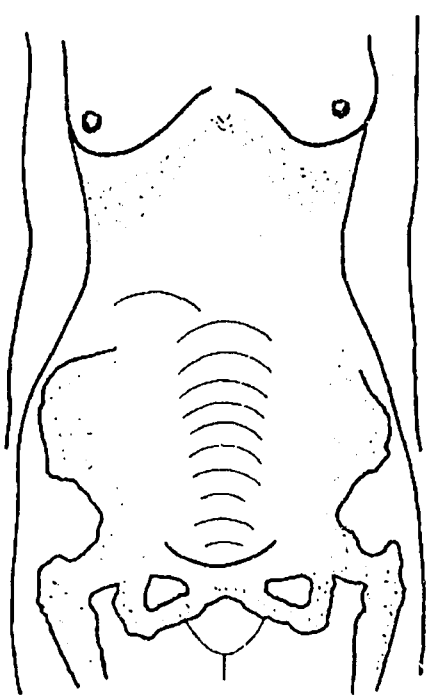

Fig. 7.13 Uterus returning to normal size during postpartum.

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7.12 PROCEDURE FOR SUTURING TEARS FOLLOWING DELIVERY

Necessary material:

- Antiseptic solution or soap and water.
- Boiled needle and thread.
- Scissors.

Procedure:

- Clean the perineal area with soap and water or an antiseptic solution after the delivery of the baby and placenta.
- Take the needle and thread which has been boiled for ten minutes and sew the wound.

When you have completed sewing, insert your finger in the rectum and see whether or not you feel the sutures. If you do, they are too deep. If so:

- Sutures should be taken out.
- Wash your hands and sew up again so that the thread is not felt in the rectum.
- Instruct the mother to wash this area and keep it clean.
- Visit the mother within a week to determine how well the perineal area is healing and to make plans for removing the sutures.
- Inspect the suture site to make sure that healing has taken place.
- Using clean scissors, insert one blade inside the suture and snip it.
- Pull out each suture with a pair of tweezers.
- If infection occurs, refer to the chapter on minor infections and proceed accordingly.

GLOSSARY

Cervix: Mouth of the uterus, located inside the vaginal canal.

Contracts: Shrinks.

Descend: Come down.

Diuresis: Increased loss of body fluids as urine and perspiration.

Dilate: Expand.

Extension: Straightening and lengthening.

Flexion: Bending and shortening.

Fontanelles: Thin soft portions of the infant skull where the bones join. Sunken fontanelles mean that an infant is dehydrated.

Involution: Return of the uterus to the normal position after childbirth.

Lochea: Discharge that is expelled gradually for a few days after childbirth. The discharge will smell foul if sepsis occurs.

Membrane: Thin layer of tissue covering or separating surfaces.

Multipara: Woman who has borne more than one child.

Oxytocic: Drug that causes contraction of muscle tissue, especially that of the uterus.

Perineum: The region between the external genitalia and the anus.

Placenta: Organ inside the uterus through which the baby is fed. It is expelled after the childbirth.

Postpartum: After childbirth.

Predictable: That which can be foreseen.

Primipara: Woman with first pregnancy.

Restitution: Returning to the previous position.

Show: Blood and fluid discharged from the uterus during the first stage of labour.

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SUGGESTED LEARNING ACTIVITIES

1. Prepare 15 to 20 women in labour for delivery. Assist and observe with the first five deliveries, conduct the second five under supervision and the last 5 to 10 independently.
2. When attending women in labour, do the following:

   - Prepare the room for labour and delivery.
   - Write down the labour history and record significant information on mother's and baby's condition including:

     o blood pressure, pulse, respiration
     o foetal heart rate
     o length and frequency of contractions and other signs of labour
     o birth of the baby and expulsion of the placenta
     o bleeding and condition of the perineum (any tear)
     o examination of the placenta

   - Massage the fundus of the uterus and describe any discharge of blood and clots.
   - Cleanse the mother, put on a sanitary pad and make her comfortable.
   - Give immediate care to the baby and help the mother to breast-feed (refer to the section on care of the newborn).
   - Give the mother a nutritious drink.
   - Help the mother to void.
   - Help the family meet the needs of the mother and baby.

3. Follow 15 to 20 new mothers in the postpartum period and provide postnatal care in their own homes. Include the following:

   - Assessment of mother's general status.
   - Assessment of breasts, uterus and lochea.
   - Assessment of nutritional and personal hygiene needs.
   - Recording of assessment.
   - Plans to meet identified needs.
   - Involvement of family members in meeting new mother's needs.
   - Recording progress notes.
   - Referring new mother for six week postpartum checkup.
   - Discussion of child spacing.

4. Conduct health education classes at the RHC or BHU on the following topics:

   - Nutrition for lactating women.
   - Breast-feeding and weaning foods.
   - Child spacing.
   - Immunization of children.
   - Growth monitoring and nutrition of children.

REVIEW QUESTION

1. List and describe the three stages of labour.
2. What is the normal range of duration for each stage?
3. List and describe the physiological changes and Health Technician's activities during:

   - First stage of labour.
   - Second stage of labour.
   - Third stage of labour.

4. How do you help prepare a family for delivery?
5. Describe the changes in position of the foetus as it passes through the birth canal.
6. Why is the period immediately after the birth of the baby considered a critical time for both mother and baby?
7. What areas do you need to concentrate on in assessing the mother's condition during labour and postpartum?
8. How can you involve the family in meeting the new mother's needs and what can they do?
9. What must you as Health Technicians do before leaving the house after delivery of a baby?
10. How long is the postpartum period?
11. What is the difference between postpartum and puerperal?
12. What changes occur in a woman during the postpartum period?
13. Describe a Health Technician's activities during postpartum visits.
14. What are the specific postpartum needs of a mother? How can you help meet these needs?
15. What is meant by lochea? Describe the changes that occur in the lochea during the postpartum period.
16. How can you help a mother maintain adequate personal hygiene habits?
17. What foods or drinks should a mother avoid during the postpartum period?

LEARNING ACTIVITIES RECORD

Name of student _____

15 to 20 labour and delivery cases

O - Observed
S - Supervised
I - Conducted independently.

15 to 20 postpartum care cases

Health education classes

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EVALUATION FORM

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of Presentation	[ ]	Simple to understand
	[ ]	Difficult to understand
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 8

COMPLICATIONS OF PREGNANCY, LABOUR, DELIVERY AND THE POSTPARTUM PERIOD

Objectives: After completing this chapter you will be able to:

1. List criteria that place a pregnant woman at risk for developing problems during pregnancy, labour and delivery.
2. Identify commonly occurring problems during pregnancy, labour and delivery.
3. Suggest ways in which female Health Technicians can help women minimize these problems.
4. Describe what a vesicular mole is and why a woman with this condition needs to be followed for one year.
5. Describe the position a woman needs to assume on her way to the hospital when there is a prolapsed cord during early labour.
6. List problems commonly occurring during the postpartum period and state how Health Technicians can help.
7. State why a mother who delivers female children in succession may develop emotional problems.

CHAPTER 8

COMPLICATIONS OF PREGNANCY, LABOUR, DELIVERY AND THE POSTPARTUM PERIOD

Complications during pregnancy may present in many ways and may occur at any time. If symptoms or other clues are observed or detected early, it may be possible to prevent complications from arising or minimize their severity. Experience has shown that women with certain histories are more likely to develop problems during pregnancy, labour, delivery and postpartum. These women are classified as being at risk for developing complications. Health Technicians need to identify pregnant women who are at risk so that they can be monitored more closely.

8.1 THE HIGH RISK PREGNANCY

This chapter will begin with guidelines for identifying women who may be at risk for developing problems. Identification of commonly occurring problems of pregnancy, labour and delivery and what Health Technicians can do to help in these circumstances will follow.

Table 8.1 is a guide for identifying women at risk during pregnancy. The left hand column gives the criteria or features of high risk pregnancies and the right column provides clues as to how to get the information needed to make such an assessment.

TABLE 8.1 GUIDE FOR IDENTIFYING THE HIGH RISK PREGNANCY

What to look for (criteria)	How to get the information
Age of the mother. Women less than 16 years of age often have premature babies. Women over 30, having their first child, usually have prolonged labour because the pelvis does not expand as easily as in a young woman.	- Ask the age of the mother.

TABLE 8.1 GUIDE FOR IDENTIFYING THE HIGH RISK PREGNANCY

What to look for (criteria)	How to get the information
Women with more than 4 children have a tendency to bleed after delivery (postpartum haemorrhage).	- Ask how many children were delivered in total.
Prolonged and difficult labour during previous deliveries. Such a history suggests a possible reoccurrence.	- Obtain a history of the previous labour, delivery and postpartum periods.
Height of mother less than 152.5 cm, weight less than 45 kg. Shorter women may have difficult labour.	- Measure and record the height and weight of the expectant mother.
Small pelvis. Women with a small or deformed pelvis have difficulty having a vaginal delivery.	- Record pelvic measurement.
Blood incompatability.	- Encourage couples to determine the blood group and RH factor for both husband and wife during first pregnancy.
Associated diseases: Heart disease, tuberculosis, diabetes or kidney disease may flare up during pregnancy.	- Take a history. - Have the Medical Officer examine the woman. - Ask if new signs or symptoms have developed on every visit.

TABLE 8.1 GUIDE FOR IDENTIFYING THE HIGH RISK PREGNANCY

What to look for (criteria)	How to get the information
Toxaemia of pregnancy and pre-eclampsia. Pregnant women having a blood pressure above 140/90 or showing albumin in the urine during pregnancy may get this serious complication.	- Record the blood pressure. - Examine the urine for protein (albumin). - Record the weight. - Observe for swelling.
Anaemia.	- Observe the general appearance, looking for a pale skin colour. - Determine the haemoglobin. - Look inside the eyelids at the conjunctiva and describe the colour. - Look at the colour of the nail beds.
History of bleeding or multiple pregnancy.	- Ask mother about any bleeding during past pregnancies or multiple pregnancies.
Any bleeding during the current pregnancy.	- Ask mother to tell you about any bleeding during this pregnancy.
Rapidly growing or too large abdomen for the stage of pregnancy.	- Measure the abdomen if suspect and continue to measure at short intervals.
Sudden loss of weight or excessive weight gain, change in blood pressure and development of any other symptoms.	- Routinely observe for changes in weight, blood pressure and other signs and symptoms.

TABLE 8.1 GUIDE FOR IDENTIFYING THE HIGH RISK PREGNANCY

What to look for (criteria)	How to get the information
Excessive vomiting.	- Routinely inquire about appetite and food consumption as well as incidence of nausea and vomiting.
Swelling of arms, legs and other parts of the body.	- Observe the appearance or press the parts to see if there is any depression (sign of oedema).
Abnormal presentation.	- Perform examination at a later stage of pregnancy.
Previous caesarean section.	- Inquire about previous caesarean sections. - Observe for scars on abdomen.

If from your findings the mother is suspected to be at high risk for developing difficulties during pregnancy, labour and delivery, you are then requested to discuss this situation with the Medical Officer and the family so that expected difficulties may be minimized by early and appropriate help.

8.2 COMMON PROBLEMS OF PREGNANCY

As Health Technicians you need to view all pregnant women as potential candidates for developing problems during pregnancy and identify those who are at risk. Table 8.2 describes the common problems of pregnancy and what Health Technicians can do to help.

TABLE 8.2 COMMON COMPLICATIONS/PROBLEMS OF PREGNANCY AND SUGGESTED ACTIVITIES FOR HEALTH TECHNICIANS

Problems	Suggested activities for Health Technicians
EXCESSIVE VOMITING	
Almost every pregnant woman gets morning sickness or vomits in the morning, afternoon or evening during the early stage of pregnancy.	- Explain to the mother that this is a normal occurrence. Suggest the eating of frequent, small meals and eating something dry before getting out of bed and before sleeping at night.

TABLE 8.2 COMMON COMPLICATIONS/PROBLEMS OF PREGNANCY AND SUGGESTED ACTIVITIES FOR HEALTH TECHNICIANS

Problems	Suggested activities for Health Technicians
Some women vomit when they have an empty stomach and some immediately after eating.	- Suggest sucking on a clove or cardamom skin. This may help some women.
Some women will vomit each time after taking food or drink. This could become serious for the mother and foetus because this is the period when a pregnant woman needs extra nutrition. If vomiting continues she will become weak and dehydrated.	- Give small amounts of food frequently. - Provide psychological support and try to divert her attention away from her condition. - Advise her to eat anything she can tolerate. - Make frequent home visits to assess her condition, to give suggestions and to provide her with as much nutrition as possible. - If dehydrated, encourage fluid intake even if she continues to vomit. - In severe cases, refer to the Medical Officer.
LOW WEIGHT GAIN	
Many women continue doing all the household works and do not adjust their food intake to meet the increased needs during pregnancy. Calorie needs increase about 350 calories per day. Weight gain is particularly important during the last trimester and should total around 10 kg for the pregnancy.	- Record the mothers' weight at each visit. Check the mothers' food intake by doing a food recall. Remind her to eat an extra chappati, and to drink an extra glass of milk and an extra serving of vegetables each day to achieve her added caloric need.

TABLE 8.2 COMMON COMPLICATIONS/PROBLEMS OF PREGNANCY AND SUGGESTED ACTIVITIES FOR HEALTH TECHNICIANS

Problems	Suggested activities for Health Technicians
ANAEMIA	
Anaemia is a condition of reduced haemoglobin in the blood. In pregnancy, anaemia is caused by a lack of sufficient iron and folic acid in foods eaten by the woman. Because of the growing foetus, the amount of iron and folic acid needed is increased above the woman's usual requirements. Frequent pregnancies or bleeding related to abortions or the delivery process lead to an even greater need for iron and folic acid. Anaemia in pregnancy is a very common condition. Some culturally related food taboos may keep the pregnant or lactating woman from eating foods with high iron and folic acid content.	- Health Technicians need to make sure that the mother's diet is adequate in iron. Iron supplements should be provided.
Anaemia causes a woman to tire easily and feel weak. She may be unable to do her regular work. She looks pale and the conjunctival and buccal mucosa as well as the nail base are pale.	- Advise her to rest more often. Determine her haemoglobin level. - Suggest eating green leafy vegetables, legumes, animal protein and foods containing iron and vitamin C together. - A stool examination for parasites as well as a blood smear for malarial parasites should be done to rule out these conditions as the cause of anaemia. If parasites are found, she should consult a Medical Officer for the proper treatment.

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TABLE 8.2 COMMON COMPLICATIONS/PROBLEMS OF PREGNANCY AND SUGGESTED ACTIVITIES FOR HEALTH TECHNICIANS

Problems	Suggested activities for Health Technicians
	- Give ferrous sulphate tablets t.i.d. and folic acid 5 mg daily. Continue until 2 months after delivery.
Anaemia may result in breathing difficulty, shortness of breath, ankle oedema or prominent neck veins.	- Refer to Medical Officer at the RHC.
PRE-ECLAMPSIA (TOXAEMIA)	
Pre-eclampsia is one of the serious high risk conditions of pregnancy. It is more common in young women and in a first pregnancy. It occurs after 30 weeks of pregnancy. Health Technicians should watch for the following signs and symptoms: - Blood pressure above 140/90. - Swelling. - Protein in the urine. - Dizziness. - Headache. - Vision problems. - Epigastric pain.	- Take and record the blood pressure on each visit. Assess the degree of swelling; test the urine for protein. Give paracetamol for headache and advise rest for dizziness if related to the headache. Reduce salt and spice intake. Refer if the condition is getting worse and/or convulsions occur.
ECLAMPSIA	
If the above symptoms worsen or are accompanied by convulsions, the condition is known as eclampsia. This is very serious for both the mother and foetus.	- This condition should be treated immediately by the Medical Officer.

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TABLE 8.2 COMMON COMPLICATIONS/PROBLEMS OF PREGNANCY AND SUGGESTED ACTIVITIES FOR HEALTH TECHNICIANS

Problems	Suggested activities for Health Technicians
BLEEDING	
Bleeding in pregnancy is never normal and must be considered a danger sign for the well-being of the mother as well as the foetus. Causes of bleeding during pregnancy may be due to one of the following conditions: - Abnormalities of the cervix. - Abortion/miscarriage. - Ectopic pregnancy. - Early separation of the placenta. - Vesicular mole. - Other.	
Bleeding in the 3rd to 5th month may stop spontaneously. If the bleeding continues, and there is abdominal pain, the foetus may not be saved but the mother's welfare needs to be considered.	- Have mother rest in bed. - Discuss her fears and feelings. - Explain to her what is happening. - Watch her condition. - Assess the amount of blood loss and observe for clots on stained clothes. - Arrange with the family for admission to the hospital as necessary. - Check clots for foetus. If abortion occurs, provide post-partum care. - Follow her for three months to assure that she recovers well, her concerns are responded to and her needs are met. **DO NOT DO A VAGINAL EXAM**

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TABLE 8.2 COMMON COMPLICATIONS/PROBLEMS OF PREGNANCY AND SUGGESTED ACTIVITIES FOR HEALTH TECHNICIANS

Problems	Suggested activities for Health Technicians
ABNORMALITIES OF THE CERVIX	
Abnormalities may be seen in the form of ulcers, growths or cancer. In these conditions there is slight irregular bleeding with no pain.	- Refer mother to RHC or District Hospital for a diagnosis. - Follow-up to make sure that a diagnosis is made and proper treatment completed. - Provide treatment or supportive care based on the diagnosis. - Provide psychological support to the mother and the family.
ABORTION/MISCARRIAGE	
Bleeding in the first two months of pregnancy with mild symptoms may indicate a threatened abortion.	- Advise mother not to do heavy work or go on a journey. - Advise bed rest for up to three days after the bleeding stops. - Avoid sexual intercourse until the 24th week of pregnancy.
SEPTIC MISCARRIAGE OR ABORTION	
A woman who is bleeding from the vagina and has a fever of 101 or more may be having a septic abortion. What this means is that, in addition to bleeding, she also has an infection which may cause her to abort. She may have a rapid pulse and low blood pressure if a large amount of blood is lost.	- Take the temperature every two to three hours. - Give paracetamol. - Take the blood pressure to assess the possibility of shock. - Encourage fluid and food intake. - Recommend rest. - If the odour is foul then this is a sign of infection and you need to start her on antibiotics. - Watch the progress, make appropriate recommendations and refer her to the Medical Officer.

TABLE 8.2 COMMON COMPLICATIONS/PROBLEMS OF PREGNANCY AND SUGGESTED ACTIVITIES FOR HEALTH TECHNICIANS

Problems	Suggested activities for Health Technicians
ECTOPIC PREGNANCY	
An ectopic pregnancy is a fertilized ovum that is growing outside the uterus, usually in a fallopian tube. A foetus cannot normally grow outside the uterus. The tube may rupture and cause severe pain and bleeding. Rupture of the fallopian tube causes sudden, sharp lower abdominal pain. An ectopic pregnancy is a life-threatening emergency. This may also occur before the first period is missed. The following symptoms should alert you: - Falling blood pressure. - Sudden, severe pelvic pain and some bleeding from the vagina. - Absence of menstrual period for one or two months or a history of light menstrual bleeding. - Cold clammy skin. - A woman with an ectopic pregnancy will look ill and anxious. - Her lower abdomen may be tender to palpation. - The cervix will be bluish, soft and usually open. You may notice some bleeding from the cervix.	- If this condition is suspected it should be explained to the family and arrangements made to transfer the patient to the hospital. - Do not do a bimanual examination. A bimanual examination may increase bleeding.

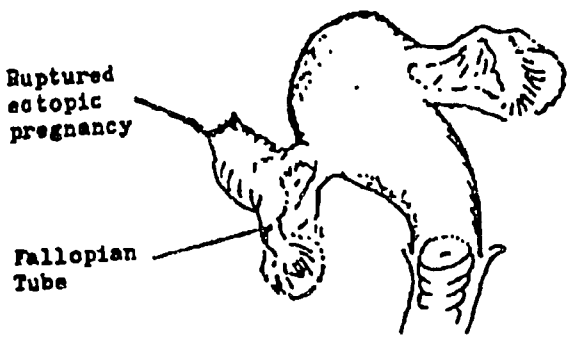

Fig. 8.1 Ectopic pregnancy.

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TABLE 8.2 COMMON COMPLICATIONS/PROBLEMS OF PREGNANCY AND SUGGESTED ACTIVITIES FOR HEALTH TECHNICIANS

Problems	Suggested activities for Health Technicians
EARLY SEPARATION OF THE PLACENTA	
The placenta normally begins to separate from the walls of the uterus after the delivery of the baby. But in some cases the placenta separates before it should. The placenta may implant itself near the cervical opening. In this case, bleeding occurs early in labour as the cervix begins to dilate. Both of these conditions will cause painless and heavy bleeding. However, the blood from a premature separation of the placenta may remain within the uterus and cause constant abdominal pain.	- Take the blood pressure frequently. This condition requires immediate medical care. You must accompany the mother to the hospital and be prepared to handle shock. Give some nutritious liquid to drink, e.g. milk, yakhni (soup). **NEVER DO A PELVIC EXAM**

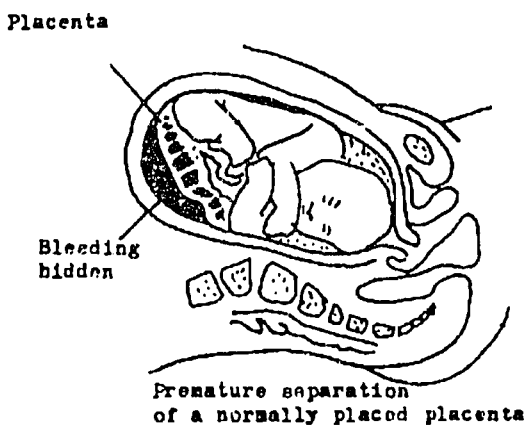

Fig. 8.3 Early separation of the placenta.

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TABLE 8.2 COMMON COMPLICATIONS/PROBLEMS OF PREGNANCY AND SUGGESTED ACTIVITIES FOR HEALTH TECHNICIANS

Problems	Suggested activities for Health Technicians
VESICULAR MOLE	
This is an abnormal growth in the uterus. Menstruation ceases and all signs and symptoms of pregnancy become evident including enlargement of the uterus. Instead of a foetus, a mole with watery, small cysts clustered in bunches develops in the uterus. After 3 to 4 months' absence of menstruation, small cysts with watery blood-stained discharge are passed through the vagina. The fundal height is higher than for the stage of pregnancy. Foetal sounds will not be heard and foetal parts will not be felt.	- When cysts are passed explain the possibilities and make arrangements for hospitalization. - You should follow the woman for a year to make sure she does not get pregnant to allow the uterus to completely heal. - Provide psychological support for at least one year.

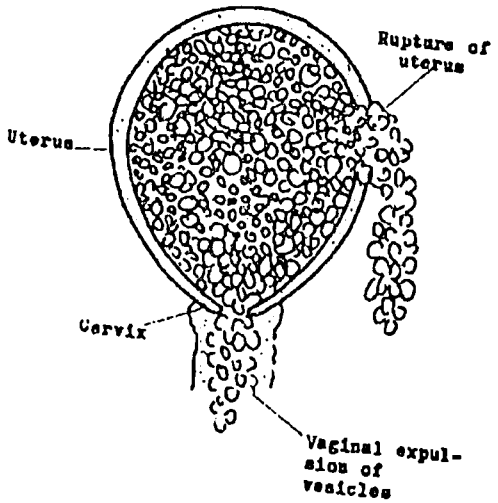

Fig. 8.3 Vesicular mole.

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8.3 COMMON PROBLEMS DURING LABOUR AND DELIVERY

Labour is a very stressful time for the pregnant woman and her family. They need constant assurance that the labour is progressing normally. However, if signs of complications become evident, such assurance should not be given freely. Instead, the woman and the family should be tactfully told about the symptoms and what you are doing to remedy the situation.

Every woman, whether in normal or complicated labour, should have someone stay with her. The Health Technician needs to support the pregnant woman and the family both physically and emotionally. Complicated labour puts enormous stress on a woman and her family. Female Health Technicians need to be aware of this and have a compassionate approach to their care.

The following list identifies possible complications of labour and delivery, how to recognize them and what female Health Technicians can do to help the pregnant woman, the unborn child and the family.

TABLE 8.3 COMPLICATIONS DURING LABOUR AND DELIVERY

Possible complications	How to recognize them	Health Technician's role
DIFFICULT OR ABNORMAL LABOUR	- Sluggishness of uterine contractions. - Prolonged labour (longer than 20 hours for first delivery and longer than 12 hours for previous delivery). - Unequal, irregular pattern of contractions with poor relaxation. - Prolonged active phase of dilation. - Increased foetal heart rate.	- Encourage and assist woman to rest. - Give fluids to keep woman well hydrated. - Explain to woman and family what is happening. - Have woman void every two hours to keep bladder from obstructing labour. - If membranes have ruptured, take temperature every 2 hours to assess if there is a uterine infection. - Take FHR (foetal heart rate) every 30 minutes.

TABLE 8.3 COMPLICATIONS DURING LABOUR AND DELIVERY

Possible complications	How to recognize them	Health Technician's role
		- Give the woman in labour small amounts of light food or allow her to suck on hard candies or 'Gur' to provide some sugar. - When you detect difficult or abnormal labour, inform the family of this and suggest that they take the woman to the RHC rather than wait. You or a TBA or CHW should accompany them to the health facility and have the Medical Officer provide the necessary help.
PRECIPITATE DELIVERY	- Labour that is completed in less than three hours.	- Women who have had previous fast deliveries should be warned to stay close to home because they may deliver this way again. - Observe newborn for subdural haemorrhage. - Observe new mother for laceration of birth canal.

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TABLE 8.3 COMPLICATIONS DURING LABOUR AND DELIVERY

Possible complications	How to recognize them	Health Technician's role
HEAVY BLEEDING DURING DELIVERY		
Bleeding may occur internally or externally from a rupture of the uterus, placental separation or inversion of the uterus (where the uterus is turned inside out).	- Profuse bleeding from the vagina. - Decreasing blood pressure. - Increasing pulse. - Cold and clammy skin. - Pale colour.	- Never put pressure on the fundus of the uterus or pull on the cord. - Do not: 1. Replace the inversion. 2. Remove the placenta if still attached. 3. Give oxytocic drugs. - Plan for the possibility of a blood transfusion. Refer to DHQ hospital.
RUPTURE OF THE UTERUS	- When the uterus ruptures, the woman experiences a sudden, severe pain during a strong labour contraction.	- If uterine rupture is suspected, you must immediately transfer the woman to the hospital for emergency surgery. - The husband should be informed. - Advise women who have had a ruptured uterus not to get pregnant.
COMPLETE RUPTURE	- There is bleeding from the uterus into the abdominal cavity and often into the vagina as well. - There is a rapid, weak pulse, a falling blood pressure, cold clammy skin and flared nares.	- Blood pressure, pulse, FHR should be taken every 15 minutes on the way to the hospital. - Intravenous fluids may need to be started immediately. However, if this is not possible, give oral fluids if the woman can take them.

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TABLE 8.3 COMPLICATIONS DURING LABOUR AND DELIVERY

Possible complications	How to recognize them	Health Technician's role
	- Foetal heart sounds are not heard. - The woman's abdomen will have two distinct swellings.	- Chance for the baby's survival will depend on the extent of the rupture and the quick extraction of the baby.
INCOMPLETE RUPTURE	- Signs and symptoms are less obvious. - Localized tenderness and persistent aching pain will be felt. - Blood pressure will begin to fall, pulse will rise and FHR will increase.	- Mother's condition will be determined by the extent of the rupture and the blood loss. - The woman should be transferred to the hospital. - Provide post-operative care after surgery.
PROLAPSED CORD	- Cord may be visible at the vulva.	- Relieve the pressure of the presenting part on the cord by having the woman assume a knee-chest position. - Do not attempt to push the cord back into the vagina. - Cover the exposed portion with a sterile saline compress to prevent drying. - If the cervix is fully dilated, deliver infant rapidly, otherwise cesarean section will be the method of choice. Help the family take her to the hospital.

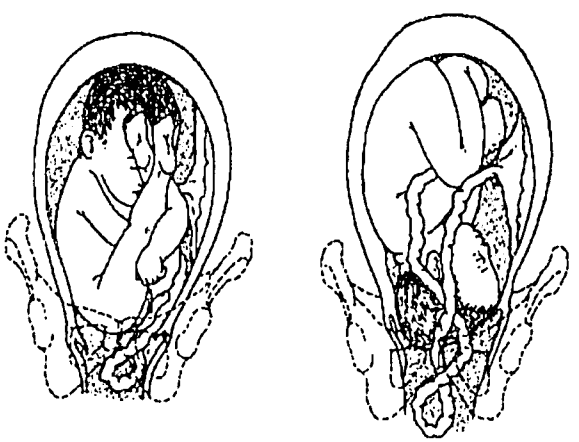

Fig. 8.4 Prolapsed cord.

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TABLE 8.3 COMPLICATIONS DURING LABOUR AND DELIVERY

Possible complications	How to recognize them	Health Technician's role
ABNORMAL POSITION		
Face, brow presentation, transverse lie, breach presentation.	- Instead of back of head, the face, brow or other body part presents first. - Shoulder, buttocks or feet can be the presenting part.	- If you are not well experienced in delivering a foetus in an abnormal presentation, refer the woman to the hospital. - If well experienced, you may want to change a breach position to a head position around the 28th to 32nd week of gestation by external inversion. - Take the mother's vital signs and FHR every 15 to 20 minutes during labour. - The woman should be told not to push with each contraction until full dilation has been reached. - When full dilation is reached, the woman is allowed to push and the buttocks, trunk and shoulder are delivered. When the shoulder is delivered, you may want to insert your finger over it and down the arm to the elbow and assist with delivery of the head as shown in the illustration. - With a breach presentation, delivery of the head is the most dangerous because the umbilical cord is put under pressure.

Fig. 8.5 Breach delivery

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TABLE 8.3 COMPLICATIONS DURING LABOUR AND DELIVERY

Possible complications	How to recognize them	Health Technician's role
		- Cover the baby with a warm blanket. - Allow a closer inspection of the newborn by the mother.
MULTIPLE DELIVERY	- More than one foetus is felt and another FHR is heard.	- Have an extra person help you with the care of the first born while you tend to the second. - Do not give oxytocic drugs such as ergot until the second baby is delivered. - Provide immediate care to the newborns. - Observe the mother and babies closely for any further signs of complications.

8.4 COMPLICATIONS DURING THE POSTPARTUM PERIOD

Most complications occurring during the postpartum period can be prevented if the new mother, her family and the Health Technician are alert in observing symptoms and quick in taking action. Three main types of complications occur during this period: haemorrhage, infection and emotional problems. These problems are described and the role of the female Health Technician is suggested for each.

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TABLE 8.4 COMMON PROBLEMS DURING THE POSTPARTUM PERIOD AND THE HEALTH TECHNICIAN'S ACTIVITIES

Problem	How to recognize it	Health Technician's activities
HAEMORRHAGE		
The uterus is not contracting properly and is soft and boggy.	- Any blood loss of 500 ml or more over a 24 hour period or 10 to 12 sanitary pads soiled over 24 hours. The bleeding may occur anytime post-delivery up to 6 weeks.	- The Health Technician should palpate the uterus to make sure it is contracting regularly. - If the uterus is "boggy," gently massage it to facilitate contraction. - Check lochea for amount and colour. - Take blood pressure, pulse and record them. - Stay close to the bleeding woman. If the Health Technician must leave, instruct a family member to be by her side. - Have the woman void at least once every four hours. - Give nutritious drinks. - Make sure the woman is able to get rest. She should be lying down. Involve the family in her care and explain what you are doing and why. - If bleeding persists, consult the Medical Officer. The mother may have to be taken to the hospital for possible surgery or for blood transfusion. - Remember that the newborn also needs to be taken with the mother.

TABLE 8.4 COMMON PROBLEMS DURING THE POSTPARTUM PERIOD AND THE HEALTH TECHNICIAN'S ACTIVITIES

Problem	How to recognize it	Health Technician's activities
Lacerations during delivery may occur.		- In the case of laceration, packing is placed and should be removed in 24 to 48 hours. - Perineal lacerations may need to be sutured. - A woman with sutures needs to be given a diet high in fibre and liquids to prevent constipation. - The perineal area should be washed thoroughly after urination and bowel movements.
The bleeding may be from a retained placenta or its fragments.		- Inspection of the placenta immediately following delivery should always be done and would reveal whether a fragment is retained in the uterus. - Have the new mother or a female member of the family inspect the vaginal discharge to determine if a fragment is discharged. - If fragments are not discharged within a few days, the Medical Officer should be consulted. He may plan to do a dilatation and curettage to remove the placental fragments.

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TABLE 8.4 COMMON PROBLEMS DURING THE POSTPARTUM PERIOD AND THE HEALTH TECHNICIAN'S ACTIVITIES

Problem	How to recognize it	Health Technician's activities
		- Women who have excessive postpartum bleeding feel very tired and require a longer period for recovery. Attention needs to be focused on assuring adequate rest and proper nutrition.
INFECTION	- Oral temperature of 38 degrees centigrade (100 F) 24 hours postpartum.	
Perineum (especially the stitches).	- Pain, heat and a feeling of pressure. - Inflamed area. - Pus may be present.	- Antibiotics will be necessary. - Give fever and pain reducing medicine. - Cleanse the area frequently with clean, warm water.
Uterus	- Usually occurs after the 3rd day. - Loss of appetite. - Chills. - Abdominal tenderness. - Dark lochea with a foul smell.	- Antibiotics will be necessary. - Encourage the drinking of lots of fluid. - Bed rest.

TABLE 8.4 COMMON PROBLEMS DURING THE POSTPARTUM PERIOD AND THE HEALTH TECHNICIAN'S ACTIVITIES

Problem	How to recognize it	Health Technician's activities
Blood vessels, thromboses		
Inflammation of the lining of a blood vessel with the formation of a blood clot.	- Fever. - Swelling of the legs. - Pale or shiny white appearance of the leg. - Stiffness and pain in the affected area.	- Suggest bed rest with affected leg elevated. - Leg should never be rubbed or massaged.
Breast		
If treated early, inflammation of the breast lasts about 48 hours. Otherwise it may take weeks to heal requiring draining the affected breast.	- Localized pain, swelling and redness. - Fever and chills.	- Antibiotics should be given. - Mother should be encouraged to drink plenty of fluids. - Advise rest. - Have mother continue to breast-feed from the unaffected breast. - Empty the affected breast. - Apply warm soaks to the affected breast(s). - If both breasts are affected, continue to breast-feed.
Urinary tract	- Burning on urination. - Blood in the urine. - Lower abdominal pain and fever. - Frequency of urination.	- Give antibiotics for 7 to 10 days. - Increase fluids to a glass of liquid every hour. - Encourage adequate rest and proper nutrition.

TABLE 8.4 COMMON PROBLEMS DURING THE POSTPARTUM PERIOD AND THE HEALTH TECHNICIAN'S ACTIVITIES

Problem	How to recognize it	Health Technician's activities
EMOTIONAL PROBLEMS		
Some new mothers develop emotional instability or problems during the postpartum period.	- Mother appears sad. - Does not show interest in child. - Seems depressed. - Birth of female child/children.	- Try and find out why she is unhappy. - Talk to her family. - What was the sex of the child? - Involve her as much as possible in interacting with the newborn and its care. - Point out positive factors about herself, her family and the infant. Make her feel good about herself. - Continue to assess her emotional state. If it does not improve over a six week period, suggest to the family that they take her for a psychiatric evaluation.

Female Health Technicians need to be aware of possible complications during pregnancy, labour and delivery and the postpartum period. As you provide services to expectant and new mothers be observant so that you can identify those at risk. After you have determined the risk factor or the possible problem areas, discuss the situation with the family and with the woman and come up with a plan to meet the identified need. Then try to help the family solve the problem according to your plan. Your role may be only to increase their knowledge and skill and/or change their attitude about maternal or child care to prevent or minimize the effects of any complications by prompt and appropriate action.

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GLOSSARY

Abortion: Termination of pregnancy before the foetus can survive.

Anaemia: Condition where the blood haemoglobin content is below the normal level.

Amenorrhoea: Stopping of the menstrual cycle.

Antibiotic: Drug that is used to treat infection.

Adnexal: Area surrounding the mouth of the uterus (cervix).

Antiseptic: Substance capable of destroying germs.

Bladder: The muscular organ which stores urine and releases it when full.

Boggy uterus: Uterus that is heavy to the touch.

Blood transfusion: Introduction of blood to the circulatory system of a person.

Breach presentation: Instead of the head, buttocks and feet of the baby come out first.

Buccal: Interior of the cheek.

Cervix: Mouth of the uterus located inside the vaginal canal.

Conjunctival: Interior fleshy portion of the eyelid.

Constipation: Inability to move the bowels.

Convulsion: An abnormal violent and involuntary contraction of the muscles.

Curettage: A process of cleaning out the inside of uterus by surgical intervention.

Cyst: Circular swelling.

Contracted pelvis: The female cavity which is smaller than the normal size and may cause obstructed delivery.

Dehydration: Excessive loss of fluid from the body.

Dilatation: Opening the cervix.

Discomfort: A state where a person is not comfortable.

Ectopic pregnancy: Pregnancy that occurs outside the uterus.

Haemorrhage: Flow of blood; bleeding.

Hypertrophy: Excessive growth.

Inversion of the uterus: Condition where the uterus is turned inside out.

Laceration: Tear or rip in the skin and muscle.

Miscarriage: Premature expulsion of the foetus from the uterus.

Mucosa: Membrane lining tissues.

Oedema: Retained fluid leading to swelling.

Oxytocic drug: Drug that enables contraction of the muscle tissue especially that of the uterus.

Placenta: Organ through which the baby is fed inside the uterus. This is expelled after the childbirth.

Postpartum (Postnatal): Period after birth.

Precipitate delivery: Early or abrupt delivery.

Pre-eclampsia: A toxic condition that may occur during pregnancy and can be fatal if not treated.

Premature baby: Baby born before 40 weeks which is the normal duration of pregnancy, or a baby weighing less than 2.5 kg.

Prolapsed cord: Cord that may be visible at the vulva before childbirth.

Psychiatric: Relating to emotional or mental condition.

Subdural haemorrhage: Bleeding beneath the tissues of the head.

Substantiate: To support with proof or evidence.

Taboo: A ban attached to social or religious customs.

Transverse lie: Horizontal position of a baby in the uterus.

Umbilical cord: The cord that connects the baby to the placenta in the uterus.

Vesicular mole: This is an abnormality where there are a number of circular units called moles with watery cysts clustered in bunches in the uterus instead of a foetus.

SUGGESTED LEARNING ACTIVITIES

1. Visit 20 women who have experienced some kind of problem during pregnancy, labour, delivery or the postpartum period.
2. Make a ten minute presentation and describe the clinical picture of one of the pregnancy complications listed below and the Health Technician's responsibility in preventing or minimizing the complication:

   - Severe anaemia.
   - Ectopic pregnancy.
   - Septic abortion.
   - Pre-eclampsia and eclampsia.
   - Foetal death.
   - Bleeding early in pregnancy.
   - Bleeding late in pregnancy.

REVIEW QUESTIONS

1. What does painless bleeding during pregnancy indicate?
2. What does a history of a few weeks amenorrhoea, sudden and acute pain in the lower abdomen and shock indicate?
3. What are the four signs and symptoms of toxaemia of pregnancy?
4. Anaemia is a common condition seen during pregnancy. Name the two nutrients and good food sources which are necessary to prevent anaemia.
5. Cultural food taboos may lead to poor nutrition. Give an example of such a taboo in your community.
6. Describe the usual clinical picture of an anaemic woman and describe the Health Technician's responsibilities in this situation.
7. What is a treatment and a preventive measure for anaemia of pregnancy? (check one or more).

   _____ 1. Rest.
   _____ 2. Give iron and folic acid.
   _____ 3. Treat heart failure.
   _____ 4. Community education.

8. What can be done for mothers who show signs of infection?
9. As a Health Technician, what would you do first if you find a woman with vaginal bleeding during the postpartum period?
10. When would you refer a mother to the hospital? List the conditions justifying your statement.
11. If you refer a mother to the hospital for a possible caesarean section, do you need to do a follow-up? Give an explanation of your answer.

LEARNING ACTIVITY RECORD

Name of student_____

Case No.	Date seen	Name of woman	Type of problem	Remarks
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				

Write down the date each woman was seen and state type of problem according to your notes in your register.

CHAPTER 9

HEALTH OF THE NEWBORN AND INFANT

Objectives: After completing this chapter you will be able to:

1. Describe what a normal newborn is like during the first 24 hours.
2. Determine the immediate needs of a newborn using the Apgar Score and describe how to meet these needs.
3. State the significance of maternal-infant bonding during the first 24 hours and how this can be facilitated.
4. Do a physical assessment of the newborn from head to toe and record the findings.
5. Demonstrate a safe way of cutting the cord.
6. Describe proper ways to care for the cord.
7. Describe the procedure for cleaning/bathing the infant before and after the cord falls off.
8. Demonstrate breast-feeding.
9. Describe the advantages of colostrum.
10. Describe the advantages of breast-feeding.
11. Suggest when and how to start weaning foods and what months different foods should be included.
12. Give helpful suggestions to the mother on how to introduce solids to the infant.
13. State ways an infant can be protected from exposure to infection.
14. Identify accidents common to infants and ways to prevent them.
15. State the five laws of growth and development.
16. Describe the signs of growth and development for the first year of life.
17. State how you can help to establish a trusting relationship between a baby and a mother.

EVALUATION FORM

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of Presentation	[ ]	Simple to understand
	[ ]	Difficult to understand
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 9

HEALTH OF THE NEWBORN AND INFANT

The foundations for the well-being of an adult are laid down very early in life, both before and right after birth. As a Health Technician, you are able to make a contribution to the future well-being of the newborn as well as maintaining the health of the child by teaching parents how to meet the needs of the infant and what to observe in its development.

The first year of a baby's life is a time of monumental growth and development. How the baby responds and adjusts to these changes determine his/her needs at the time. It is very important to know what normal growth and development is during this first year and how to assess and meet the needs of the baby. Health Technicians play a crucial role in guiding parents in this area.

This chapter will discuss the needs of the baby during the first 24 hours of life through the first year. Special attention will be given to the following topics:

1. Physical and emotional care during the first twenty-four hours.
2. Feeding and nutrition guidance.
3. Good health and hygiene.
4. Monitoring of growth and development.
5. Development of adult attachments and effective interactions with people.

9.1 PHYSICAL AND EMOTIONAL CARE: THE FIRST TWENTY-FOUR HOURS

The first 24 hours of a baby's life are very critical. This is because internal and external body changes are constantly taking place as the baby adjusts to the change from life inside the uterus, where it was wholly dependent on the mother for all vital functions, to life outside the uterus, where its own vital activities have taken over. Therefore, observing how a newborn adjusts to these changes is very critical.

Before delivery, the baby was in a warm, dark and totally liquid surrounding. After delivery the environment became cold and dry and filled with glaring lights, sounds and touches.

It is very important for Health Technicians to carefully assess how well the newborn is adjusting to these changes and if there is any difficulty or distress. Most full-term healthy newborns make the necessary adjustments in about six hours.

The goals of the Health Technician's activities during the first 24 hours are basically three:

1. Carefully observing for any sign of difficulty. The Health Technician will not be with the newborn and the family for the whole 24 hours, so it is important to instruct the new mother and other family members on what to observe and report to the Health Technician.
2. Meeting the basic physiological needs of the newborn.
3. Facilitating the relationship between the baby, mother and other significant members of the family.

In order to achieve these goals, Health Technicians must know:

1. What the normal newborn is like during the first 24 hours.
2. What the immediate needs of the newborn are and how they can best be met.
3. What the significance of the parent/adult-newborn contact is during the first 24 hours and how this can be facilitated.

As you have learned in the previous chapters, complications during labour and delivery can be life-threatening to the infant. They can cause the infant to stop breathing right after birth which may result in brain damage or death or cause other problems.

One way of assessing a newborn's condition immediately after birth is called Apgar Scoring. In this procedure the infant's Apgar Score is determined at one minute and five minutes after birth and both scores should be recorded. Evaluation of the newborn is based on five signs. Each sign is assigned either zero, one or two points and if the total number of points is 7 to 10, then the infant's condition is normal and requires routine newborn care. But if the newborn's score is less than 7 points and does not improve within 15 minutes, the baby should be referred immediately to a Medical Officer. This system will help identify children who are experiencing difficulty and who need life-supporting measures.

TABLE 9.1 APGAR SCORING

Apgar letter	Signs to look for	Normal signs	Abnormal Signs
A	Appearance: Look at the colour of the newborn's skin.	(1) *Pink body, blue arms and legs. (2) Completely pink body and face.	Pale or blue body and face.
P	Pulse.	(1) 100 beats/ min or less. Weak heart beat. (2) More than 100 beats/ min. Strong heart beat.	No heart beat.
G	Grimace on stimulation.	(1) Grimace or pucking of the face. (2) Crying, coughing, sneezing.	No response.
A	Activity.	(1) Some movement in response to stimulation. (2) Active movement, waving of arms and legs.	Limp arms and legs. No movement in response to stimulation.
R	Respiration.	(1) Slow irregular breathing. Retracting of chest wall. Weak cry. (2) Strong crying.	Irregular breathing (fast or slow). No cry.

* Numbers indicate points. All abnormals receive 0 points.

As Health Technicians you should assess a newborn's colour, pulse, body movements, respiration and grimace. The infant's physical signs are rated and the score or points are totaled and used as a guide to the newborn's condition and what appropriate care should be given.

Physical assessment. If the baby begins to improve, then attention should be focused on providing routine newborn care. This includes a complete physical assessment of the newborn. What to look for and how to determine normal from abnormal is given in Table 9.2. Findings from the assessment will tell you how the newborn is progressing.

TABLE 9.2 PHYSICAL ASSESSMENT OF THE NEWBORN

Area	Normal findings	Major abnormalities
General measurement:		
Head circumference	33-35 cm(13-14 inches)	Head circumference less than chest circumference or more than 4 cm greater than chest circumference.
Chest circumference	Should be 2-3 cm less than head circumference.	
Length (crown to heel)	48-53 cm(19-21 inches)	
Birth weight	2.5-4.0 kg(6-9 pounds)	Less than 2.5 kg or more than 5.0 kg.
Skin:		
At birth	Bright red and puffy.	Bluish colour of skin and lips.
Second day	Pink, flaky, dry. Vernix caseosa. Lanugo (fine hair on body).	
Neonatal jaundice	After 24 hours	Jaundice before 24 hrs.
Head:		
Anterior and posterior fontanelles	Diamond shaped and triangular, flat, soft and firm.	Bulging or depressed.

TABLE 9.2 PHYSICAL ASSESSMENT OF THE NEWBORN

Area	Normal findings	Major abnormalities
Eyes:		
Colour	Usually closed, dark brown, blue or grey. Absence of tears.	Pink coloured iris. Yellow discharge.
Blinking reflex.	In response to light or touch.	Absence of pupil reflex.
Fixed eyes on object.	Fixes eyes on object. Ability to follow to midpoint.	
Ears:	In line with eyes.	Low placement.
Nose:	Patent nasal canal.	Non-patent canals. Thick, bloody discharge, flaring nares.
Mouth and Throat:		
Reflex	Sucking, gag and rooting reflex.	Absence of reflexes.
Salivation	None or minimal.	Excess drooling, cleft lip or palate.
Neck:		
Skin folds	A few short and thick folds.	Too many skin folds.

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TABLE 9.2 PHYSICAL ASSESSMENT OF THE NEWBORN

Area	Normal findings	Major abnormalities
Chest:		
Sternum	Slight retraction.	Asymmetric chest expansion.
Breast	No secretion or some secretion of milky substance on expressing or pressing.	Redness, tenderness and firmness around nipples.
Lungs:		
Respiration	30-60 breaths/min, usually abdominal.	Grunting, rate well below 30 or well above 60. Rales.
Heart:	120-140 beats/min.	Rate below 100 or well above 140. Murmurs.
Abdomen:		
Shape	Cylindrical. Veins visible in thin infants.	Abdominal distention.
Female genitalia:		
Labia minora	Slightly swollen, larger than labia majora. Vernix caseosa between labia.	Fused labia. Absence of vaginal opening. Faecal discharge from vaginal opening.
Male genitalia:		
Urethral opening	At tip of penis.	Opening under or on the side of the glans penis.
Testes	Two testes palpable in scrotum.	Foreskin not retractable. Not palpable.

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TABLE 9.2 PHYSICAL ASSESSMENT OF THE NEWBORN

Area	Normal findings	Major abnormalities
Back and rectum:		
Spine	Intact with no opening or mass.	Opening or mass.
Rectum	Patent anal opening.	Absence of opening.
Extremities:		
Fingers, toes	Ten each.	More or less in number or webbed.
Nail beds	Pink.	Yellow.
Extremities	Symmetrical.	Not symmetrical, unequal in length.
Neuromuscular system:		
Extremities	Semi-flexed position.	Limp. Tremors and twitches.
Head	Able to turn from side to side when lying.	Unable to hold up head when on abdomen.
Temperature:		
Axillary Rectal	36.5 to 37 C(97-98 F) 35.5 to 37.5 C (96-99.5 F)	Well above or below 37.5 and 35.5 C.

The results of the physical assessment will enable you to meet the immediate needs of the newborn.

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TABLE 9.3 THE IMMEDIATE NEEDS OF THE NEWBORN AND THE HEALTH TECHNICIAN'S ACTIVITIES

Immediate needs	Health Technician's activities
Respiration	- If the newborn does not start breathing on its own, rub its back or the soles of its feet. - Dry and wipe the baby. - With the newborn in the feet up, head down position, gently suction any mucous from the nose and mouth with a bulb syringe or mucous extractor. - Once respiration has started, put the baby down on its abdomen or its side without a pillow to allow additional fluid to drain and to prevent aspiration. The head should be turned to the side if on the abdomen.
Temperature control center is immature, newborn is unable to regulate body temperature.	- Keep the newborn warm, wrapped up, especially the head where most of the body heat is lost. - If the environment is too warm, use a light cover not a heavy one.
Prevent infection	- Wash hands before handling because newborns are very susceptible to infection. - Cut the cord with boiled or sterile scissors, knife or blade as soon as possible. Refer to procedure later in this chapter.
Nutrition: Need for fluids in a newborn is proportionately higher than for an older child or adult.	- Put the baby to the breast immediately after birth. Colostrum is a critical first food for the baby's nutritional well-being and the development of their immune system. Mothers should be advised to breast-feed their infant as frequently as every two or three hours the first two weeks. After that an attempt can be made to lengthen the interval between each feeding. Breast-milk provides all the fluids a baby needs. Ghutti or other fluids can cause diarrhea and since the baby suckles less, reduces the milk supply.

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Facilitating newborn-adult contact during the first 24 hours. A great deal has been written on parent-infant bonding in the last ten years. A mother begins to feel an attachment for her baby soon after conception and this attachment is strengthened during pregnancy and the neonatal period. However, because of the newborn's small size and appearance of fragility, new mothers may be reluctant to handle the baby. It is very important for the mother and baby to have early and frequent contact with each other.

A new mother should be encouraged to talk to and look at her baby as she holds and cares for it. Health Technicians need to point out to the mother that the baby needs to be viewed as an individual with its own individual characteristics.

Mothers vary greatly in the degree to which they are able to hold the baby immediately after delivery. Some may not feel comfortable. As Health Technicians you need to help the mother touch, hold and inspect her baby. As the mother is inspecting the baby, the Health Technician should point out certain positive characteristics about the baby such as:

- The baby is looking at you.
- See how well the baby sucks.
- The baby looks like you, like your husband.
- Feel the grasp of the baby by putting your finger in his/her hand.

Observe how the mother reacts to the baby and let your findings serve as guidelines for helping her relate to it. The relationship established during this neonatal period may determine the type of relationship the newborn will develop later on with others. Adequate interaction with the newborn is essential in establishing a sense of trust and comfort for the baby.

Procedure for cutting and caring for the cord. When the child is born, the cord pulsates and is fat and blue. Do not cut the cord at this time.

Fig. 9.1 Pulsating cord.

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After a while, the cord becomes thin and white. It stops pulsating. Tie it in two places with a strip of cloth, ribbon or string. This should have been recently ironed, heated in an oven or washed and sundried. Cut between the ties as illustrated.

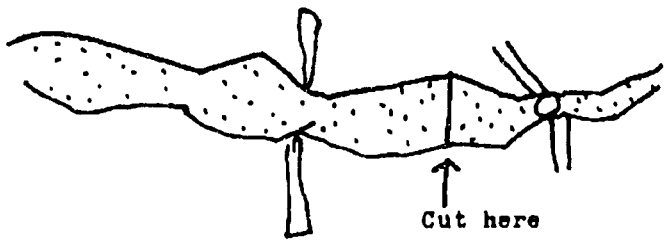

Fig. 9.2 Cutting the cord.

It is important to cut the cord with a clean, unused razor or boiled scissors or knife. When cutting the cord, leave only about 2 to 4 centimeters attached to the body. These precautions help prevent tetanus and other infections.

Caring for the cord. The most important way to protect the freshly cut cord from infection is to keep it dry. To help it dry, the air must get to it. If the home is very clean and there are no flies, leave the cut cord uncovered and open to the air. If there is dust or flies, cover the cord lightly. It is best to use sterile gauze, however you can cover the cord with a very clean and freshly ironed cloth. Wipe clean the umbilical area with any antiseptic solution. Be sure the baby's nappy (diaper) does not cover the cord area so that the cord does not get wet with urine. Sponge the baby with a wet cloth until the cord falls off. Once the cord falls off the baby can be immersed in water for bathing. Application of talcum powder, "surma" or oil to the cord should be avoided.

9.2 FEEDING AND NUTRITION

The ideal food for the baby is its mother's breast-milk. Breast-milk provides about 20 calories/20 to 30 ml. It not only has the right amount of calories, but also has the right proportion of proteins, carbohydrates and fats as well as vitamins, minerals and water for the baby's needs.

Babies should be put to breast as soon after delivery as possible. Colostrum, a thin watery substance, is produced until the third or fourth day, when milk begins to be produced. Starting breast-feeding with colostrum is very important for the baby since it contains antibodies against chicken pox, measles, mumps and polio. It also has a laxative effect which helps in evacuating the bowel. To promote milk production, it is important to feed frequently (every 2-3 hours) from both breasts. A good guideline is at least 10-15 minutes for each breast.

Before four months the infant should only receive breast-milk. Even in hot weather, breast-milk provides all the nutrients and fluids needed during the first four months. Feeding the infant water, ghutti or other foods increase the risk of infection and diarrhea. In Pakistan, many infants are malnourished under 6 months of age because of the practice of giving other fluids, which results in diarrhea during these early months.

Breast-feeding position. Any position that is comfortable for the mother and baby is fine.

Fig. 9.3 Breast-feeding positions: sitting and lying down.

The mother should be taught to insert her finger gently inside the baby's mouth or put a little pressure on the chin to break suction before taking the baby off the breast. This will prevent pain from cracked nipples for the mother.

The main advantages of breast-feeding are:

- Breast-milk is the perfect food for the infant and is fresh. For, example, camel's milk is not for lambs or kids, so why would cow's milk be fed to human babies? For the first 4-6 months it is the only fluid or food that the baby needs.

- The hormonal stimulation from breast-feeding immediately after delivery helps to contract the uterus and prevent hemorrhaging.

- Breast-milk is inexpensive; families do not have to buy it.

- It is convenient because the milk is always available in the right quantity and temperature and does not spoil or go bad.

- Breast-milk, especially colostrum, contains antibodies, so infants fed breast-milk exclusively will have fewer infections.

- Frequent and exclusive breast-feeding helps protect against another pregnancy for up to about 5 months after delivery.

- The mother must sit or lie down to breast-feed which gives her a chance to rest.

- The uterus returns to the pre-pregnant size earlier.

- Breast-feeding allows for close maternal-child contact.

- The mother has less chance of breast cancer later in life.

Most Pakistani mothers have seen how breast-feeding is done and do it very well. Unfortunately, some practices are unnecessary or harmful to the infant. Many mothers throw away the colostrum and do not initiate breast-feeding until the third or fourth day. During that time they feed water, ghutti or other local feeds or medicines to clean out the bowel. Other liquids or foods are often contaminated with bacteria that can cause infections and diarrhea. Colostrum is the best ghutti.

In addition, they do need help with breast care during pregnancy and the proper cleansing of the breast once they start breast-feeding. Some also need help in learning how to express milk if the baby cannot suck or for other reasons. For expressing breast-milk refer to the procedure later in this chapter. Eating increased amounts of food and milk and at least 8 glasses of fluid each day will help increase milk supply.

There is an increase in the number of mothers that are bottle feeding exclusively or are mixing breast-feeding with bottle feeding. These are dangerous practices.

The many disadvantages of bottle feeding are:

- Cow's milk or buffalo's milk contain too much or the wrong kind of some nutrients like, protein, salt, fat and calcium and too little iron and vitamins.

- Infant formulas are very expensive if they are mixed properly.

- The formulas are often diluted too much and result in malnutrition and diarrheal infections.

- It is very difficult to clean a bottle and nipple well enough to avoid contamination.

- The water that must be mixed with the formula is often contaminated.

- It does not provide the immunologic protection of breast-milk and in fact may promote food allergies.

- It is easier to suck from a bottle than a breast and the infant may refuse to breast-feed.

- It takes time to prepare the formula properly (which is difficult at night).

- It has to be stored properly in cool temperatures or it will spoil.

Fig. 9.4 Burping position.

Fig. 9.5 Making sure the infant has room to breathe properly.

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Fig. 9.6. Reversing the baby's position to ease sore nipples.

Fig. 9.7 Talk to and look at the baby when holding it.

Other helpful hints for breast-feeding mothers:

Burping the baby. As a baby sucks on the nipple for milk, some air may also be taken in. This air can cause gas pains and discomfort to the baby. Therefore, after each feeding the baby should be burped by placing him on the shoulder or the lap.

When burping the baby on the shoulder:

- Place a clean towel over one shoulder. Lift the baby, placing its head on the protected shoulder, with its face to one side so that he can breathe.
- Support the back and head and gently rub or pat the back to help release the swallowed air.

When burping the baby on the lap:

- Use the free hand to reach across the baby's chest and grasp the far arm at the shoulder, supporting the chin on the forearm.
- Bring the baby to a sitting position, letting it lean forward for support.
- Gently rub the back to help release the swallowed air.

Fig. 9.8 Gently rubbing or patting the baby's back helps him to release swallowed air.

If for some reason the mother cannot breast-feed, another alternative for meeting the nutritional needs of the infant is to arrange for breast-feeding with another lactating woman in the family or village. In the rare cases that a child must be fed formula or milk, the infant should be fed with a cup and spoon. The mother should be taught how to prepare the formula, to wash utensils and hands before handling food and to have the infant weighed regularly.

Procedure for expressing breast-milk. If a baby is too weak to nurse, expressed breast-milk is the best food to give him. When a mother expresses the milk from her breast to feed the baby, her supply of milk will not dry up. When the baby is strong, he can once again be fed from the breast.

You may need to explain to a mother how to express milk from her breasts:

- Have the mother wash her hands before she starts and use a clean bowl or cup to collect the milk.

- Using her hands and a cup:

  . Show her how to hold up her left breast with the front of her left hand and to press it with her right hand from the edge towards the nipple.

  . Place the cup or bowl under the breast.

  . Show her how to squeeze the part behind her nipple between her thumb and first and second fingers.

  . After she has done this two or three times, milk will start to come out into the bowl.

  . Have her continue to do this many times and to press on each part of both breasts, especially the hard parts. It will take about 10 minutes to get all the milk from one breast.

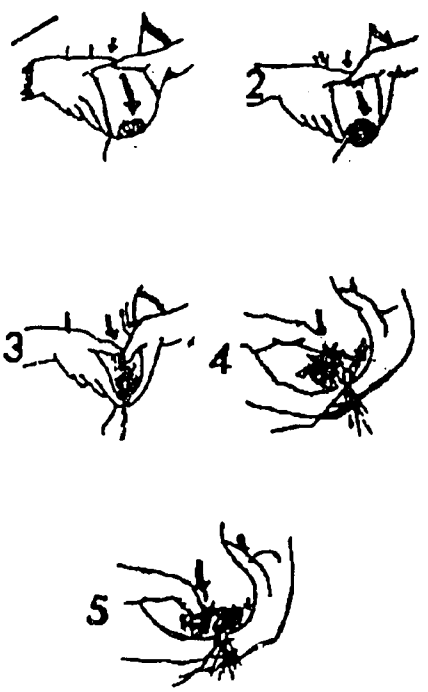

Fig. 9.11 Expressing breast-milk.

Note: A breast pump, if available, may be utilized to express the milk.

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It is not possible to measure the amount of breast-milk the baby takes in, so how can one tell if the baby has had an adequate amount? If the baby sleeps or plays between feedings and is growing, then this is an assurance that the baby is getting adequate nutrition. However, as the baby grows, breast-milk alone will not be enough to maintain steady weight gain and supplementary food must be introduced to meet the nutritional needs.

The baby's requirements for calories are usually exceeded by those that breast-milk alone can supply around 4-6 months of age. Regular monthly weighing of babies is critical to make sure that the baby is gaining about 200 gm per week or about 800 gm per month. Since breast-milk provides the best nutrition, babies do not need supplementary food as long as the breast-milk provides enough calories for adequate weight gain.

When should solids be started? Communities vary in the practice of giving solids to infants. In some societies and communities, solids are introduced as early as the first week of life, while in others infants up to a year or older are given only milk. There are reasons for initiating the feeding of solid foods between 4-6 months. Some of these reasons are:

- Breast-milk does not contain sufficient quantities of some nutrients for older infants. For example, iron in breast-milk is well absorbed in the baby's gut, but after 6 months of age, the baby needs more iron than breast-milk alone can supply. There is only a small amount of iron in cow's milk and it is not well absorbed.

- By the time a full-term infant is four to five months of age or a premature infant is two to three months of age, the supply of prenatal iron acquired from the mother gradually diminishes.

- When an infant is about five months of age, teething begins and chewing and biting behaviour develops.

- A mother can produce about one liter of breast-milk a day. However, an older infant requires more calories and other nutrients from a variety of foods.

Somewhere between four and six months an infant needs the added calories and nutrients of supplementary foods and is developmentally able to push the food toward the back of the mouth to swallow. Delaying the introduction of supplementary foods beyond 6 months of age slows growth and can cause malnutrition. When supplementary foods are introduced, care must be taken to select solid

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foods that meet the nutritional needs of the developing child and to prepare and store the foods in a sanitary way to avoid the risk of infection. The table below gives some general guidelines on what and how often infants and young children should eat. More specific details follow this table.

Methods of introducing solids. A baby who is used to sucking milk may not like the idea of being fed solids with a spoon. At first, the baby may even spit out the food. Therefore, patience is important in introducing solids. The following table provides suggestions that may be helpful in counseling mothers. In addition, Table 9.5 contains more detailed information about the quantities of food to be fed to infants and children when growth is adequate and when growth is found to be inadequate due to illness.

TABLE 9.4 GENERAL GUIDELINES ON WHAT AND HOW OFTEN INFANTS AND YOUNG CHILDREN SHOULD EAT

WHEN	HOW	WHAT
- Introduce solids only after the extrusion reflex begins to fade (after four months). - Introduce solids when the infant is hungry, before breast-feeding not after. - Feed infants supplementary foods at least 3 times a day at the beginning and more often once feeding is established. Infants have small stomach capacity and can only eat a small amount at one time.	- Begin spoon feeding by placing the food on the back of spoon. The consistency of the first foods should be thin at first and then gradually made thicker as the infant gets used to eating. Most mothers introduce mashed banana, kitchri and/or a cooked cereal gruel as first foods. - Food should be mashed or strained until 8 months, chopped from 9-11 months and small pieces after one year. - Hand wash food and prepare with clean utensils.	- Give the baby food that is locally available, affordable and of high nutritive value e.g., kichri, keer, dal, rice, banana and fruit juice. - By 6-8 months the child should be eating supplementary foods from the 4 groups plus breast-milk. - By one year the infant should be eating the same foods as the family plus breast-milk.

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TABLE 9.5 STANDARD GUIDELINES FOR NUTRITION FOR ALL CHILDREN

Ministry of Health, Special Education & Social Welfare
Government of Pakistan

STANDARD GUIDELINES FOR

NUTRITION OF YOUNG CHILDREN

FOR ALL CHILDREN

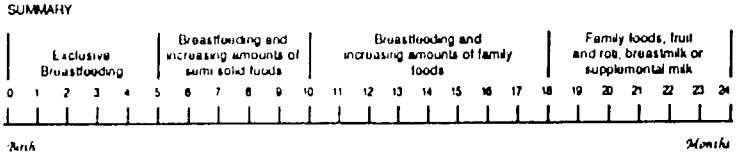
who visit a health facility for any reason:

1. WEIGH and ASSESS growth rate. If child is extremely thin and weak, refer immediately to a child specialist.
2. TREAT FOR ANAEMIA (check lower eye lids and inside lower lips) and check for parasites.
3. TREAT FOR INFECTIONS (such as diarrhoea and ARI) according to standard guidelines.
4. VACCINATE according to immunization guidelines.
5. COUNSEL ALL MOTHERS ACCORDING TO THE TABLE BELOW.

CHILD'S AGE	CHILDREN OF AVERAGE WEIGHT/ GROWING ADEQUATELY	CHILDREN WITH LOW WEIGHT/ NOT GAINING ADEQUATELY OR RECOVERING FROM ILLNESS	CHILDREN WHO ARE ILL OR EXTREMELY UNDERNOURISHED
0-4 Months	**Breastfeed exclusively**, from both breasts, at least 8 times during day and night. Do not give water or other liquids	**Breastfeed more frequently than usual.** Tell mother to drink more fluids and eat an additional roti per day.	**Continue breastfeeding with greater frequency every time the child fusses or every few hours.** Tell mother to drink more fluids and eat more roti and food.
5-9 Months	Introduce semi-solids made from foods taken from family's food (khichri, choori, khiur, yogurt, mashed potato and banana). Begin with a small spoonful, until child is eating 2 teaspoonsful for each month of age 3 times a day. **Continue full breastfeeding**	**Breastfeed more frequently.** **Give semi-solids 1 more time than usual (4 times a day).** Add a teaspoon of oil and a food rich in vitamin A such as carrots and dark green leafy vegetables (spinach) to the child's food.	**Continue feeding soft foods like khichri, yogurt, mashed potato and banana.** Add oil and a food rich in vitamin A such as carrots or spinach. Feed in smaller quantities but more frequently, 6 times a day. **Continue to breastfeed more frequently.**
10-17 Months	**Shift child to solid foods.** Feed child everything the family eats including 1/2 roti with each meal and fruit. Continue breastfeeding.	**Add an additional meal to what the child usually eats (5 meals+fruit).** Add oil and yogurt and foods rich in vitamin A such as carrots or dark green leafy vegetables to the child's food. Continue breastfeeding.	**Feed at least 6 times a day.** If child is not able to eat family foods, give soft foods. Foods must contain oil and yogurt, carrots, spinach or mango (vitamin A). Feed child family foods as soon as possible. Give favourite foods. Continue breastfeeding.
18-24 Months	**Feed child all family foods plus fruit and breastmilk or supplemental milk.** Give 1/2 roti plus a full cup of food every time the child eats.	**Feed child one more time than usual (5 times a day) plus fruit plus breastfeeding or supplemental milk.** Add oil and yogurt and a food rich in vitamin A such as carrots or green leafy vegetables to the child's food.	**Same as 10-17 months.**

- **Child feeding requires patience and supervision.**
- **Separate child's food to visualize the quantity.**

SUMMARY



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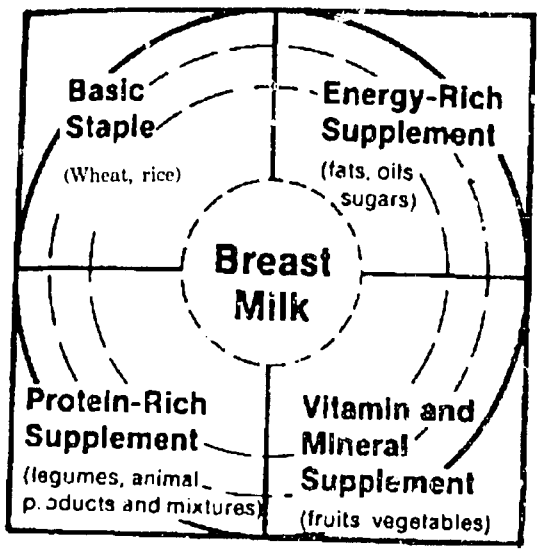

Fig 9.10 Food guide for planning supplementary mixes for infants.

Preparation of Supplementary Foods. In Pakistan, rice and then dal are often the first infant foods. Within two weeks additional foods should be eaten. All mixes should contain at least 3 groups: the staple, an energy-rich food and a protein-rich or a vitamin or mineral food. As a guide, 4 spoons of staple plus one spoon each of cooked foods from the protein and vegetable group plus a little oil will make a good mix.

Food should be prepared fresh for the infant or reheated to a boil and then cooled to the right temperature. Always cover and keep foods cool that will not be served immediately.

Recipes. These recipes are for the mother who wants to cook a meal especially for her young child. They tell her how much of each ingredient to use for one child.

The recipes have a low volume with a high concentration of energy and other nutrients. Some fat or oil is included to improve consistency and to increase the amount of energy. Fats and oils are often expensive or in short supply. Even so, mothers should be encouraged to use any type of cooking fat or oil they can get and also foods which contain oil, such as groundnut.

Each recipe provides enough for a meal for a child 1-2 years old. Children 6-12 months will eat one-third to one-half of the recipe.

WHEAT

SUJI KHEER

Ingredients:	Local measure:
Suji	2 tablespoons
Sugar	2 tea spoons
Milk	1 1/2 cups

1. Roast suji till light brown. Add milk and sugar.
2. Stir and cook on low fire till semi-solid.

Makes 1 cup

Approx. 300 calories

RICE

KICHRI

Ingredients:	Local measure:
Rice	1/4 cup
Mung dal (split beans)	2 Tablespoons
Oil or Ghee	1 teaspoon

1. Wash rice and dal.
2. Soak rice and dal for 1/2 hour.
3. Add about 2 cups water and cook gently until rice is soft and water is absorbed. Mash to desired consistency.
4. Add oil and mix well.

Makes 1 1/2 cups

Approx. 300 calories

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RICE

KICHRI (with greens)

Ingredients:	Local measure:
Rice	1/4 cup
Mung dal (split beans)	2 Tablespoons
Oil or Ghee	1 teaspoon
Leafy greens	

1. Wash rice and dal.
2. Soak rice and dal for 1/2 hour.
3. Add 2 cups water, greens and cook gently until rice is soft and water is absorbed. Mash.
4. Add oil and mix well.

Makes 1 1/2 cups

Approx. 300 calories

RICE

KHEER

Ingredients:	Local measure:
Rice, uncooked	2 Tablespoons
Milk	2 cup
Sugar	2 teaspoons

1. Wash rice, add milk and sugar and cook slowly until rice is tender.

Makes 1 cup

Approx. 440 calories

The following recipe from the family pot is given to save mothers having to cook separate meals for their small children. The amount of each cooked ingredient which should be given to a small child is shown.

The cooked food should be put into a separate bowl, to make sure the child gets his full share of the meal. A young child eats more slowly than his older brothers and sisters and might not get enough if he eats from the family plate or bowl.

WHEAT

FAMILY COOKING POT

Equivalent raw weight in grams		Local measure:
25	Wheat flour	1 small chapatti
20	Mung beans	1/4 cup
40	Spinach leaves	1 tablespoon
25	Carrots, cooked	2 teaspoons
5	Ghee	1 teaspoon
50	Banana	1 small

1. Make flour into one small chapatti.
2. Cook clean, washed beans in water till soft, with spices.
3. Add to 1/4 cup cooked dal, washed, chopped spinach leaves and cooked carrots, and continue cooking until soft.
4. Add oil and mix well. Serve with chapatti.
5. Give mashed banana to eat and breast-feed.

Approx. 300 calories

9.3 HEALTH AND HYGIENE

Care of the cord and umbilicus. The cord, which is cut soon after delivery, begins to dry and usually falls off between 7 to 10 days. The cord stump provides an excellent place for bacteria to grow and infection to develop. Therefore, it is important to keep the cord dry and clean. Exposing it to air and washing the area around the cord with soap and water will prevent infection. The place on the body where the cord comes off is called the umbilicus or navel. After the cord stump falls off, it still takes a few weeks for the

umbilicus to heal completely. The area needs to be cleaned with soap and water daily during the bath or when soiled. If kept clean and thoroughly dry the area will not get infected, but must be watched until complete healing takes place. If a foul smelling discharge or constant clear discharge is observed, the area should be cleansed with an antiseptic and gentian violet or Mercurochrome applied. Consult with the Medical Officer at the BHU or RHC.

Bathing. Immediately after delivery, the baby should be bathed to remove any blood from the face, head and body. Warm water sponging is all that is required. Afterwards, a daily sponge bath or oil massage will help keep the baby clean. The diaper area should be washed with soap and water after each stool. Once the cord falls off, the baby may be immersed in water for bathing.

During bathing, the baby should be cleaned from head to toe with special attention to eyes, ears, folds of the neck, underarms, groin, genitalia and the spaces between the fingers and toes. The procedure for positioning and bathing is as follows:

- Wipe the eyes with a wet cloth from the nose towards the ears.
- Clean the ears and nose.
- Wrap the baby with a blanket and hold him in a football hold position in your left arm.
- Wipe the scalp with the wash cloth. If shampoo is needed cup your right hand and fill it with water. Wet the scalp, soap it, then rinse and quickly dry it well.
- Next undress the baby. Hold him in a sitting position with neck supported and wash him from neck to toes.
- Quickly dry well, then dress him.

Napkin/Diaper. A napkin/diaper, or nappy, is the most common item of the baby's clothing. It may be made of a variety of fabrics. If your advice is sought on making a napkin/diaper, suggest that the material be soft absorbent cotton, preferably white in colour.

Napkins/diapers are folded in four different ways as shown in Figure 9.11. Each method is equally good. What is important to remember is that the extra thickness part should be placed in the front for boys and in the back for girls for better absorption of urine.

Plastic napkins/diapers and nonabsorbent materials should be avoided because these are common causes of napkin rash.

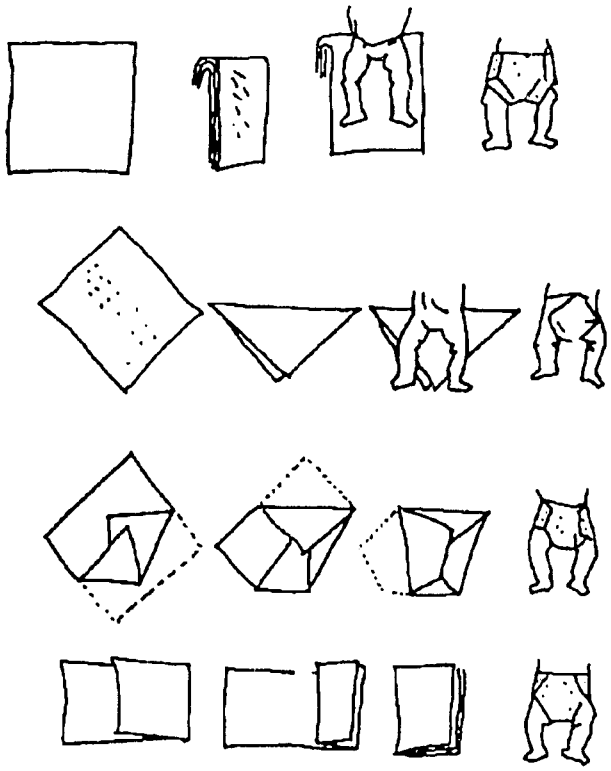

Fig. 9.11 Four ways to fold a napkin/diaper.

Sleeping. Infants spend a great deal of time sleeping. They sometimes fall asleep during feeding. To avoid aspiration oı fluids getting into ears should the child spit up or vomit during sleep, it is recommended that the infant be placed on its side or abdomen.

Safety from infection and accidents. Certain measures should be taken to protect the baby from infection as well as accidents. The biggest threat to survival for an infant is infection with one of the childhood communicable diseases such as measles, mumps, whooping cough, tetanus and diphtheria. A baby is born with some protection from the mothei but as it gets older, the protection carried over from the maternal system begins to fade and the baby

is more vulnerable to infection. However, scientific advancements in knowledge and technology have made vaccines available which protect the infant from these communicable diseases. Immunization is covered in detail in Chapter 12. Please refer to that section for detailed information. Only the recommended immunization schedule for infants is provided here as a reminder.

AGE IN MONTHS	IMMUNIZATIONS RECOMMENDED
At birth	BCG, Polio (0 dose)
Two to three months	DPT, Polio (1st dose)
Three to four months	DPT, Polio (2nd dose)
Four to five months	DPT, Polio (3rd dose)
Nine months	Measles

Any kind of infection may become a threat to the infant's survival. Therefore, it is important to instruct the family that the baby should not be handled by anyone who is sick. The family should also be instructed to make sure that everyone washes his/her hands before touching the baby.

Infants have been known to experience the following types of accidents and need to be protected from them. These are common in older children as well so the details will be given in the next chapter. Several common accidents and what precautionary measures to take are mentioned briefly.

ACCIDENTS		PRECAUTIONARY MEASURES
Suffocation-	-	Do not cover the baby's face.
Falls	-	Do not leave the baby unattended on a high surface.
Aspiration of foreign objects	-	Do not give the baby small objects to play with.
Burns	-	Keep the baby out of the kitchen.
	-	Keep hot things out of the reach of children.
Poisoning	-	Keep all harmful detergents and chemicals on high shelves or lock them away.

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9.4 MONITORING GROWTH AND DEVELOPMENT

Growth refers to an increase in total body size over a period of time. Growth is governed by individual heredity and is further facilitated or inhibited by environmental factors. These environmental factors, such as available nutrients, determine how fast or slow the child grows. A system of measuring an infant's growth pattern has been developed, and is discussed in Chapter 10.

Development refers to the changes that cause an individual to differentiate and increase in complexity. Development also refers to the process of maturation whereby a child begins to change from a completely dependent person to an independent one. Both growth and development are governed by some general laws. These are:

1. The growth and development process proceeds from the head to the foot (cephalocaudal). The baby holds the head up first, then sits, crawls, stands and walks.
2. Growth and development starts centrally and moves peripherally. This means that it starts in the centerline of the body and extends outwardly.
3. Growth and development occurs in a predictable manner with individual variation. The orderly sequence of head control to walking occurs in the same sequence for all children but variation occurs in the age in months at which these steps are mastered.
4. The critical period of growth and development is the time when rapid physical or behavioural development is taking place. During the critical period, environmental factors have a great impact. For example, the development of brain cells occurs during the entire antenatal period, but brain growth is particularly rapid between the 23rd and 36th week of life. Therefore, the mother's nutritional status at this point has greater impact on the infant's brain growth than at any other time.
5. First gross motor control occurs followed by fine motor control. For example, a baby can first hold large things in its hands and later can pick up small things with the fingers.

Monitoring of growth and development rests with the Health Technician and the family. Health Technicians should inform parents or significant caregivers what to expect at various ages in the infant's development and ways to facilitate the well-being of the infant. Table 9.5 presents significant growth and development points and advice the Health Technician may want to give.

TABLE 9.6 SIGNIFICANT GROWTH AND DEVELOPMENTAL POINTS

Age	Development	Health Technician's advice
Birth - 6 weeks	Infant sleeps most of the time, wakes when hungry, wet, soiled or because of pain or discomfort.	Play and talk to infant during feeding and changing. Let infant sleep as long as he or she can.
6-16 weeks	Infant stays awake for longer periods, looks round, looks at hand and puts it in mouth. When happy or content the infant will smile. It is able to hold up its head when lying on the abdomen or when held on the shoulder. Baby begins to vocalize by making small gurgling sounds and laughs aloud.	When awake place the baby on its stomach and back. Play with the infant and talk to it.
16-24 weeks	Reaches out for objects and people. May roll over. It is awake almost 8 to 10 hours. Looks at hands and plays.	Put rattle or soft play thing in front of the baby and let him/her hold it if able. Encourage other children to play with baby.

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TABLE 9.6 SIGNIFICANT GROWTH AND DEVELOPMENTAL POINTS

Age	Development	Health Technician's advice
	Puts objects in hand and to mouth. Plays with toys.	Advise mother to keep small things out of the reach of infants. Do not give balloons to the baby without supervision because the baby may bite and try to swallow them causing closure of the windpipe.
24-36 weeks	Rolls over and sits up. Is interested in small objects. Plays with others, smiles, reaches out to them.	Do not leave baby unprotected or unattended. He/she may fall or roll into dangerous places.
	Puts everything in mouth.	Keep small objects away from baby because baby may choke on them.
	Likes to play hide and seek. Begins to make sounds like mama, dadda. Baby can pull, stack and bang things together. Becomes shy and afraid of strangers. Teeth may begin to erupt. Stands up holding onto furniture.	Do not give the baby hard sweets or peanuts. These can't be swallowed until two years of age. Give something hard to chew, like ends of toast to mature the gums and stop itching. A stranger needs to be instructed to approach the baby gradually.

TABLE 9.6 SIGNIFICANT GROWTH AND DEVELOPMENTAL POINTS

Age	Development	Health Technician's advice
36-50-52 wks (one year)	May be crawling, standing, walking and at the same time exploring its environment.	Watch for the possibility of accidents, such as falls or burns.
	May have developed a strong attachment to those caring for it.	Someone should be with the baby when it is awake.

9.5 DEVELOPMENT OF ADULT-BABY ATTACHMENT AND EFFECTIVE INTERACTION WITH PEOPLE

Parenting is not an instinctive ability but is acquired through learning. The attachment of the parent and child begins before birth. Only recently has the importance of the first few hours of life been studied and recognized.

The behaviour of the newborn has significant influence on the development of attachment or bonding. For example, an active and responsive newborn is more likely to evoke satisfaction and pleasure than a passive infant. Since the bonding or attachment process involves a two way interaction, Health Technicians will have to work with parents in stimulating the passive child to be more responsive.

In the process of developing attachments two factors become important. One of them is time. The time period immediately after birth is called the 'sensitive period' when the foundations of attachment and interaction are laid down. Therefore, Health Technicians need to work with the mother or any other member of the family who is or will become a consistent caregiver to the baby to help stimulate the child and learn to respond to its needs.

The second important factor to be considered in the process of attachment is the developmental behaviour an infant acquires during the first year. This includes:

- Differential crying, smiling and vocalization (more to the mother than anyone else).
- Looking at or for the mother when she is not close by.
- Crying when the mother leaves the room.

- Approaching the mother by crawling, creeping or walking.
- Clinging to the mother when a stranger is present or looks in the direction of the infant.

During the formation of an attachment to a parent or adult, the infant progresses through four stages:

1. The first few weeks the infant will respond to anyone.
2. Beginning at about 8 to 12 weeks of age, the baby will cry, smile and vocalize to the mother more than to others.
3. At about six months of age the infant shows a distinct preference for the mother by following her more, crying when she leaves, playing with her more and showing that she feels more secure in her arms.
4. Between 6 and 8 months the infant shows fear of strangers and separation.

The period from 6 to 12 months of age when a child prefers the mother to others and does not want to be separated from her becomes a difficult time for the mother as well as the infant since the mother cannot be with the infant all the time. The mother will have to tend to her other activities. Knowing this, Health Technicians should be observant of mother-child interaction and attachment and encourage other members of the family to care for the infant as well. This helps the infant to become comfortable with others and not just the mother. This makes it easier for the child to develop a trusting relationship with more people.

The most important task the infant needs to accomplish during the first year of life is to identify and develop a trusting relationship with one or more adults. The biological mother does not necessarily have to be the focal point of this relationship. The infant will automatically develop this relationship with the caregiver if she is consistent in meeting its needs. For a child who has been consistently cared for by a number of family members and has had its needs met, it becomes easier to relate to more than one person than for a child who has had a single caregiver. But if the caretaker(s) has not been consistent in meeting the needs of the child, it will be difficult to establish a relationship of trust. Therefore, as Health Technicians you can play a very important role by pointing out to the family how important consistency and positive attitude is in helping an infant develop a trusting relationship with an adult.

GLOSSARY

Allergy: An unusual or hypersensitive reaction to certain drugs or substances. An adverse reaction.

Aspiration: To draw foreign objects, such as food, into the windpipe during inspiration.

Antibodies: Protective substances in the blood.

Apgar scoring: Procedure for determining the condition of a newborn.

Asymmetric: Lack of symmetry of parts on opposite sides of the body. For example, when the right and left side of the body are not mirror images.

Biologic: Relating to living things.

Colostrum: First part of the milk from the mother's breast soon after birth.

Critical: Serious.

Cylindric: Having the shape of a cylinder.

Crown: Top of the head of an infant visible at birth.

Cepholocaudal: Head to tail or in the direction of head to trunk.

Distention: Swelling.

DPT: Diphtheria, polio and tetanus immunizations combined as one.

Extremities: Arms and legs.

Facilitate: To make easy.

Extrusion reflex: Reflex to push solid food out of the mouth that lasts until infants get accustomed to solids.

Fine motor control: Control of fine movements by the nervous system.

Fragility: Easily damaged.

Gastrointestinal tract: Stomach and intestines.

Grimace: Expression of the face indicating pain.

Groin: Recessed area between the thigh and trunk.

Infection: A disease caused by organisms resulting in visible and/or measurable signs and symptoms.

Interaction: To act and react with another person.

Intrauterine: Inside the uterus.

Laxative: Food or medicine that is used to treat constipation.

Monitoring: A system for recording observations over time such as periodic weights of children to assess their nutritional status.

Neonatal: The first month of an infant's life after birth.

Neuromuscular: Relating to nerves and muscles.

Neonatal jaundice: Jaundice normally seen in newborns after 24 hours of age.

Passive: Inactive or less active.

Prenatal: Period before childbirth.

Peripheral: Pertaining to the outer part of the body.

Rales: Abnormal crackling or rattling sounds in the lungs heard with a stethoscope.

Reflex: Involuntary action or response to a stimulus.

Retraction: Act of drawing back.

Rump: Buttocks of an infant.

Sternum: Middle bone of the chest, sometimes called the breastbone.

Stimulation: To rouse to action as by encouragement.

Vernix caseosa: White, cheesy, greasy substance on the skin of the infant at birth. It acts as a lubricant and protects the skin and retains heat. It is easily removed when the newborn is washed.

Vocalization: To try to produce voice.

Weaning: An introduction of foods other than mother's milk.

SUGGESTED LEARNING ACTIVITIES

1. Conduct and record 10 newborn examinations including:

   - Head to toe examination.
   - Taking pulse and respiration.
   - Measuring length, weight and head and chest circumference.

2. Provide immediate newborn care including:

   - Treatment of aspirated mucous if indicated.
   - Cutting and caring for the cord.
   - Keeping the baby warm.
   - Breast-feeding.

3. Provide care for 10 infants (newborn to 1 year of age) including:

   - Care of the cord.
   - Bathing.
   - Breast-feeding.
   - Immunization.
   - Weaning foods.

4. Conduct five health education classes that are 10 to 20 minutes long on:

   - Breast-feeding and nutrition.
   - Health and hygiene.
   - Immunization.
   - Importance of playing with and talking to babies.

REVIEW QUESTIONS

1. What is your responsibility in caring for a newborn from the time of delivery until you leave the home or the hospital?
2. Describe what the newborn is like during the first 24 hours?
3. What is an Apgar score and how is it used in assessing a newborn's condition?
4. What would you look for in assessing a week old baby?

5. What are your activities in meeting the immediate needs of a newborn?
6. What points are important to consider in cutting the cord?
7. Why is it important to put the newborn to breast immediately after birth?
8. What are the advantages of breast-feeding and disadvantages of bottle feeding?
9. How could you tell that a baby has had enough milk?
10. Why is it important to burp the baby after breast-feeding?
11. When should solids be started and why?
12. Give 3 examples of supplementary foods for infants.
13. What are the groups that make up the diet of an infant and in what proportion should they be found in a mixed diet?
14. What would you suggest to a mother who says she is not producing enough milk for the baby?
15. If the area around the umbilicus is red, what would you do and say to the mother?
16. Describe how you would bathe a 4 day old and 15 day old baby?
17. What points do you need to consider in helping the expectant mother prepare some baby napkins/diapers?
18. What immunizations should be given to a baby and when?
19. List some of the common accidents that are likely to occur during the first year of a baby's life and what precautionary methods could be taken.
20. What is the Health Technician's role in facilitating the development of adult-baby attachment?

LEARNING ACTIVITIES RECORD

Name of student _____

	Newborn	Infant
Examination		

Health education		

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CHAPTER 10

HEALTH DURING EARLY CHILDHOOD

Objectives: After completing this chapter you will be able to:

1. State what ages are included in the early childhood period.
2. List the six tasks a child has to learn during early childhood to be able to master them later in life.
3. Describe a growth chart and the information contained in it.
4. Describe how to complete the growth chart.
5. Describe how to use the chart.
6. Describe the procedure for weighing children on the four kinds of scales.
7. Describe each of the following six developmental tasks of early childhood and the Health Technician's activities:
   - Seeing oneself as a person and not an extension of the mother.
   - Ability to withstand delayed gratification.
   - Control over bodily functions.
   - Acquisition of socially acceptable behaviour.
   - Acquisition of verbal means of communication.
   - Ability to interact with others.
8. Describe how Health Technicians can help parents provide appropriate guidance to their children in accomplishing the six major tasks.

EVALUATION FORM

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of Presentation	[ ]	Simple to understand
	[ ]	Difficult to understand
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 10

HEALTH DURING EARLY CHILDHOOD

In the previous chapter, growth and development during the first year of life were covered. This chapter will cover early childhood, the period from one to five years of age. During this period, dramatic changes occur in the child: he leaves the dependency stage and learns to become independent.

The "terrible twos" is the term used to describe the toddler years, from 12 to 24 months of age. During this period, children explore to find out how things work. Since they lack the experience of being hurt, they are not careful and accidents are frequent. Children need to be supervised and guided throughout this period to learn about the environment. The natural tendency for parents is to say, "no, don't" too many times, losing the meaning of "no" at a period when children need to be guided, so that they learn to look up to adults for guidance rather than fear of punishment.

Children of two to four years of age are called preschoolers. The toddler and preschool age together is called early childhood. The foundations of the following developmental tasks are initiated during early childhood:

1. Seeing oneself as a person and not an extension of the mother.
2. Ability to withstand delayed gratification.
3. Control over bodily functions.
4. Acquisition of socially acceptable behaviour.
5. Acquisition of verbal means of communication.
6. Ability to interact with others.

In order to initiate the above tasks properly, the child has to be in good health. The general health status can be easily measured in terms of weight gain. Therefore, the topic of determining the child's health and nutritional status will be discussed first followed by a discussion of the above six developmental tasks.

10.1 DETERMINING A CHILD'S HEALTH AND NUTRITIONAL STATUS

The general health and nutritional status of children is measured in terms of how well they are gaining weight. The growth chart has been designed to help Health Technicians assess the health of the child by weighing him frequently and keeping track of the weight gain. A sample of this card is presented in Figure 10.1 and instructions for use of the card are given on the following pages.

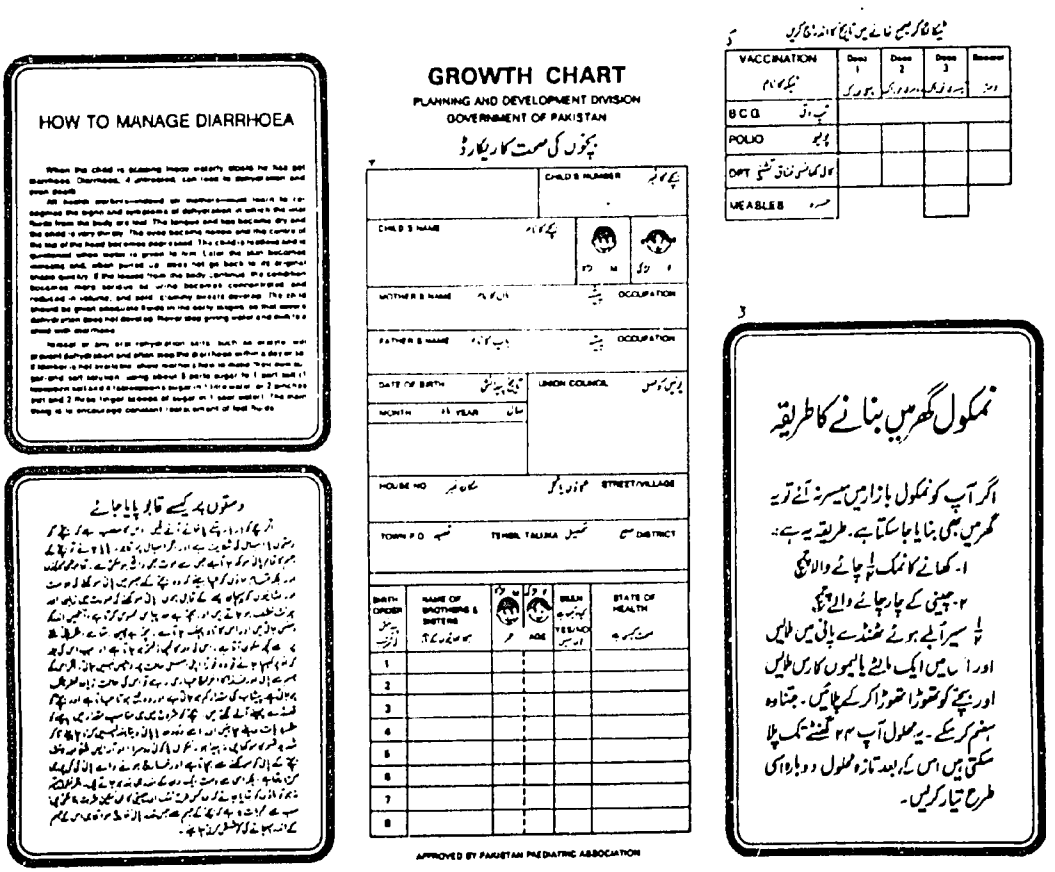


Fig. 10.1 The growth chart.

Instructions for the use of the growth chart. This card has two sides, a front and back side. One card is filled out for each child seen. The front side has five boxes. Boxes 1 and 2 describe how to recognize diarrhoea and dehydration and manage them by using oral rehydration solution. Box 3 gives directions for making ORS at home. Box 4 and 5 have identifying and health information about the family and child.

When you see a child under five years of age, fill in the information on the growth chart as follows:

1. **Child's number:** The number assigned to the child at the RHC or BHU.

2. **Child's name:** Write in the child's complete name, first, last name and any other name.

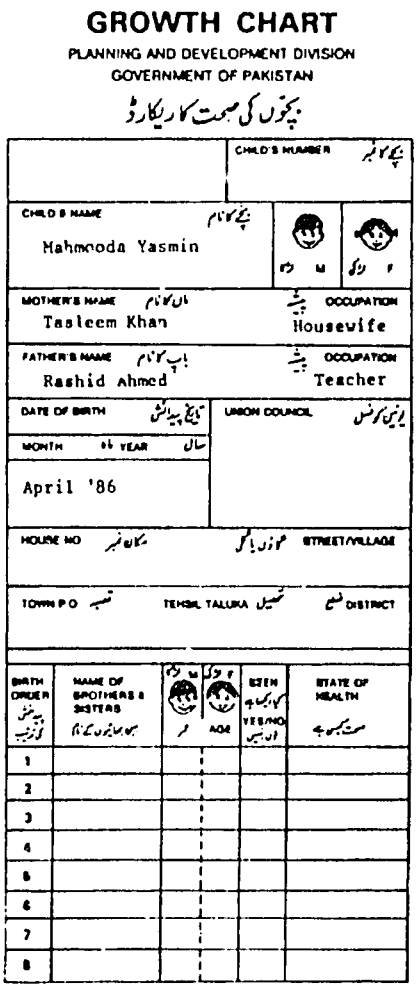
3. **Sex:** Indicate if child is a boy or a girl.

4. **Mother's name:** Fill in the mother's name which she uses on documents.

5. **Mother's occupation:** If mother works outside of the house write down what she does. If not, write down housewife.

6. **Father's name:** Write in the name of the father as it appears in the employment record or other documents.

7. **Father's occupation:** Write down his occupation or what he spends most of his time doing.



GROWTH CHART

PLANNING AND DEVELOPMENT DIVISION
GOVERNMENT OF PAKISTAN

بچوں کی صحت کا ریکارڈ

	CHILD'S NUMBER بچے کا نمبر
CHILD'S NAME بچے کا نام: Mahmooda Yasmin	M لڑکا / F لڑکی
MOTHER'S NAME ماں کا نام: Tasleem Khan	OCCUPATION پیشہ: Housewife
FATHER'S NAME باپ کا نام: Rashid Ahmed	OCCUPATION پیشہ: Teacher
DATE OF BIRTH تاریخ پیدائش / MONTH ماہ YEAR سال: April '86	UNION COUNCIL یونین کونسل
HOUSE NO مکان نمبر	STREET/VILLAGE محلہ / گاؤں
TOWN P.O قصبہ	TEHSIL TALUKA تحصیل / DISTRICT ضلع

BIRTH ORDER پیدائش کی ترتیب	NAME OF BROTHERS & SISTERS بہن بھائیوں کے نام	M لڑکا / F لڑکی	AGE عمر	SEEN YES/NO دیکھا / نہیں	STATE OF HEALTH صحت کیسی ہے
1					
2					
3					
4					
5					
6					
7					
8					

Fig. 10.2 Information on the the front of the growth chart, box 4.

8. **Date of birth:** This refers to the date, month and year of birth of the child for whom the growth chart is being prepared. If the mother does not know the exact date, help her to give you an estimate by linking it with a holiday or major event in the village.

9. **Union Council:** Write the name of the Union Council where the child resides, not where the BHU or RHC is located.

10. **House number, street, village:** If the street the house is located on has a number or name, write that down, otherwise give any information which will help locate the house (fifth house on the right side of Shah Faisal Mosque facing the canal in the village of Sheikhupura).

11. **Town PO:** Write down the name of the post office and town from which the family receives their post/mail.

12. **Tehsil/Taluka, District:** Write down the name of the tehsil/taluka and district in which the house they live in is located.

The bottom of the front section of the card asks for information about other children in the family.

1. **Birth order:** This means the order in which the children were born; the oldest will be number one, next born will be number two and so on. Enter the name of each child according to the birth order. The age of each child is to be entered under either the girl or boy column. If you saw the children, write yes in front of each child; if you did not, write no.

2. **State of health:** Briefly state the health condition of the child in terms of healthy, borderline or ill. A healthy child is one who looks alert, is active, growing in height and weight according to age and has completed all immunization. A borderline child is one who looks alert, is active, but whose immunizations are not yet complete and/or is either overweight or underweight for his age. An ill child may have symptoms of illness or is not alert, not active and requires medical attention.

Box 5 - Immunizations. In the boxes provided, write down the dates (not a check mark) on which the first, second and third doses of immunization were given. This helps you to estimate when the next dose or booster is due.

ٹیکا لگا کر صحیح خانے میں تاریخ کا اندراج کریں

VACCINATION ٹیکہ کا نام	Dose 1 پہلی خوراک	Dose 2 دوسری خوراک	Dose 3 تیسری خوراک	Booster بوسٹر
B.C.G تپ دق				
POLIO پولیو				
DPT کالی کھانسی خناق تشنج				
MEASLES خسرہ				

Fig. 10.3 Box 5, Immunizations.

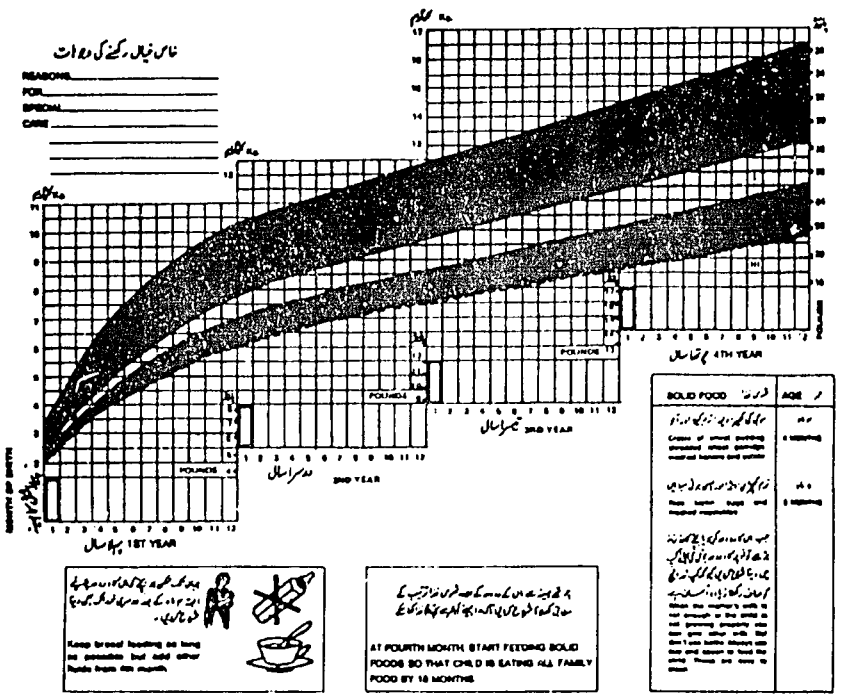


Fig. 10.4 The back side of the growth chart.

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The back side contains the actual growth chart and instructions for feeding. In addition, the top left hand column asks for information identifying "at risk" children.

Identifying children at risk is the first step in preventing them from becoming malnourished. The following factors contribute to malnourished children requiring special care. Therefore, if any are applicable for a particular child, write it down under reasons for special care.

1. Malnourished mother.
2. Child with low birth weight.
3. Mother suffering from TB.
4. Mother unable to breast-feed.
5. Extremely poor.
6. One parent dead.
7. Too many children in the family.
8. Any illness.
9. Child not gaining weight.
10. Twins.

How to complete the growth chart. The growth chart has vertical and horizontal lines. The vertical lines represent age in months and the horizontal lines weight in kg or pounds. There are 48 months divided into four years and the weight goes up to 17 kg or 38 lbs.

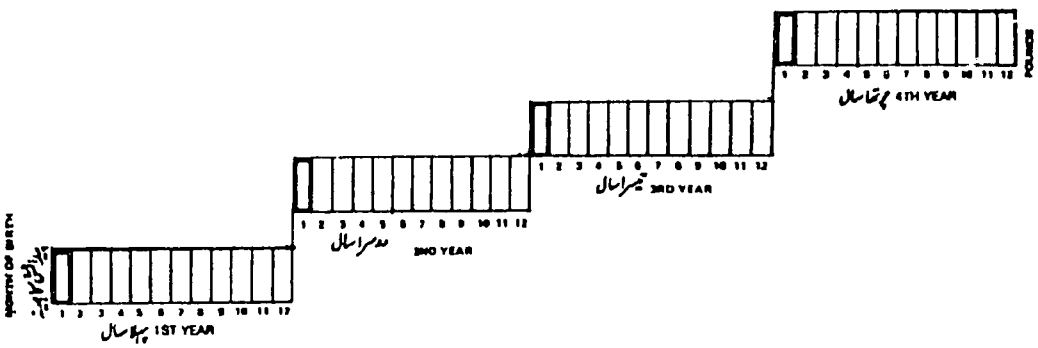

Fig. 10.5 Darkened box for birth month and year.

In filling out the growth chart, first fill in the month and year of birth of the child in the extreme lower left hand corner of the card. This box has dark lines and has "Month of birth" written next to it. You will also note that there is a box with dark lines at the beginning of each year. Write the birth month and year in each box.

For example, for a child born in October 1986, the growth chart would be filled in as shown:

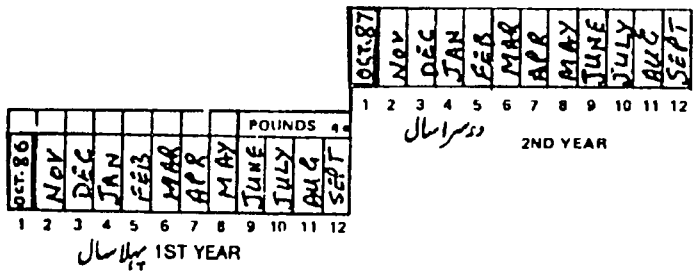

Fig. 10.6 Child born October 1986.

Now weigh the child and put a large dot with a pen on the horizontal line that equals the weight, directly above the month in which the weight was taken. For example, Shakir-Ullah Khan, who was born in October 1986 came to the RHC in January and weighed 5 kg. His chart would look like this:

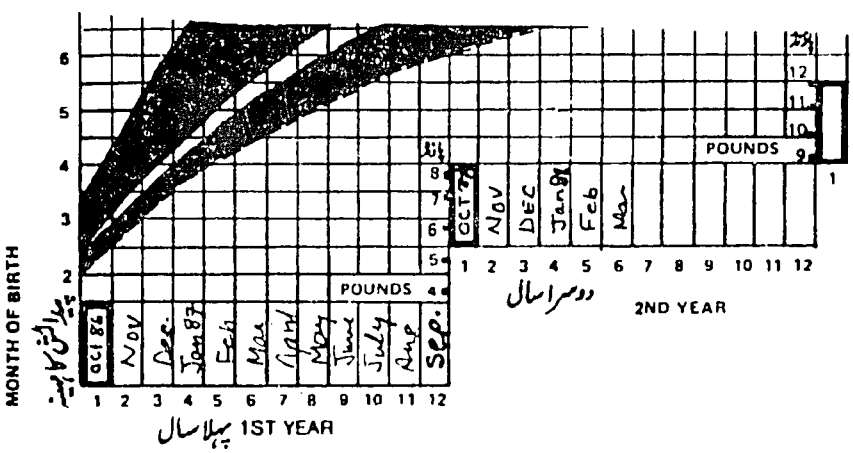

Fig. 10.7 Charting the weight.

When the child comes again, weigh him and put the dot above the month he is weighed. Connect the new dot to the previous dot. The line formed by joining dots is the growth line of the child.

How to use the chart. There are three coloured curved areas on the chart. These are growth reference lines. If the child's weight falls in the green portion, this means that the child is growing

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well and the family may be advised to continue the existing feeding pattern. If the weight falls in the yellow area, it means that the child is borderline malnourished and requires frequent small feedings (5 times a day). If the child's weight falls in the red area, the child is not getting enough nutrition and may even be ill. So in addition to paying special attention to nutrition, a medical evaluation may also be required. Children who fall in the red line require follow-up visits or home visits by the Health Technician. A monthly or periodic increase in the weight of a child should follow the direction of the reference lines. It does not matter if the growth line falls above or below the reference line. What is more important is that the growth line should continually go up. If the child's growth line is flat, this is a warning that the child is not gaining weight and may be ill. If a child's growth line is going down, this is a dangerous sign and may indicate an episode of acute illness. In this case, instruct the mother on special care and extra nutrition and follow the child carefully.

Procedure for weighing infants and children. Infants and children may be weighed on a variety of available scales. The most commonly used are:

- Infant scale.
- Salter scale.
- Stand up scale.
- Bathroom scale.

When available, an infant or Salter scale should be used for weighing infants and toddlers. If these are not available, an adult may carry the infant or child and take a combined weight on a stand up beam and balance scale or a bathroom scale.

Fig. 10.8 A salter scale with a spring.

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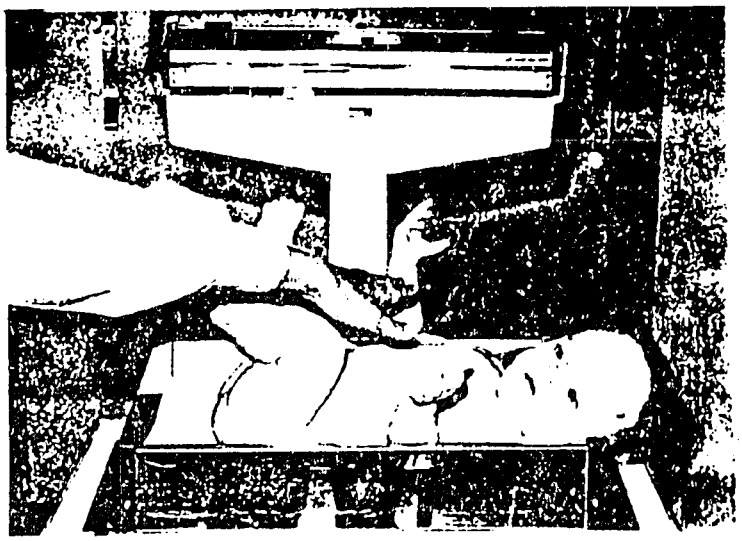

Fig. 10.9 An infant scale.

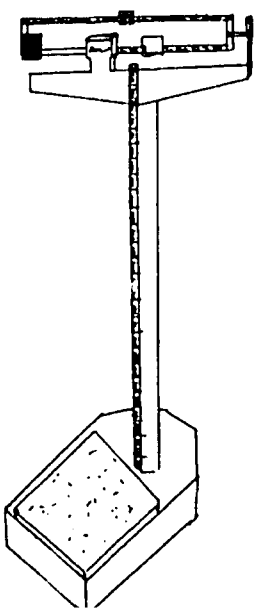

Fig. 10.10 Stand up scale with beam and balance.

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Using an infant scale:

- Undress the child to nappy or underwear.
- Set the balance of the scale to zero and make sure the beam registers exactly in the middle.
- Place the child on the scale and move the weight until the beam again balances in the middle.
- Read the weight and record.
- Take the child off the scale.

Weighing small children and infants on an adult scale:

- Have an adult stand on the scale.
- Read the weight.
- Record the weight.
- Have the same adult hold the undressed infant or child on the scale.
- Read and record the weight.
- Subtract the weight of the adult alone from the combined weight of the adult and child. This will give you an approximate weight for the child.
- Record the child's weight on his chart.

10.2 SIX DEVELOPMENTAL TASKS OF EARLY CHILDHOOD

1. Seeing oneself as a person and not as an extension of the mother. An infant is dependent on others for its physiological needs and for affection. A toddler has the added need for self-esteem, the desire to feel important, in control and respected. At the same time, the child is reluctant to give up his/her much enjoyed dependence on others. In order for a child to see herself/himself as a person he must be guided by his parents. Parents may need to be helped in this. Showing a parent what to expect from growing children and how to handle them is called anticipatory guidance.

Anticipatory guidance. Parents should be informed about the natural need of children to identify themselves as important people. Toddlers should, therefore, be called by their names and treated as individuals at their level. They should be taught as much about self-care as possible, starting with self-feeding to grooming and management of personal hygiene. This will help them develop confidence and become independent in self-care.

Nutrition and feeding counseling. Eating habits established in the first two to three years of life tend to have lasting effects. It is therefore important to keep the following points in mind:

- During early childhood, growth rate is not as rapid as in the first year of life and the nutritional and fluid requirements per kg of weight decrease. However, overall caloric needs are higher than infancy. After 18 months of age, toddlers become less interested in food and more interested in other activities. Frequent meals and snacks are still important.
- By 12 months of age most children may be eating the same food prepared for other members of the family.
- Some may also be drinking from a cup, although occasionally spilling.
- Give a child their own plate of food so that they can eat at their own pace and so that a mother can be sure that the child is consuming the food.
- Do not scold the child for spilling liquids or food. Instead help him not to spill by giving small amounts at a time, adding more as he finishes what he has.
- Have him sit still while eating and clean his hands and face before and after each meal.
- Children at this stage may like sameness, for example, they like to be served in the same dish. When their favourite food is served in a new dish it may be rejected.
- Children are not yet able to control their emotions so if they are angry or frustrated they will throw what they have in their hand. It is important to have unbreakable dishes for them.
- Likes and dislikes for food, as well as degree of appetite change during these years.

Grooming. As children grow and show a readiness to do things, they should be encouraged to do as much for themselves as possible. Children vary in this ability, therefore parents must observe their own children for readiness and teach and help them to master such grooming tasks as dressing, washing of hands, face and body and brushing the teeth and hair.

Children are constantly observing adults and copying them and adults need to encourage this, observe their readiness and teach them to become independent in self-care. The following two tables provide the normal age for a child to perform various tasks in dressing and grooming.

TABLE 10.1 CHILD'S READINESS FOR DRESSING

Age	Activity
15 months	- Is able to extend arm or leg on verbal instruction.
18 months	- Is able to take off underwear, socks, cap.
	- Tries to put on shoes. (Help child to push foot into shoe by using an oversized shoe first.)
21 months	- Begins to undress. (Demonstrate how step-by-step: first pull down pants to child's ankles and have him pull them off, next to knees, hips and waist.)
24 months	- Removes shoes. (Adult must loosen/open shoes so that child can pull them off from the heels.)
	- Helps in dressing. (Use same technique here as for undressing.)
36 months	- Dresses self completely if helped with back buttons and told which shoe is right and left.
48 months	- Tries to tie shoes but is not always successful.

TABLE 10.2 CHILD'S READINESS FOR GROOMING

Age	Activity
14 months	- Cleans teeth with the help of fingers. (Demonstrate cleaning of your own teeth. Help child clean teeth by moving his/her finger in the mouth. Teach child how to rinse mouth and use a toothbrush.)
18 months	- Washing of face and body. (Guide his hands over face to cleanse it and have him imitate adult. Also have child rub body parts he can reach (arms and legs) and pour water over his body.)

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TABLE 10.2 CHILD'S READINESS FOR GROOMING

Age	Activity
24 months	- Washing of hands. (Give the child soap and show him how to scrub the hands and pour water.)
	- Washing of hair. (After a good lather has been formed, have child put hands in hair and have him scrub scalp. Let him observe this in the mirror. Cover his eyes while rinsing. Give him/her a large toothed comb for the hair and guide his hands.)
30-36 months	- Is able to clean teeth alone. (Observe to make sure all surfaces are covered.)
36 months	- Is able to wash hands alone with the tap running or someone pouring water over them.

2. Ability to withstand delayed gratification. Achieving independence is not enough for optimum development. What is more important is to develop socially acceptable behaviour. Learning to wait to have your needs met is expected of all individuals who live with other people as part of a group.

A newborn is seen as being helpless and his only means of communication is crying. The mother or other caretaker rushes to meet his needs whenever he cries. It is an accepted fact that an infant's needs must be satisfied upon demand. As the newborn gets older, he matures physically, intellectually and socially and the community expects the child to be patient and understanding when his needs are not met immediately. By the beginning of the second year of life, a child has begun to think and reason things out and has learned to experiment to produce certain results. He also has some understanding of time, space and causality but the child's concept is different from that of an adult. This difference in concept sometimes brings about difficulties for parents as well as children.

The toddler or young child with his newly gained knowledge, strength and experience tries to gratify his needs immediately. When his needs are not immediately met he gets frustrated and throws things about, hits and kicks whoever is near and cries and throws

himself on the floor with temper tantrums. It is important to avoid too many temper tantrums because these can become a habit. Instead parents need to anticipate the child's needs and be prepared to meet them by involving him. For example, if, upon waking, the food is not ready, instead of leaving the baby to cry, pick him up, take him with you and say let us prepare the food together. Involve him in playing near you and if possible involve him in preparing the food or suggest that you will get the food while he finishes going to the bathroom. In this manner he is taught to accept delayed gratification.

Children need to feel secure that their needs are being tended to or will be tended to. If this feeling can be given, then they learn to wait because they know that these needs will be gratified. If they are not given this feeling fully, they develop a habit of wanting immediate gratification because they are not sure what delay means. For this reason a time table for eating, sleeping and recreational activities should be established.

3. **Control over bodily functions.** Two of the most important bodily functions which a child has to learn to control voluntarily are bowel and bladder elimination. Control of bowel and bladder elimination is influenced by multiple factors of a physiological and psycho-social nature.

The most important prerequisite for learning control is the maturity of the anal sphincter and the capacity of the bladder to retain urine for a long time. The ability to control the anal sphincter occurs sometime between 18 and 24 months of age and the child can be toilet trained from this period on. As far as bladder control is concerned, by 14 to 18 months of age the child is able to retain urine for up to two hours or longer. This does not mean that the child is ready for toilet training. The general guideline to use is that by two years of age bowel and bladder training may be started.

It is important to keep in mind that children will eventually control their own bowel and bladder elimination and no pressure should be utilized.

4. **Acquisition of socially accepted behaviour.** Toddlers and young children learn the ways of their social group by observing older children and adults around them. One way of learning is by imitation. They imitate what they see, socially acceptable as well as unacceptable behaviour. In order to help them develop socially acceptable behaviour, they need to be ignored or discouraged when

they behave in an unacceptable manner and rewarded or reinforced when they behave in an acceptable manner. In addition, certain activities need to be initiated as they show readiness. For example:

- They should learn to greet elders and to use acceptable terms in addressing various members of the family and community.
- They should learn to sit quietly on mother's and father's lap in a gathering or to be out of sight playing.
- They should learn to say namaz with elders, etc.

5. Acquisition of verbal means of communication. During early childhood children have a better understanding of language than the ability to use it. Therefore, the number of words a child uses in speaking is only part of his language acquisition. It is also important to keep in mind that in a family where more than one language is used a child may be late in speaking despite his level of understanding.

TABLE 10.3 LANGUAGE DEVELOPMENT BY AGE IN MONTHS

Age	Acquired number	Use of words
12 months	4 words	- Mama and baba.
24 months	300 words	- Uses 2 to 3 word phrases. Says I, me, you. - Understands simple verbal commands. - Refers to self by name. - Verbalizes need for food, toilet. - Talks constantly.
36 months	900 words	- Uses complete sentences of 3 to 4 words. - Talks constantly whether anyone is listening or not. - Constantly asks questions.
48 months	1500 words	- Uses sentences of 4 to 5 words. - Knows simple short songs. - Understands analogues, such as if sugar is sweet, lemon is ... - Repeats 4 digits. - Tells exaggerated stories.

As a child acquires new words, he needs guidance in their usage so that he can learn the language effectively and with interest. This is also a time to read stories to the child to give him an opportu-

nity to learn. Remember, the number of words given in the table is the number of words a child is capable of learning. If he is not exposed to new words he will not learn them. Therefore, it is very important to expose a child to a variety of learning situations: radio, TV, books, stories, mosques, prayers, etc.

6. **Ability to interact with others.** This refers to personal-social interaction. All toddlers experience a fear of separation from the mother and do not like change. Children of 12 to 24 months of age like the same routine, the same people and the same places. During early childhood, children become more social and begin to interact with others.

TABLE 10.4 CHILDREN'S READINESS TO INTERACT WITH OTHERS

Age	Social interaction
12 - 24 months	- Fear of strangers. - Fear of separation from mother.
24 - 36 months	- Tries to please others. - Is aware of manners.
36 - 48 months	- Likes to interact. - Begins to work out social interaction through play with dolls or playing side by side with other friends. - Expresses own ideas. - Has fear of darkness. - Is independent. - Becomes aggressive physically and verbally. - Takes pride in accomplishments. - Has mood swings. - Has immaginary friends. - Enjoys performing, singing, dancing and reciting. - Tends to be selfish and impatient.

The six developmental tasks of early childhood have been presented in terms of what the child needs to accomplish to initiate them so that he can continue to master them later in life. How these tasks are accomplished is dependent on the guidance parents provide. Therefore, you as Health Technicians need to be aware of these tasks and instruct parents to use the child's readiness and ability to guide him further.

GLOSSARY

Acquisition: Act of acquiring or possessing.

Analogous: Similar or alike.

Borderline: Not quite meeting accepted standards.

Causality: The relationship between a cause and its effect.

Concept: A general notion or idea.

Control: To exercise restraint; the act or power of controlling.

Counseling: Giving of advice and instruction.

Delayed: Put off until later.

Discouraged: Deprived of courage, hope or confidence.

Episode: An incident in a person's life or experience.

Exaggerated: Magnified beyond the limits of truth.

Extension: To be or become continued or enlarged.

Frustrated: Disappointed.

Gratification: Satisfaction.

Grooming: Making oneself neat and tidy in appearance.

Growth chart: A chart to monitor the growing patterns of a child by keeping track of his weight.

Horizontal: Parallel to the level ground.

Ignore: Not to recognize or notice the presence of.

Imitation: The act of copying or imitating.

Initiate: To cause the start of; to introduce.

Lather: Foam made by soap when stirred with water.

Maturity: The state of being fully developed.

Rectified: Corrected.

Record: To put down in writing.

Recreational: Activities that result in relaxation and enjoyment.

Reinforced: Made stronger.

Reject: Refuse.

Rewarded: Recognized for good behaviour.

Rinse: Wash lightly with water.

At risk: Exposed to danger or hazard.

Sameness: The state of being the same.

Secure: Safe or free from danger.

Scales: Standard of measurement, such as a scale for weighing.

Self-care: Caring for oneself as opposed to being cared for by others.

Sphincter: A circular band of voluntary muscle that makes up an opening in the body, e.g., anus.

Task: A definite piece of work expected of a person.

Temper tantrum: Demonstration of anger or frustration by uncontrolled physical activities.

Vertical: Upright or straight up and down.

Withstand: To resist, oppose or endure, especially in a satisfactory way.

SUGGESTED LEARNING ACTIVITIES

1. Complete a growth chart and arm band reading on 10 to 15 children over a 6 to 12 month period.

Growth chart				
Arm band				

2. Conduct 2 to 3 health education sessions for mothers on each of the following topics:

   - Use of locally available foods in meeting the nutritional needs of children.
   - Helping children develop good personal hygiene habits and grooming.
   - Helping children develop socially acceptable behaviour.
   - Helping children learn the proper use of language.
   - Helping children become independent.

REVIEW QUESTIONS

1. What ages are included in the early childhood period?
2. What are the six tasks a child has to be helped with during early childhood?
3. Name one simple screening test to determine a child's health status.
4. What is a growth chart?
5. What information can you get from the growth chart about a child's health status?
6. What do you write in box # 1 (darkened) of the growth chart?
7. What do the three colours of the curved areas on the chart mean?
8. Why do you have to be concerned about clothing when weighing children?

9. Why is the following information included on a growth chart?

   - Instructions on feeding.
   - Identifying "at risk" children.
   - Immunization.

10. Describe how you would utilize the information contained in a completed growth chart.
11. What kinds of scales are utilized in weighing infants and children?
12. Why are different kinds of scales used in weighing children?
13. If you had only one scale for the BHU, which one would you choose?
14. What do you have to do to adjust the scale before weighing children?
15. What is anticipatory guidance?
16. How does developing confidence in self-care help the child to see himself as a person rather than an extension of the mother?
17. What can parents do to reduce the incidence of temper tantrums?
18. What are the prerequisites for starting toilet training?
19. How do you help children develop socially acceptable behaviour?
20. How should parents guide children to use newly acquired words?
21. How can Health Technicians help mothers meet the needs of growing children?

LEARNING ACTIVITIES RECORD

Name of student_____

Health education sessions

Nutrition			
Personal Hygiene			
Socially acceptable behaviour			
Language			
Independence			

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EVALUATION FORM

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of Presentation	[ ]	Simple to understand
	[ ]	Difficult to understand
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 11

COMMON PROBLEMS OF NEWBORNS, INFANTS AND CHILDREN

Objectives: After completing this chapter you will be able to:

1. Identify eight problems common to newborns.
2. Describe how Health Technicians can help family members cope with these problems.
3. Describe the following conditions and the activities of the Health Technician in each situation:
   - Malnutrition
   - Diarrhoea
   - Respiratory infections
   - Communicable diseases
4. Distinguish between kwashiorkor and marasmus in identification and treatment.
5. Define diarrhcea.
6. Distinguish the three stages of dehydration and the management of each.
7. Prepare and administer the oral rehydration solution.
8. Identify those diseases against which preventive immunization is available.

CHAPTER 11

COMMON PROBLEMS OF NEWBORNS, INFANTS AND CHILDREN

In the preceding chapters, you learned what is normal for newborns infants and children and what activities you were to assume i teaching families to provide adequate care for them. Even though majority of children are born normal and continue to develo normally, there are a number of common problems that you will hav to deal with. These are:

IN THE NEWBORN

1. Low birth weight
2. Difficulty in breathing
3. Newborn tetanus
4. Infection (of any kind)
5. Head or brain injury
6. Hypoglycaemia
7. Conjunctivitis

IN INFANTS AND CHILDREN

1. Malnutrition
2. Pica
3. Respiratory infection
4. Infectious diseases
   - Mumps
   - Whooping cough
   - Diphtheria
   - Polio
   - Chicken pox

In this chapter, you will be instructed on how to recogniz these problems, what to do as a Health Technician and how to hel family members cope with these problems.

11.1 COMMON PROBLEMS IN NEWBORNS

Table 11.1 lists the common problems in newborns and the role c the Health Technician in dealing with them.

TABLE 11.1 COMMON PROBLEMS OF NEWBORNS

Problems	How to recognize them	Health Technician's activities
Low birth weight/premature babies	- Newborns with low birth weight (less than 2500 grams) or born before 38 weeks of pregnancy.	- Make sure the newborn is breathing. - Take and record birth weight.

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TABLE 11.1 COMMON PROBLEMS OF NEWBORNS

Problems	How to recognize them	Health Technician's activities
	- Newborn appears small, thin, with a large head and abdomen. - Skin appears red with very little fat underneath. - Sucking may be weak. - May move very little. - May tire easily. - Cry is weak and whiny.	- Maintain body temperature by: . Keeping the baby wrapped and well covered to avoid heat loss. . Not bathing the baby for a few days. . Holding the baby. - Feed frequently: . Put the baby to breast soon after delivery. . If sucking is too weak for breast-feeding, have the mother express her milk and feed with a dropper, or spoon. . Feeding should consist of small but frequent amounts. . Amounts of breast-feeding time should be gradually increased every day. . When breast-feeding, put the baby to breast and squeeze the breast to put milk in baby's mouth until it starts to suck well. . Weigh the baby each day or once a week and record weight. . Consult the MO if weight gain is not satisfactory.

TABLE 11.1 COMMON PROBLEMS OF NEWBORNS

Problems	How to recognize them	Health Technician's activities
Difficulty in breathing	- Skin colour appears bluish red. - Respiration may be irregular and the chest may be concaved.	- Hold the baby upside down and clean airway with a mucous extractor or rubber bulb. - Dry the baby. - Give mouth-to-mouth breathing if necessary. - After the baby starts breathing, make sure to keep it warm, clean and well fed.
Newborn tetanus The chance of the baby's survival depends on how fast it is taken to the hospital.	- Difficulty in sucking that gets progressively worse. - After one or two days baby may not be able to suck due to spasms of the jaw muscles. - Episodes of muscle spasms involving face, limbs and back. - The back arches and becomes stiff.	- Can be prevented by giving pregnant women two injections of tetanus toxoid during the last trimester of pregnancy. - Cut the umbilical cord with a sterile/boiled instrument. - Attendant in delivery must have clean hands. - Do not put anything on the cord. - Once tetanus is suspected, refer to hospital immediately. - Help the family get the baby to the hospital.
Newborn septicaemia This is a very serious condition and the	- Area around the cord stump is red, swollen and may have discharge. - Baby is irritable and feeds poorly. - Jaundice and seizures may occur later on.	- Cut the cord with a sterile/boiled instrument. - Clean the cord every day with soap and water and keep it clean and dry. - Refer mother and baby to the hospital.

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TABLE 11.1 COMMON PROBLEMS OF NEWBORNS

Problems	How to recognize them	Health Technician's activities
baby should be seen by the MO and antibiotics started as soon as possible.	- Urine output is reduced. - Abdominal distension may occur. - Temperature may be high, normal or low. - Newborn may sleep too much. - Grunting (noisy and laboured breathing) may be present.	- Continue to breast-feed or use breast-milk feeding. - Keep the baby warm. - Inform the mother of what is being done for the baby and why.
Cerebral brain injury This sometimes occurs at birth from lack of oxygen or physical trauma during labour and delivery. The labour and/or delivery are usually difficult. The brain swells and/or bleeds, causing increased pressure inside the skull. Most cases are mild and the infant has no obvious long-term damage.	- The baby is usually either depressed or irritable, feeding poorly from birth and breathing may be irregular. - Seizures can occur within the first three days, usually limited to one side of the body only. - Usually occurs in primiparas with large babies, usually from diabetic mothers. - Enlarged head with bleeding under the skin. - Boggy feeling over the scalp.	- Put the child on the side position. - Open mouth to drain mucous and allow air in. - Advise mother to give expressed milk if newborn is not breast-feeding on its own. - If irritable, handle the baby to a minimum. - Advise family to take severe or unresponsive cases to the hospital.

TABLE 11.1 COMMON PROBLEMS OF NEWBORNS

Problems	How to recognize them	Health Technician's activities
In more severe cases, mental retardation and/or cerebral palsy may develop.		
Hypoglycaemia or low blood sugar	- Signs of low blood sugar may be seen before 24 hours of age and up to three days. - Twitching, pale colour, poor sucking are seen. - Brief periods of not breathing (apnea) may occur. - In severe cases, seizures may occur. - Temperature may be low. - Limpness may be evident. - Vascular return is not good. e.g., if you hold onto the limbs and then let go, the colour will return very slowly. - A blue and dusky colour will remain for awhile.	- Observe for changes in the colour of extremities. - Observe newborn's breathing. - For mild to moderate cases, breast-feeding will take care of this. - Put baby to breast immediately after delivery and frequently thereafter. - Keep newborn warm. - For moderate to severe cases, give milk or 25 ml of glucose water alternating with breast-feeding. (To make glucose water, mix 4 teaspoons of sugar to one cup of water, boil and then cool.) - Honey may be given. - If seizures and/or other signs develop refer to MO. Otherwise, discontinue sugar water after newborn begins to take breast-milk adequately.

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TABLE 11.1 COMMON PROBLEMS OF NEWBORNS

Problems	How to recognize them	Health Technician's activities
Conjunctivitis If not treated promptly, corneal ulcers may develop with the possibility of blindness.	- Red eyes with pussy discharge.	- Wash affected eye with boiled and cooled water from the nose side outward. - Avoid contact with the unaffected eye. - Penicillin eye drops or ointment should be given three times a day.
Thrush Thrush is a mouth infection caused by a fungus (a type of micro-organism). This fungus is passed from the mother to the baby in the birth canal during delivery. It is seen in older children who are malnourished, children with poor oral hygiene, severely or chronically ill children or those on antibiotics for a long time.	- The lesions of thrush are white spots. - The mucous membranes of the mouth are usually inflamed. - In more severe infection, a white membrane forms.	- Extra fluids (to prevent dehydration) should be given. - 1% gentian violet put 2-4 times a day on the lesions for 3-4 days can control pain. - Continue to feed as usual. - Instruct caretaker to wash hands before handling baby. - Consider stopping antibiotics if they are being used for any other infection. - Check with mother about any vaginal discharge. - If mother has an infection, treat her also.

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TABLE 11.1 COMMON PROBLEMS OF NEWBORNS

Problems	How to recognize them	Health Technician's activities
Napkin rash Napkin rash is a common condition in newborns and infants who wear napkins. The rash is caused by a combination of heat, sweat, stool, urine and sometimes infections, especially fungal infections.	- Rash is seen in the napkin area only. There are usually patches of red, tender skin. In severe cases ulcers may be present.	- Advise the mother to keep the napkin off the baby as often as possible. Expose the skin to air or sunlight for healing. - Advise mother not to use plastic napkin covers, but to use cotton napkins instead. - Demonstrate the cleaning of the napkin area with soap and water and advise the mother to change the napkin as soon as it is soiled. - Apply gentian violet to affected area. - Apply Mycostatin ointment to affected areas if rash does not clear with washing and air drying.

The following section will deal with those problems of infants and children which occur commonly and are easy and simple to solve or manage if detected early. However, if these common problems are not detected early, they do not remain simple. Instead they not only become complicated and difficult to manage, but may result in permanent damage or even death of the child. These common problems are:

- Malnutrition
- Diarrhoea
- Respiratory infections
- Communicable diseases
- Bed wetting
- Napkin rash
- Pica

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11.2 MALNUTRITION

Malnutrition is a condition which results from not getting an adequate amount or the right type of food. If a child continues to eat an unbalanced diet over a period of days, weeks or months, (s)he will develop malnutrition. This condition is easy to correct early on but gets more difficult to correct over an increasing period of time and can result in death. In Pakistan, 48% of young children were malnourished in a survey conducted in 1985-1987. Therefore, it is important for Health Technicians to routinely evaluate a child's nutritional status in order to detect malnutrition early. This is done by keeping track of weight gain or loss on a growth chart.

There are many causes of malnutrition and Health Technicians must know about them. Then you can identify the cause(s) of the malnutrition in each child and help the family overcome the problem accordingly. The causes of malnutrition are presented below in table form for quick and easy reference. This is followed by another table which outlines the two most severe types of malnutrition and the activities of the Health Technician in overcoming them.

TABLE 11.2 CAUSES OF MALNUTRITION AND THE HEALTH TECHNICIAN'S ROLE

Causes	Role
Lack of knowledge about daily food needs.	- Conduct nutrition classes for expectant mothers (individually or groups) to explain a balanced diet for: . Pregnant women, lactating women. . Newborns, infants and children.
Lack of knowledge of importance of breast-feeding from birth and the trend towards total or partial bottle feeding.	- Discuss with the mother the advantages of breast-feeding, the importance of exclusive feeding during the first 4 months and the disadvantages of bottle feeding.
Stopping breast-feeding due to second pregnancy.	- Make sure the family understands about the amount and type of foods and milk to be given to the child according to his/her age.

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TABLE 11.2 CAUSES OF MALNUTRITION AND THE HEALTH TECHNICIAN'S ROLE

Causes	Role
Delay in introducing additional food.	- Inform all new mothers as to when solid foods should be started. - Be sure to see the mother around 3 months after delivery to remind her about starting the baby on solids between 4-6 months. Discuss that the mother should prepare the foods for the infant.
Multiple births (such as twins).	- Encourage the mother to eat and drink more nutritious foods. - If mother's milk is not enough, consider other alternatives to meet the needs of the baby.
Large family with low income.	- Refer to World Food Programme's supplemental feeding programme during pregnancy, lactation and early childhood. - Consider other community resources. - Suggest the raising of chickens, ducks, goats, etc, or the growing of a variety of vegetables on their land. - Refer to family planning.
Infectious diseases such as diarrhoea, worms and other conditions.	- Continue normal feeding and refer the child for diagnosis and treatment. - Follow up child's progress. - Discuss proper sanitation in preparation and storage of food.
Early stoppage of breast-milk due to death of mother.	- Consider feeding by another lactating woman. - Provide animal milk.

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TABLE 11.3 TWO SEVERE TYPES OF MALNUTRITION AND THE HEALTH TECHNICIAN'S ACTIVITIES

Problem	How to recognize it	Health Technician's activities
Malnutrition is a condition which results from not getting enough food or the right type of food. There are two types of malnutrition of a severe nature: marasmus and kwashiorkor.	- Child is not growing as expected.	- Weigh all children regularly; plot weights on a growth chart and note the direction of the growth curve. - Children with malnutrition must be identified early.
Marasmus is the result of general caloric and protein malnutrition. It is usually a sign of physical and emotional deprivation and therefore, may occur in unwanted daughters.	- Is common in children 6-18 months of age. - Child is thin and underweight. - Gradual wasting of body tissues especially muscles and subcutaneous fat resulting in loose skin folds over arms, legs and buttocks. - Face is wrinkled like an old man. - Child looks irritable.	- Encourage family to increase both calorie and protein intake according to age. - Have family members play with the child and hold the child frequently in affectionate ways. - Refer to Medical Officer for diagnosis of other possible reasons for malnutrition. - Refer to World Food Programme for supplemental nutrition. - Protect child from anyone who has an infectious disease. - Teach mothers about preparation of supplemental food to breast-feeding according to the child's age.

Fig. 11.1 Child with marasmus.

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TABLE 11.3 TWO SEVERE TYPES OF MALNUTRITION AND THE HEALTH TECHNICIAN'S ACTIVITIES

Problem	How to recognize it	Health Technician's activities
		- Weigh child regularly and record weight on a growth chart; point out progress to mother.
Kwashiorkor is a condition of malnutrition resulting from an inadequate supply of protein in the diet. This condition occurs in children between 12-48 months of age, especially after the birth of another sibling, after an infection or after being weaned from the breast and put on a starchy diet.	- Child may not be thin. - Skin is scaly and dry. - Hair is thin, dry, coarse, dull and changes in hair colour may also occur. - Swelling of the body, face, arms, abdomen, legs and feet may occur. - Child may have frequent diarrhoea. - Child is weak and withdrawn and may not show interest in food.	- Get a history of child's growth and development. - Do a diet recall for 4 days on the child. - Weigh the child and record weight on a growth chart. - Instruct the family to provide a diet high in protein, vitamins and minerals from locally available food. - If the condition is severe, refer to Medical Officer. - Refer to supplemental food programme if necessary. - Protect the child from infection. - For each of the identified malnourished children, the Health Technician must follow-up periodically, in terms of days or weeks, to make sure that the child is improving.

Fig. 11.2 Child with kwashiorkor.

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11.3 DIARRHOEAL DISEASE CONTROL

What is diarrhoea? Diarrhoea is when stools contain more water than normal. The stools becomes loose and watery. They may also contain blood, in which case the diarrhoea is called dysentery. Babies who are breast-fed often have stools that are soft. This is not diarrhoea. Mothers usually know when their children have diarrhoea. Usually diarrhoea is a self-limiting disease and stops in a few days. The treatment of diarrhoea lasting more than 14 days is more complicated and should be referred to a doctor. Diarrhoea is common in children especially those between 6 months and 2 years of age. Diarrhoea is the main cause of deaths in Pakistan children, killing 300,000 children each year. These deaths can be prevented with early correct treatment. The correct early treatment of diarrhoea is Oral Rehydration Therapy (ORT) with extra fluids and food.

Why is diarrhoea dangerous? The 2 main dangers of diarrhoea are DEHYDRATION and MALNUTRITION.

DEHYDRATION. What is DEHYDRATION? Most diarrhoea-related deaths result from the body loosing a large amount of water and salt in the stools. The more diarrhoea stools a person passes, the more water and salt is lost. This loss is called DEHYDRATION.

The human body is like a plant and requires enough water to make it function properly. As Surat XII (Anbiyaa) Verse 30 says "We made from water every living thing." If the lost water in the diarrhoea stools is not replaced quickly by giving fluids, the person becomes very sick from dehydration and may even die, just like a plant dying from lack of water.

To prevent this dehydration a person with diarrhoea should be treated early with EXTRA FLUIDS. Good fluids for treating diarrhoea include breast-milk, rice water, lassi, plain water, ORS, and homemade salt and sugar solution. These fluids will not stop the diarrhoea, but they will help prevent and treat the dangerous dehydration. They are therefore life saving. Whichever fluid is available in the home and familiar to the parents should be used. Oral Rehydration Salts (ORS) packets are good because they work quickly to prevent and treat dehydration. Dehydration develops faster in younger children, and those with a fever or vomiting. The World Health Organization (WHO) has divided dehydration into three degrees, NONE, MILD TO MODERATE, and SEVERE. (See Table 11.5)

MALNUTRITION. Diarrhoea is more dangerous in people with MALNUTRITION. Diarrhoea can cause malnutrition and can make existing malnutrition worse because:

- Nutrients are lost from the body in the diarrhoea stools.
- A person with diarrhoea may not be hungry and therefore will not be given enough food.
- The traditional custom is to withhold foods from a person during diarrhoea and for some days after the diarrhoea stops.

To reduce malnutrition from diarrhoea, soft FOODS should be given to people with diarrhoea as soon as they can eat. Good foods for treating diarrhoea include breast-milk, kichri, yoghurt and mashed banana or any food the child will take. Children with severe malnutrition should be referred to the doctor.

What is the role of drugs in diarrhoea treatment? Drugs are not required in the majority of diarrhoea cases. All acute watery diarrhoea cases can be successfully treated with FLUIDS and FOOD. ORS packets and home fluids are a cheap, highly effective therapy and will prevent the majority of deaths if used early enough and in sufficient amount. ORS packets contain the correct scientific balance of salts and sugar to treat dehydration. Antibiotic use is limited to the following specific diarrhoea cases:

- Cholera.
- Acute and chronic dysentery.
- Associated systemic infection (eg. pneumonia, ear infection, malaria etc.).

It is now widely known that antibiotics if used in diarrhoea cases, other than those listed above, can be harmful and may even prolong the diarrhoea. Antimotility drugs like opium, Imodium, Loperamide, slow the elimination of toxic substances and can lead to severe drowsiness, bowel obstruction and death. Antiemetics used to stop vomiting, make children very drowsy so that they do not drink or eat enough and become dehydrated. The National Diarrhoea Treatment Policy states that NO antidiarrhoeal, anti-emetic or antispasmodic drugs will be used for diarrhoea in children, especially under 5 years. Many parents will ask you for drugs to stop the diarrhoea. It is important that you take time to explain to them the dangers of giving drugs when they are not required and the importance of giving FLUIDS and soft foods to treat dehydration.

What causes diarrhoea? Diarrhoea is caused by microbes in faeces contaminating water, food, fingers, feeding bottles and soothers (in other words anything that goes into the mouth). Flies also help the spread of diarrhoea. Malnourished children have diarrhoea more often and more severely than well nourished children. This explains why there is more diarrhoea in communities where hygiene is poor, bottle feeding is common and children are malnourished. Diarrhoea can be reduced in the following ways:

- Giving ONLY breast-milk for the first 4-6 months and continuing to breast-feed for 2 years.
- NEVER using feeding bottles or soothers.
- Introducing clean, freshly prepared foods at 4-6 months to prevent malnutrition.
- Washing hands before touching food.
- Giving clean drinking water.
- Disposing of stools carefully either in a latrine or burying them.

There are 4 important life saving functions of a Health Technician in diarrhoea management:

1. **ASSESSMENT.** Assessing the degree of dehydration by physical examination.
2. **REFERRAL.** Referring complicated cases like SEVERE dehydration, diarrhoea for more than 14 days, blood in stool and fever to the doctor.
3. **TREATMENT.** Treating NONE and MILD TO MODERATE dehydration according to treatment chart (Table 11.6)
4. **FOLLOW UP.** Following up diarrhoea cases until full recovery.

1. ASSESSMENT. Assessing the degree of dehydration by physical examination. When a child comes to you with diarrhoea, the first step is to assess the person for signs of dehydration using this assessment chart. A list of questions you should ask and signs to look and feel for are given on the assessment chart (Table 11.5). When you examine a person, note your findings and see into which column on the assessment chart they fall. The 3 columns correspond to the 3 degrees of dehydration, NONE, MILD TO MODERATE, SEVERE.

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TABLE 11.5 HOW TO ASSESS YOUR PATIENT FOR DEHYDRATION DUE TO DIARRHOEA

HOW TO ASSESS DEHYDRATION

EVALUATE CHILD FOR DEGREE OF DEHYDRATION
ACCORDING TO TABLE BELOW

	DEGREE OF DEHYDRATION		
	NONE (no visible sign of dehydration)	MILD TO MODERATE	SEVERE
ASK			
Diarrhoea	Less than 4 liquid stools per day	4 to 10 liquid stools per day	More than 10 liquid stools per day
Thirst	Normal	Greater than normal	Unable to drink
Vomiting	None or a small amount	Some	Very frequent
Urine	Normal	Small amount, dark	No urine for 6 hours
LOOK			
Condition	Well and alert	Unwell, sleepy or irritable	Very sleepy, unconcious, limp, having convulsions
Eyes	Normal	Sunken	Dry and sunken
Tears	Present	Absent	Absent
Mouth and Tongue	Wet	Dry	Very dry
Breathing	Normal	Faster and normal	Very fast and very deep
FEEL			
Skin	Abdominal pinch goes back immediately	A pinch goes back slowly in 1-2 seconds	A pinch goes back very slowly in 2-3 seconds or longer
Pulse	Normal	Faster than normal (more than 110/min)	Very fast, weak, or you cannot feel in (more than 140/min.)
Fontanelle (in infants)	Normal	Sunken	Very sunken
DECIDE	The patient has NO signs of dehydration.	If the patient has two or more of these signs, he has MILD TO MODERATE dehydration.	If the patient has two or more of these signs, he has SEVERE dehydration.

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As you examine the child teach the parents these signs of dehydration.

- Look at the column on the right side for SEVERE dehydration. If 2 or more signs are present, the person has SEVERE dehydration. If 1 or no signs are present then look at the column on the left for MILD TO MODERATE dehydration.
- If 1 or no signs are present in the MILD TO MODERATE column, the person has NONE dehydration.

2. REFERRAL TO DOCTOR. ALWAYS refer the person with diarrhoea to the doctor if you find ANY of the following:

- SEVERE dehydration (if person can drink, give ORS on the way to doctor).
- Blood in stool (an antibiotic like Cotrimoxazole is required).
- Fever (the doctor must look for systemic infection).
- Diarrhoea for more than 14 days.
- Severe malnutrition (grade 2 or 3 on growth chart).

3. TREATMENT. Use Table 11.6 for deciding which treatment plan to use for treatment of diarrhoea.

TABLE 11.6 STANDARD TREATMENT FOR ALL LOOSE OR WATERY STOOLS FOR ALL CHILDREN

STANDARD TREATMENT FOR ALL LOOSE OR WATERY STOOLS
(DIARRHOEA/DYSENTERY) FOR ALL CHILDREN

TREAT CHILD ACCORDING TO THE TABLE BELOW

DEGREE OF DEHYDRATION	AGE OF CHILD		
	UP TO 4-6 MONTHS (exclusively breasfed)	MORE THAN 4-6 MONTHS (partially breasfed)	
NONE (No visible sign dehydration)	Breastfeed more often	Breastfeed more often. Give more fluids such as rice water, lassi and plain water. Continue soft foods such khichri, yogurt and mashed banana.	
MILD TO MODERATE	0-11 MONTHS First 4-6 hours ORS 200-600 ml or 1/4-1/2 seer	1-4 YEARS First 4-6 hours ORS 600-800 ml or 1/2-3/4 seer	5 YEARS & OVER First 4-6 hours ORS 1 to 2 litres or 1 to 2 seers
	10-20 ml ORS per kilogram body weight per hour		
SEVERE	Refer immediately to BHU/RHC	Refer immediately to BHU/RHC	Refer immediately to BHU/RHC
MAINTENANCE	1/2 large cup (100 ml) ORS or other fluids per stool	1 large cup (200 ml) ORS or other fluids per stool	2 large cups ORS or other fluids per stool
	CONTINUING FEEDING THE CHILD OFTEN IF CHILD WANTS MORE WATER GIVE IT.		

- o Observe parent prepare and feed ORS according to the above table.
- o If child vomits, wait 10 minutes and then give small amounts of ORS slowly.
- o After 4-6 hours, reassess the child using the assessment chart, then choose the suitable treatment.
- o For Bloody Stools: Refer to BHU/RHC.

EXPLAIN TO PARENT AND ENSURE THAT PARENT UNDERSTANDS THAT:

- o Child should continue to breastfeed often.
- o Child should drink more liquids than usual.
- o Child should continue eating soft foods like yogurt, khichri, mashed banana, etc. 5 to 7 times a day.
- o After diarrhoea stops, child should eat one extra meal each day for two weeks.

FOLLOW-UP THE CHILD UNTIL RECOVERY, OR REFER THE CHILD TO BHU/RHC IF THE CHILD DOES NOT IMPROVE OR DIARRHOEA LASTS MORE THAN 2-3 DAYS.

FOLLOW THESE STEPS FOR THE TREATMENT OF A CHILD WITH NO SIGNS OF DEHYDRATION (NONE).

Step-1: Explain to parent the 4 rules for treating diarrhoea at home:

1. Extra Fluids.
2. Food.
3. When to bring child to health worker.
4. How to prevent diarrhoea.

DO NOT GIVE ANTIDIARRHOEAL DRUGS. These are dangerous and contraindicated by WHO.

Extra Fluids. Parent should give child more fluids than usual to prevent dehydration. Suitable fluids include:

- Home fluids like rice water, lassi, plain water and ORS (ask parents which home fluids they usually give to a child with diarrhoea and then advise them on which of these is best to use.)
- Breast-feed more often or give extra milk feeds. DO NOT dilute the milk. Mix milk with suji, dall or rice instead.
- Give fluids with a cup and spoon. DO NOT use feeding bottles.

Food. Parent should give food to a child 4-6 months of age and onwards:

- Give freshly prepared soft foods. Recommended foods are kichri, yoghurt and mashed banana. Add a few drops of oil to the food.
- Give fresh fruit juices or bananas to provide potassium.
- Offer food 6 times a day or more often for very young children.
- Encourage the child to eat as much as he or she wants.
- Cook and mash or grind food well so it will be easier to digest.
- After the diarrhoea stops, give one meal each day for 2 weeks or until child has gained normal weight as shown on a growth chart. Bring child back to check the weight.

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When to bring child to health worker. Parent should take child to health worker if s(he) has any one of the following signs:

- Passes many stools.
- Is week and irritable.
- Is very thirsty.
- Has sunken eyes.

These signs suggest your child is dehydrated

- Has fever.
- Has blood in stool.
- Does not eat or drink normally.
- Seems not to be getting better.
- Diarrhoea lasts more than 2-3 days.

Step-2: Teach parent how to use ORS solution at home:

Show parent how to mix and give ORS. Show parent how much to give for a child. (An adult who has diarrhoea should drink as much as they want.) Tell parent if the child vomits, wait 10 minutes. Then continue giving the solution but more slowly - a spoonful every 2-3 minutes. Observe parent prepare and give ORS. Give parent 2 ORS packets to take home to continue treatment.

0-11 months	1-4 months	5 years & over
1/2 large cup (100 ml) ORS or other fluids per stool.	1 large cup(200 ml) ORS of other fluids per stool	2 large cups ORS other fluids per stool.

Step-3: Explain to parent how to prevent diarrhoea by:

- Giving only breast-milk for the first 4-6 months and continuing to breast-feed for at least 2 years.
- Washing hands before preparing food or feeding the child.
- Quickly disposing of the stool of a young child by putting it into a latrine or burying it.

Step-4: Ask parent to repeat all this advice.

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FOLLOW THESE STEPS FOR THE TREATMENT OF A CHILD WITH MILD-MODERATE DEHYDRATION:

Step-1: If the child shows signs of MILD TO MODERATE dehydration, he should stay in the health facility and receive enough ORS to rehydrate him. Calculate amount of ORS solution to give in the first 4-6 hours. Use the patient's age to calculate the amount of ORS, only when you do not know the weight.

0-11 months	1-4 months	5 years & over
First 4-6 hours ORS 200-600 ml or 1/4-1/2 seer	First 4-6 hours ORS 600-800 ml or 1/2-3/4 seer.	First 4-6 hours ORS 1 to 2 liters or 1 to 2 seers.
10-20 ml ORS per kilogram body weight per hour.		

Step-2: Teach parents how to mix and give ORS. Show parents how to mix ORS. Demonstrate the following:

- Wash hands with soap and water.
- Pour all the powder from 1 ORS packet into a clean container.
- Pour 1 seer (1 liter) of clean water into the container.
- Mix well with a clean spoon until powder is completely dissolved.
- Keep container covered.

Ask parents to repeat this demonstration to check they understand.

Show parent how to give ORS.

- Give with a cup and spoon. NEVER use a feeding bottle.
- Give a spoonful every 1-2 minutes. If the child wants more ORS then give more. Remember to give small amounts and at a steady pace.
- If the child vomits, wait 10 minutes and then continue giving ORS, but more slowly.
- If the eyelids become puffy, stop ORS and give plain water. If diarrhoea continues, use ORS again when the puffiness is gone. Check from time to time to see if parent has any problems following these instructions.

Step-3: Regularly reassess the child for signs of dehydration, using the assessment chart.

- If the child still has signs of dehydration, continue giving ORS.
- Breast-feeding should be continued.
- Soft foods, like kichri, should be offered as soon as child can eat.
- If the parent must leave any time before child is fully rehydrated, show how much ORS to give to finish the 4-6 hour treatment at home.
- When the child no longer has signs of dehydration he can go home.

Step-4: Before parents leave check they know the 4 rules for home treatment.

1. Extra fluids.
2. Food.
3. When to bring child to health worker.
4. How to prevent diarrhoea.

Give parent 2 ORS packets to take home to continue treatment.

Step-5: Ask parent to repeat all this advice.

4. FOLLOW UP DIARRHOEA CASES UNTIL FULL RECOVERY. You must follow up diarrhoea cases until the child has regained all the lost weight and weighs what is normal for his/her age as judged by the growth chart. Parents should be advised to give an extra meal each day for 2 weeks after the diarrhoea stops. By doing this follow up you will prevent malnutrition from developing.

This treatment of diarrhoea is summarized in the Pakistan National Diarrhoea Treatment Policy shown on the next page. Make sure this policy is followed in your health facility.

TABLE 11.7 PAKISTAN'S NATIONAL DIARRHOEA TREATMENT POLICY

ORAL REHYDRATION THERAPY(ORT): ORS + BREASTMILK + FOOD

- All diarrhoea cases will drink ORS (or other fluid) prior to leaving.
- All parents will be taught how to mix ORS.
- All parents will be taught how to give ORS (how much, how often, how long). ORS will be given using a cup and spoon or dropper.
- Special care/attention will be given to neonates, especially low birth weight, to avoid excessive use of ORS. Breastfeeding will be encouraged and assisted where needed.
- All parents will be given 1 to 2 ORS packets for home use.

BREASTFEEDING

- Breastfeeding will be encouraged for all infants and continued even during rehydration.

CONTINUED FEEDING

- Feeding appropriate for age will be encouraged to start no later than 4 hours after start of rehydration.
- Milk feeds will not be diluted but may be mixed with cereals and can be offered during maintenance.
- No feeding bottles will be used.

DRUGS

- No anti diarrhoeal, antiemetic, antispasmodic drugs will be used or prescribed for diarrhoea in children, especially under 5 years.
- Antibiotics will be used only for specified indications to be recorded on the patient record whenever used. This will generally be reserved for bloody dysentery or other systemic infections. Only a single antibiotic will be prescribed.

IV THERAPY

- I.V. will be used only for severe dehydration as demonstrated by objective findings recorded on the patient record form.
- I.V. will be used only for rehydration and stopped within 6 hours of initiation.
- Ringer's lactate is preferred but 0.9% Saline with 5% Dextrose is an acceptable alternative. Glucose/Dextrose solution alone will not be used.
- Patients on I.V. will be started on ORS as soon as they can drink.

IMMUNIZATION

- Ensure that no child leaves before its immunization is up-to-date (especially measles). Similarly, the mother should be given TT immunization.

HYGIENE

- Staff will demonstrate commitment to importance of personal hygiene by washing their hands after handling each patient.

PLEASE ENSURE THAT

- Parents leave only after they can explain in their own words the following:

1. **The Need for the Child to Drink More Fluids than Usual:**
   - Mix ORS correctly using local measures.
   - Use ORS correctly offering 1/2 to 1 tea cup for each stool or vomit and more if child desires.
2. **The Need for the Child to Continue Eating:**
   - Breastfeed, and if 6 months or older, state the food and the approximate amount of food to feed child.
3. **When to Bring the Child Back:**
   - Explain signs of dehydration and indications to bring child back.
4. **How to Prevent Diarrhoea:**
   - Explain the importance of handwashing, breastfeeding and danger of bottle feeding.

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What the Health Technician should do when ORS packets are not available. The Health Technician must be instructed on what to do if the supply of ORS packets is finished. The routine procedure for ordering more, and how to obtain emergency supplies quickly, should be understood.

If packets of ORS are not available, oral rehydration solution can be made with the salts and sugars shown in the following table. (Note: if you measure the salts and sugars in bulk, it is very important to mix them well before dividing them into smaller amounts.)

TABLE 11.6 MAKING ORS

Salts and sugars	Amount required for 1 litre of solution*	Note
Sodium chloride (common salt)	3.5 grams	You cannot make rehydration solution without this.
Glucose anhydrous or glucose monohydrate or sucrose (common sugar)	20 grams 22 grams 40 grams	You cannot make rehydration solution without one of these.
Trisodium citrate dihydrate or Sodium bicarbonate and Potassium chloride	2.9 grams 2.5 grams 1.5 grams	You can make rehydration solution without these, but it is much better if you have one or more of them.

* The sugar and salts (in the amounts shown) should be completely dissolved in one litre of clean drinking water. (Boiled water, cooled before use, is best.)

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The salts and sugars can be measured by any of several methods. Scales may be available, for example, in a local pharmacy. Small volume measures (such as 5 or 10 ml syringes) can be used to give approximate weights as follows:

3 ml	=	approx. 3.5 g of sodium chloride.
3 ml	=	approx. 2.9 g of trisodium citrate dihydrate.
3 ml	=	approx. 2.5 g of sodium bicarbonate.
1.5 ml	=	approx. 1.5 g of potassium chloride.
30 ml	=	approx. 20.0 g of glucose.
50 ml	=	approx. 40.0 g of sucrose.

Note: The density of an ingredient can vary substantially depending on how it is made and stored. Therefore, the above volume measurements will not always be accurate.

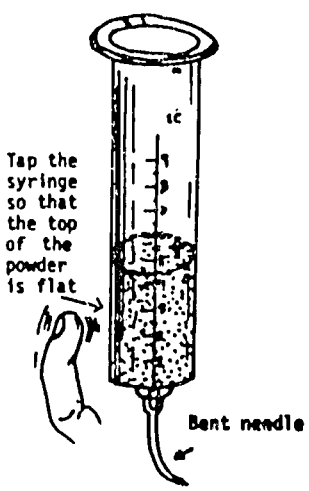

Fig. 11.7 Measuring with a syringe.

Fig. 11.8 Measuring spoons.

Rehydration solutions that contain sugar and three salts (as described above) are best. ORS packets are most convenient for making rehydration solutions because the sugar and salts are already measured. Other solutions, for example, those made with common salt and sugar only, should be used **ONLY** if ORS packets or the recommended sugar and salts are not available.

11.4 RESPIRATORY INFECTIONS

Respiratory infections are common in children, especially those who are malnourished. These infections can easily increase the severity of the malnutrition. An upper respiratory tract infection of even as little as two days duration can result in reduced intake in a malnourished child so that the child may have considerable difficulty in making up for this period of poor intake over the succeeding days. Similarly, a baby with chronic nasal obstruction may have difficulty in breast-feeding, resulting in poor growth. The mother needs to be taught that during respiratory infections the child intake is to be maintained.

Seasonal occurrence of respiratory infections. Respiratory infections are more common in winter months. This may be due to the fact that during this season people remain indoors, and in overcrowded communities droplet infections occur easily. Droplet infections are those that spread through minute drops during sneezing and coughing. Colds are common to all ages, but bronchitis and pneumonia are more frequently seen in young children and may prove fatal if not detected and treated early.

Table 11.8 lists common respiratory infections and the related activities of the Health Technician.

TABLE 11.8 COMMON RESPIRATORY TRACT INFECTIONS AND HEALTH TECHNICIAN'S ACTIVITIES

Respiratory infection	Health Technician's activities
1. COLDS	
The main feature of a cold is nasal discharge, watery, mucoid or purulent. In more severe cases there is malaise, moderate fever and loss of appetite. An infant with a cold may need treatment if there is difficulty in breast-feeding.	- Advise mother to keep the child's chest covered. - Reassure mother that the cold will clear gradually. - Encourage mother to give child plenty of fluid. - Advise that sick child gets rest during daytime. - Advise mother to have good ventilation in the room. - If fever is continuous and and does not diminish, consult Medical Officer.

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TABLE 11.8 COMMON RESPIRATORY TRACT INFECTIONS AND HEALTH TECHNICIAN'S ACTIVITIES

Respiratory infection	Health Technician's activities
2. BRONCHITIS	
This is a febrile illness of moderate constitutional disturbances, cough, and in younger children, wheezing. The condition is recognized by the presence of rhonchi and rales in the lungs upon listening with the stethoscope.	In addition to the above points: - Advise soft, liquid or semi-solid diet. - If condition does not improve within 48 hours, refer to RHC. - A penicillin preparation needs to be started immediately. - Paracetamol may be given for fever according to age.
3. PNEUMONIA	
Pneumonia is an acute respiratory infection of the lungs with fever, cough, pallor or cyanosis, restlessness and rapid respiration, flared nares and grunting.	Same as above.
4. TONSILLITIS AND PHARYNGITIS (Sore throat)	
These are illnesses of the throat and may or may not be accompanied by fever. They are recognized by a throat examination. There is redness of the throat with or without yellow pus.	- Advise warm saline drinks such as soup. - Encourage increased fluid intake. - Encourage rest. - If fever is excessive (which is common) it must be reduced by wetting the skin.

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TABLE 11.8 COMMON RESPIRATORY TRACT INFECTIONS AND HEALTH TECHNICIAN'S ACTIVITIES

Respiratory infection	Health Technician's activities
5. EAR INFECTION	
An illness with fever, malaise and ear pain. There may be discharge of pus from the ear.	- Ampicillin by drops if there is some discharge. - Increased fluid intake. - Allow rest. - Check on temperature, pulse and respiration and note rate and type. - Pay particular attention to nutrition. - Protect the child from other sick persons. - Spend time with the child to calm him. - Refer to or consult with MO.

11.5 INFECTIOUS DISEASES OF CHILDREN

The common infectious diseases of childhood are whooping cough, diphtheria, polio, tetanus and measles. Tetanus has been described under newborn tetanus. This section deals with whooping cough, diphtheria, polio and measles and the role of the Health Technician in each of these conditions. Chicken pox and mumps, which are also common infections of children, have been added to this section.

TABLE 11.8 CHILDHOOD INFECTIOUS DISEASES AND HEALTH TECHNICIAN'S ACTIVITIES

Infectious disease	Health Technician's activities
WHOOPING COUGH	
Whooping cough (pertussis) is an infection caused by the pertussis bacteria. It causes inflammation of the mucous membranes in the nose, throat, trachea and bronchi. A thick mucous is formed. When the	The presence of a case of whooping cough should enable Health Technicians to motivate the community to seek immunization (DPT). See immunization schedule.

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TABLE 11.8 CHILDHOOD INFECTIOUS DISEASES AND HEALTH TECHNICIAN'S ACTIVITIES

Infectious disease	Health Technician's activities
cough begins, the infant is in distress and the cough ends in a whoop, often followed by vomiting. The cough comes in spasms. The infant becomes blue while coughing. Sometimes choking leads to suffocation. The spasmodic cough ending in a whoop sound followed by vomiting and the infant's distress especially during nights enables you to identify the disease.	- Advise mother to have the baby breathe vapors from a kettle of hot water until secretions begin to loosen. - Advise mother to turn baby upside down and gently pat the back. - Breast-feed baby as frequently as baby desires. If baby vomits, feed again. - Consult MO regarding medication. - Advise immunization of all other children.
DIPHTHERIA	
Diphtheria is a serious infection usually affecting the throat and/or nose. It is caused by a bacteria which produces a strong toxin affecting the heart muscle early in the disease. The disease is spread by direct person-to-person contact. The "cardinal sign" of diphtheria is a grey coloured membrane covering the mucousa of the throat and/or nose. Bleeding occurs when this membrane is removed. The early onset is similar to any throat infection. However, the patient becomes very ill much quicker. This is due to the toxin.	- Refer the case immediately to the MO because it can damage the heart and kidney if not treated promptly. - Treatment in the hospital may be necessary rather than at home. Refer the child to a paediatric specialist if one is available. - Diphtheria is easily prevented by the routine injections of DPT vaccine. Advise immunization of all infants and children. - All contacts should be vaccinated and watched for early signs of the disease.

TABLE 11.8 CHILDHOOD INFECTIOUS DISEASES AND HEALTH TECHNICIAN'S ACTIVITIES

Infectious disease	Health Technician's activities
The pulse becomes very fast and weak due to the toxin's effect on the heart. Weakness and pallor are common. Breathing may be difficult, especially in younger children, due to blockage of the airway by the thick grey membrane. In severe cases the patient becomes drowsy and may fall into coma.	
POLIO	
Polio is due to an infection by the polio virus. It is seen throughout the world but polio is rare where polio immunization is given routinely to all children. It is usually spread by the faecal-oral route but can be spread by coughing. The most infective state lasts about two weeks following the beginning of symptoms. The disease is most common in children under five years of age but may affect older children and adults.	- Refer the case to the MO. - Notify the health authorities of all cases of polio so that area-wide immunization can be carried out. This will prevent many new cases from occurring. Polio is another disease which can be entirely prevented if you make certain that all children in your area come for their routine vaccination.

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TABLE 11.8 CHILDHOOD INFECTIOUS DISEASES AND HEALTH TECHNICIAN'S ACTIVITIES

Infectious disease	Health Technician's activities
The disease can be divided into four phases. The disease may stop at any phase:	
1. Early phase of fever, cough, mild gastroenteritis and generalized malaise lasting for a few days. Most cases stop at this phase.	- Keep the room well ventilated.
2. In the preparalytic phase, the fever returns and is accompanied by headache, muscle pains, stiff neck and vomiting.	- Discourage massaging of affected parts in all phases except in the late phase.
3. One or two days after the headache and stiff neck begins, some children will develop paralysis of one or more extremities (arms and legs). This is called the paralytic phase. The affected extremities will be tender. The paralysis is flaccid, which means that the extremity is "floppy" when you pick it up. Some children also develop paralysis of the respiratory muscles.	- Provide necessary care according to child's condition. - All cases must be referred to the hospital as early as possible to stop the development of the next phase.
4. During the late phase, all children will show some recovery, from total paralysis of one or more arms or legs to mild weakness or limp.	

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TABLE 11.8 CHILDHOOD INFECTIOUS DISEASES AND HEALTH TECHNICIAN'S ACTIVITIES

Infectious disease	Health Technician's activities
MEASLES	
Measles is caused by a virus. It is preventable by vaccination. This is a common and simple condition but when complications develop the condition may become dangerous. In the initial stage it is recognized by symptoms of a cold, redness of the eyes, runny nose, the appearance of small greyish spots inside the mouth and a high fever lasting for 3 to 4 days. After this period a rash appears and the fever subsides.	- Advise mother to feed the baby with food and fluids. - Reduce the light in the room by putting sheets against the windows. - Consult the MO and watch for complications. - Advise immunization for all infants. - Make child comfortable so that it is possible to rest.
CHICKEN POX	
Chicken pox is caused by a virus and is very contagious. It is recognized by a skin rash over the whole body, especially on the trunk, which is very itchy. Several stages of the rash can be seen at the same time, from red spots to blisters and ulcers with scales. The rash is profuse over the chest and abdomen. Healing occurs in about 10 days.	- Calamine lotion may be applied to relieve itching. - If there is fever, ad-administer paracetamol or whatever is available to bring the fever down. - Consult the MO. - Continue to give the normal diet with increased fluids.

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TABLE 11.8 CHILDHOOD INFECTIOUS DISEASES AND HEALTH TECHNICIAN'S ACTIVITIES

Infectious disease	Health Technician's activities
MUMPS	
Mumps is an infection caused by a virus which usually affects the parotid glands (located at the angle of the jaw). Swelling and tenderness are seen at the angle of the jaw. Usually the angle can no longer be felt because of the swelling. Men with mumps may develop tenderness and swelling of the testicles which may occasionally lead to sterility. Females may develop tenderness and swelling of the breasts.	- Advise rest. Increase the fluids. - Consult the MO if symptoms are disturbing eating and sleeping patterns.

11.6 OTHER COMMON PROBLEMS OF CHILDREN

The problems of bedwetting and pica are described below along with the related activities of the Health Technician.

TABLE 11.9 OTHER COMMON PROBLEMS OF CHILDREN

Problem	How to recognize it	Health Technician's activities
BEDWETTING		
This is a condition in which a child over 5 years of age cannot control the passing of urine. Usually	The parents and grandparents bring this to your attention.	- Discuss with the mother possible causes and what she has done to encourage the child to stop. - Advise mother not to punish the child.

TABLE 11.9 OTHER COMMON PROBLEMS OF CHILDREN

Problem	How to recognize it	Health Technician's activities
the child is able to control his urine in the day but not at night.		- Suggest limiting fluids late in the evening, having child go to the bathroom before sleeping. - Refer to MO to rule out a physical condition.
PICA		
Pica is the term for eating undigestible things: dirt, plaster and paint. It occurs most often in the first 4 years of life.	Child eats unusual undigestible things.	- Explain diet supplement to parent. - Identify and treat parasites, especially roundworms. - Advise mother to reward child for not eating dirt. Refer to hospital for Medical Officer to evaluate if the problem persists without improvement.

11.7 OTHER SUGGESTIONS FOR THE TREATMENT OF MALNUTRITION, DEHYDRATION AND DIARRHOEA

How to determine if a child is undernourished. The upper arm has bone, muscles and fat. When babies are about one year of age, they have quite a lot of fat under the skin of their arms. When they are five years old, there is much less fat and more muscle. The distance around the upper arm remains almost the same between the ages of one and five years. If a child is undernourished, this distance is reduced and the arm becomes thin. This is due to a reduction in muscles and fat. By placing a special measuring strip around the upper arm, one can find out whether a child between the ages of one and five is undernourished or not.

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This measuring strip is called a tri-coloured arm strip and looks like this:

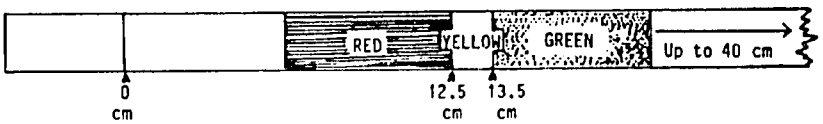

Fig. 11.5 Tri-coloured arm strip.

You can make one from a string or a strip of material that does not stretch, being careful that the markings are accurate.

Put the strip around the mid-upper arm of the child and see which colour is touched by the 0 cm end of the strip.

- If the green part is touched, the child is well-nourished.
- If the yellow part is touched the child is moderately under-nourished.
- If the red part is touched, the child is severely undernourished.

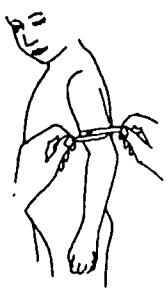

Fig. 11.6 Measuring the arm.

This method of measuring the arm is useful because the Health Technician can identify undernutrition in a child without using a scale or knowing the child's age. However, since it only shows large changes in a child's nutrition, it is not suitable for determining whether the child is improving or becoming worse. To monitor improvement the weight must be taken.

GLOSSARY

Apnea: Cessation of breathing.

Asphyxia: Interference with breathing, caused by lack of air in the lungs.

Auscultation: Listening to sounds within the body with a stethoscope.

Cardinal: Essential.

Cerebral Palsy: Paralysis of the limbs due to a disease of the nervous system.

Conjunctivitis: Inflammation of the interior of the eyelids.

Cyanosis: Condition in which the person becomes blue due to lack of oxygen.

Dehydration: Excessive loss of fluid from the body.

Deworming: Treatment procedure by which parasitic worms are expelled from the body through the stool.

Distended: Expanded.

Fungus: Disease-producing organisms which are larger than bacteria.

Gastroenteritis: Disease of the digestive system resulting in diarrhoea.

Hypoglycaemia: Condition in which the blood sugar level diminishes below normal, resulting in loss of concentration and weakness. Opposite of diabetes.

Ingredient: Constituent.

Kwashiorkor: A disease resulting from a deficiency of protein.

Malaise: Feeling of illness.

Marasmus: Wasting of the muscles of the body in an infant due to malnutrition.

Mucoid: A substance found in the connective tissue of the body.

Pallor: Pale.

Paralysis: Loss of muscle function.

Parotid gland: These are salivary glands on either side of the lower portion of the cheeks.

Pigmentation: Colouration of the skin.

Pulsate: Expand and contract rythmically; throb.

Purulent: Containing pus.

Pica: Craving for substance not fit for food.

Rales: An abnormal sound heard in the chest with the stethoscope due to secretions of fluid.

Septicaemia: An infection of a very severe nature, spread through the bloodstream.

Thrush: Fungus infection of the mouth.

Toxin: A poisonous substance produced by bacteria.

Trauma: An injury or wound.

Ulcer: An open sore or lesion of the skin or mucous membranes.

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SUGGESTED LEARNING ACTIVITIES

Describe and manage the problems common to newborns and infants and children.

REVIEW QUESTIONS

1. Describe the management of a baby with low birth weight.
2. How would you prevent newborn tetanus before child-birth?
3. Describe the management of a baby with conjunctivitis.
4. Describe the immediate care for a baby with septicaemia.
5. What action would you take when a baby shows symptoms of:

   - Newborn hypoglycaemia (low blood sugar).
   - Cerebral birth injury (brain damage).

6. What is thrush and what action would you take as a Health Technician if a mother brings you a baby with thrush?
7. Describe the two types of severe malnutrition in infants and children. What action would you take if a mother brings an infant with signs of malnutrition?
8. Describe the causes of malnutrition and how it can be prevented.
9. Explain the relationship between diarrhoea and dehydration.
10. Why is diarrhoea dangerous?
11. Describe the causes of diarrhoea.
12. What are the levels of dehydration? How do you recognize them?
13. Describe the symptoms of:

    - None dehydration.
    - Mild-to-Moderate dehydration.
    - Severe dehydration.

14. Describe the treatment of dehydration.
15. What is ORS? How is ORS prepared?
16. What advice would you give to a mother on preparing ORS and giving it to the child?
17. How should a cold be recognized in an infant? What management would you advise for an infant who is suffering from a cold?
18. What is bronchitis? How is it identified and what is its treatment?

19. What is pneumonia and how is it recognized? Describe its management.
20. Describe the procedure for recognizing tonsillitis and pharyngitis and describe their management.
21. How is an ear infection managed?
22. How would you recognize whooping cough in an infant?
23. What advice would you give to the mother whose infant is suffering from whooping cough?
24. What is diphtheria? What measures are available for the prevention of diphtheria?
25. What action would you take if a child is suspected of having diphtheria?
26. What is the preventive measure for polio?
27. What advice would you give to the mother if the infant has measles?
28. How would you identify chicken pox?
29. What is the role of the Health Technician if a case of chicken pox is detected?
30. How would you identify mumps?
31. What advice would you give to the family where there is a case of mumps?
32. What advice would you give to the mother who brings a baby with napkin rash?

LEARNING ACTIVITIES RECORD

Name of student_____

Problem	Newborns	Infants and Children

* Under each appropriate group write down the name of the child and the nature of the problem according to the outline in the chapter.

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EVALUATION FORM

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of Presentation	[ ]	Simple to understand
	[ ]	Difficult to understand
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 12

THE HEALTH TECHNICIAN'S ROLE IN FAMILY PLANNING

Objectives: After completing this chapter you will be able to:

1. Describe the meaning of family planning.
2. Give reasons for the need for family planning services.
3. Describe two major types of family planning services.
4. Describe various methods of family planning.
5. Describe the two types of permanent family planning methods.
6. List the side effects of various family planning methods.
7. Describe the Health Technician's role in delivering family planning services.
8. Identify the Health Technician's activities in:
   - History taking.
   - Physical examination.
   - Inserting or removing IUDs.
   - Prescribing contraceptives.
   - Follow-up of cases.
   - Dealing with side effects.
9. State the Health Technician's role in record keeping.

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CHAPTER 12

THE HEALTH TECHNICIAN'S ROLE IN FAMILY PLANNING

Family planning allows a couple to have the number of children they want when they want them. It means planning to have a desired number of children at desired intervals. Family planning does not just mean birth control; it also includes fertility counseling and other counseling for those who have difficulty becoming parents. As Health Technicians, your main responsibility lies in informing couples of the benefits of family planning, the contraceptive techniques available and the services provided so that they are able to make a decision based on this information. This chapter will cover the Health Technician's role in the following areas:

1. The importance of family planning services for the health of the mother, her other children and the world.
2. The indications for family planning.
3. Techniques of child spacing.
4. Side effects of contraceptives.
5. Family planning counseling and follow-up.
6. Clinic management and record keeping.

12.1 THE IMPORTANCE OF FAMILY PLANNING FOR THE HEALTH OF THE MOTHER AND THE FAMILY

In the past, most women had no choice in controlling pregnancy. For young girls marriage was soon followed by pregnancy. This was accepted as a fact of life and resulted in repeated pregnancies which resulted in poor health because:

- There was not enough time for a woman to recover fully between births.
- An additional baby (person) to look after meant more energy and time was required for child care, thus depriving her of needed rest.
- There was an increase in responsibility for the care and management of her family.
- There was the possibility of having to stretch existing family resources, causing the mother to sacrifice essential food and care.

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Repeated and frequent pregnancies are hazardous to the unborn foetus as well as to other children in the family. This is because:

- Repeated and frequent pregnancies may result in miscarriages or abortions.
- The mother will have to stop breast-feeding one child early to feed another, depriving the child of required nutrition.
- The older children, who may still need looking after, have to take care of younger ones because the mother finds it difficult to manage. This caring of children by children may result in injuries and ill health.

Repeated and frequent pregnancies also have negative effects on the father and the rest of the family. This is because:

- A mother is tired from bearing too many children in a short time and her capacity for work is reduced.
- She may get overtired, irritable and neglect her children, husband and the house, resulting in an unhealthy home environment.
- If the family income is limited, it now has to be stretched to meet the needs for food, clothing, shelter, etc. This may create frustration and unhappiness in the family.

From the discussion so far it seems fairly clear that planning a family has the following advantages:

- Improved maternal, child and family health.
- Parents enjoy each child more fully.
- Each child has a better chance of getting proper attention, food and education.
- The husband has fewer worries, so he can share the responsibility of rearing children.
- The husband and wife can enjoy each other. Their sexual life will be without the fear of pregnancy.
- Overcrowding in the home is prevented.
- The family can use its income for education, recreation, a few comforts of life and medical care.

Family planning is based on the fact that we have the ability to control births and limit the family size. The advantages of family planning also extend to the community, the nation and the world at large, because when the size of these populations is also controlled, the impact is felt all over the world.

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Over-population puts a greater demand on our existing resources, creating economic, political, social and health problems. Realizing this, the governments of most countries have developed a National Family Planning Policy and have established National Family Planning Programmes.

Pakistan is also facing the problem of uncontrolled population growth. Between 1901 and 1951, the population of Pakistan doubled, from 16.5 million to 33.7 million. Again in only 22 years time (between 1951 and 1972), its population doubled. The present population is over 11 crores or 110 million.

If the population continues to increase like this, it will bring on epidemics, famine and other undesirable consequences. Therefore, the Government of Pakistan has developed the present population welfare programme to control birth rates through a planned and organized programme.

Until 1960, family planning work was solely dependent on voluntary and non-governmental agencies. But from 1960 to 1965, the government introduced its own family planning services. The current plan (1988 to 1993) is an integral part of the national development effort. In fact, in 1990, the government's health policy specifically incorporated family planning as an important health intervention, recognizing the impact of birth spacing on both infant and maternal health and survival. Health Technicians have a definite role in informing the community about the government's policy and plans.

12.2 INDICATIONS FOR FAMILY PLANNING

There are two major types of family planning services available. The most well known is the service for counseling and prescribing the contraceptive methods utilized to space pregnancies and limit the number of children. The other service is for fertility counseling and other services for those couples who are unable to become parents according to their expectation.

As Health Technicians, you need to be aware of both situations. Pregnancy as well as infertility may cause problems for some families.

Planning the number of children a couple wants when they want is a very personal and individual matter. You, as Health Technicians, need to remember this and respect the decision. Your main role is to provide up-to-date information on what methods are available and how these can be obtained.

All women of child-bearing age should be well informed about family planning methods and services so that they can feel confident in approaching a health and/or family planning worker with their questions or concerns. In this way they will maintain better health and contribute to family welfare. Health Technicians have a big role to play in assisting with maternal/child and family health and welfare. In the following section, fertility services will be discussed first, followed by methods of contraception.

12.3 INFERTILITY AND THE HEALTH TECHNICIAN'S ACTIVITIES

In order to understand conception and contraception, it will be necessary to discuss the menstrual cycle first.

Normal menstrual cycle. As young girls develop and mature, their bodies and systems mature as well. Between the ages of 12 and 15 years, reproductive organs mature and begin to function. One sign of maturity is the start of menses. Menses do not occur in all girls at the same age, but vary from one individual to another. However, once menses start, they occur approximately every month and continue for many years. These years are called the child-bearing age, starting with the onset of menses (12 to 15 years of age or earlier) to the stopping of menses (40 to 50 years of age). The period after the end of menses is called menopause.

The menstrual cycle is also covered in Chapter 6, but will be reviewed here to refresh your memory and to relate it to the topic of family planning. Every month, the following changes occur in a woman of child-bearing age:

- The lining of the uterus prepares itself automatically to receive a fertilized ovum (egg).
- The ovaries release the ovum. This is called ovulation. The ovum then moves through the fallopian tube.

If intercourse takes place, sperm can enter the uterus and fallopian tube and attach to the ovum. The ovum is said to be fertilized when one sperm cell penetrates it. This fertilized ovum then moves down to the uterus and attaches itself to the lining of the uterus and grows, resulting in pregnancy. But if the ovum passes through the tubes into the uterus without becoming fertilized, then the unfertilized ovum and the uterine lining is shed. This causes bleeding from the vagina for three to five days. This monthly cycle of events is called "menstruation" or "menses" or the "monthly" period or cycle. The menstrual cycle is the period (days) between the first day of menstrual flow and the day before the beginning of the next menstrual flow.

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The menstrual cycle varies in length in individual women. The cycle could be 25 days or shorter or 31 days or longer. The average length of a cycle is 28 days. In a woman with a 28 day cycle, ovulation occurs on day 14. A woman is fertile (able to become pregnant) from the time of ovulation to two to three days following ovulation. Ovulation usually takes place two weeks before the start of the next menses. Sperm from a male can live inside a woman for three days. What this means is that an ovum can be fertilized by a sperm which entered the tubes two or three days before or two or three days after ovulation.

As Health Technicians, you need to have women determine the length of their menstrual cycle and help them identify their fertile period and their infertile period (safe period) in relation to their menses and ovulation. Three examples are given below as a guide in helping them to get pregnant or prevent pregnancy.

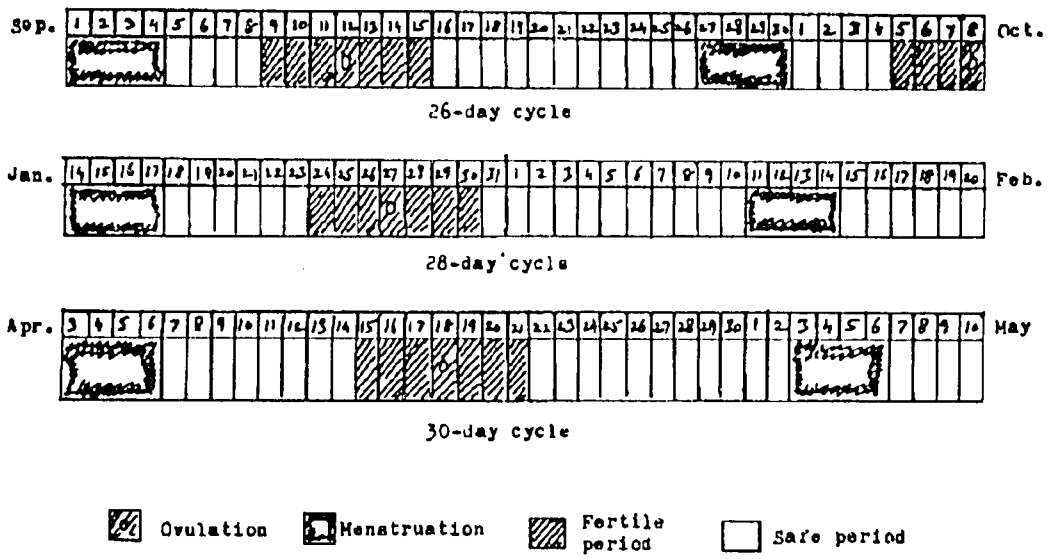

Fig. 12.1 Determining the fertile and safe period in women with different menstrual cycle lengths.

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Infertility. In an Islamic society, children are viewed as a gift from God. If a woman is unable to become pregnant soon after her marriage, this becomes a cause for concern, especially to the woman. The husband and his family may begin to look for another woman to be his wife and bear his children. The family views the woman as being infertile or unable to become pregnant. As Health Technicians, you should inform the family and community that in the medical field, a couple (husband and wife) is considered infertile or unable to have children only if the woman does not become pregnant after two years of marriage or after two years of trying to become pregnant (and has not used any contraceptive during this period).

There are two types of infertility: primary and secondary. Primary infertility means that the wife has not become pregnant even once after marriage. Secondary infertility means that at least one pregnancy has taken place but subsequent pregnancies have not occurred.

Infertility is caused by many factors. We do not know as much about ways to overcome infertility and help women become pregnant as we know about ways to stop pregnancy. However, research in the last twenty years has provided us with new knowledge, insight and techniques for helping infertile couples. Recent experience indicates that the cause of infertility may be found in either the female or the male. Therefore, when a couple is unable to have a child, it is essential that both husband and wife be investigated for the cause of the infertility.

The role of Health Technicians in helping a couple who desire to become parents but are unable to have children is limited to the following:

- Providing up-to-date knowledge on infertility.
- Helping the couple to discuss the problem together and seek help in investigating the cause of the infertility together.
- Helping the couple organize their medical history and concerns in such a way that they can express their needs clearly to the fertility counseling service staff.
- Referring the couple to the fertility counseling service in the local area or other place of their choice.
- Encouraging the couple to keep in touch so that follow-up services may be provided according to their needs.

Health Technicians should not attempt to treat a couple for infertility.

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12.4 DELAY IN PREGNANCY

There are several different procedures that may be used by couples in order to delay pregnancy. These are called child-spacing techniques and are used when couples do not want to have a child immediately, but plan to have one some time in the future.

For the health of the mother and the new infant, it is best to allow at least two years, preferably three years, between children. This allows the mother's body to prepare for the foetus and allows the earlier child to grow and develop adequately before the mother is pregnant again.

Abstinence. One of the oldest methods of child spacing is abstinence. This means that the couple refrains from intercourse. Some cultures expect the mother and father to live apart for a year after the birth of a child. Other couples plan to live apart because of work or study. If a man and woman do not have intercourse, obviously the woman will not get pregnant.

Withdrawal (Coitus interruptus). Another old and still common method of child spacing is coitus interruptus. The penis is withdrawn from the vagina towards the end of the intercourse before the sperm cells and fluid of ejaculation are released. This method is dependent on the man knowing the right time for withdrawal. Even if the timing is correct, there is still a risk of pregnancy, because some sperm may be present in the moisture at the tip of the penis before actual ejaculation occurs. Therefore, this method is considered risky and should not be used by a couple where pregnancy is life-threatening for the woman.

Lactational amenorrhea. This occurs when women who are breast-feeding do not get their period. Not having menses means that ovulation has not occurred, therefore, pregnancy does not occur. In the early days, this was the method responsible for delaying pregnancy in village women who gave their infants only breast-milk.

Studies have been conducted to observe the pregnancy rate between breast-feeding and non-breast-feeding mothers. The breast-feeding group had fewer pregnancies. However, the incidence of pregnancy in lactating women is still high enough that a couple should not depend on this method of birth control.

Safe period (Rhythm method). As has already been discussed, there are certain days of the monthly cycle when the female egg (ovum) is not in the fallopian tubes. What this means is that either the egg has not been released from the ovary or has already moved out of the tubes. Normally an egg is released once a month, 14 days before the menstrual period for a woman with a 28 day cycle. The sperm must attach itself to the egg within two to three days for a woman to become pregnant. Sperm can live inside a woman for three days. Therefore, if a woman has had intercourse with her husband during the two days before the egg was released and the one day after, she could get pregnant. Utilizing this knowledge it is possible to prevent pregnancy by:

- Avoiding sexual relations three days before ovulation and two days after.
- Using a contraceptive method for three days before and two days after ovulation.

However, the monthly cycle is not always very regular for all women. Sometimes menses occurs a few days early or late. This means the egg is also released early or late. To make sure that the safe period is indeed safe, the couple has to leave a margin of safety for early and late menses. This will require them to use a contraceptive or avoid sexual intercourse for five days before and four days after the estimated date of ovulation. Therefore, there are approximately nine days that are not safe for sexual relations if no contraceptive is used and the couple is trying to prevent pregnancy.

Another way of calculating the unsafe period is by:

- Keeping dates of the monthly cycle for six months and subtracting:
  18 days from the shortest cycle 26 - 18 = 8.
  11 days from the longest cycle 30 - 11 = 19.

This means the unsafe period is from the 8th to the 19th day of each cycle.

Basal body temperature method. This is another method of determining the safe period. The early morning body temperature is recorded for three months. Ovulation can be determined by the rise in temperature of 1 degree centigrade.

The rhythm method and basal temperature method are not very effective because:

- Complete abstinence for 10 to 11 days each month requires a great deal of self-control.
- The temperature method requires daily effort for three months.
- Both methods require some writing which is difficult for illiterate women.

Condom. This is also called a "prophylactic," "rubber" or "sheath." It is a narrow rubber or latex bag a man wears on his penis while having sex. The condom physically blocks the sperm and ovum from joining. It prevents the sperm from getting into the woman's body. A new condom is required each time intercourse takes place. Condoms usually come rolled up in small packages.

When used, the rolled condom is placed over the tip of the erect penis and unrolled up to the base of the penis. After intercourse, the man should hold the condom while withdrawing from the vagina to prevent semen spilling out into the vagina.

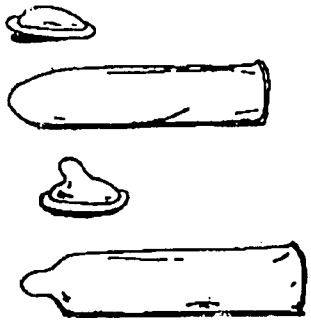

Fig. 12.2 Condom, rolled and unrolled.

The advantages of condoms are that they are cheap, easily available and easy to use. When used with a spermicidal cream, they are nearly one hundred percent effective.

The disadvantages are that some do not like this method. If lubricant is not used, a condom may cause irritation to some women. For some men and women, it may not be satisfying. Occasionally, a condom may rupture and spill sperm in the vagina.

Suppositories, foams and jellies. Various kinds of foams and jellies are available for use inside the vagina. All of these are effective because they kill sperm without damaging the vaginal tissues.

Some are available in tablets which are placed inside the vagina like a suppository. Once inside, the tablet forms a bubbly mass which is spermicidal (that is, it kills sperm).

Other forms are jellies or creams that come in tubes and must be placed in the vagina with a vaginal applicator. The applicator is screwed onto the tip of the tube and the jelly is squeezed into the applicator. The applicator is then separated from the tube and inserted into the vagina and emptied.

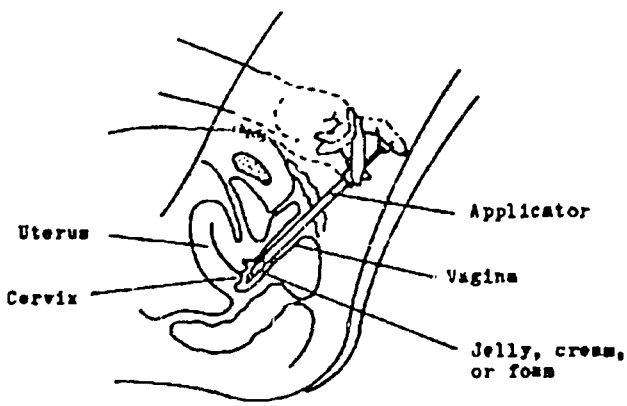

Fig. 12.3 Inserting the spermicidal foam.

A modification of the tube is the aerosol foam. Here, the applicator is attached to the top of a can and filled up with foam. The applicator is removed from the can, inserted into the vagina and emptied.

These foams and jellies must be used every time intercourse takes place and must be inserted five minutes before intercourse. Even when used correctly, they are not completely effective and pregnancies may occasionally occur.

This method should be prescribed only to those who are self-disciplined, will have access to them and have a lot of privacy. This is not a method for rural women.

Diaphragm. This is a thin and shallow cup-like structure made of soft rubber or latex. The edge has a flexible circular coiled spring. It comes in different sizes and a woman needs to be fitted by an experienced family planning worker. A diaphragm should be used together with a spermicidal jelly or foam.

Fig. 12.4 A diaphragm

A woman inserts the diaphragm in her vagina to cover the cervix and leaves it on during sexual intercourse and for at least six hours afterwards. When taken out, the diaphragm should be washed with soap and water and stored in its container.

The diaphragm needs to be checked before and after each use for holes. A new diaphragm should be obtained if holes are present. Otherwise a new diaphragm should be obtained at least once a year.

Intrauterine device (IUD). The IUD is an object which is placed inside the womb of a woman by a trained person (Medical Officer, Nurse, Health Technician, Lady Health Visitor), to prevent an unwanted pregnancy. IUDs come in many shapes. They are usually made of plastic and have a piece of thread hanging from the end. The thread hangs in the vagina so the woman can check for the string to make sure that the IUD is still in place. If she cannot feel the string, she should use another method to prevent pregnancy until she can go for a check up. The string should never be in the uterus.

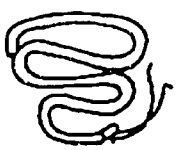

Fig. 12.5 Lippes loop.

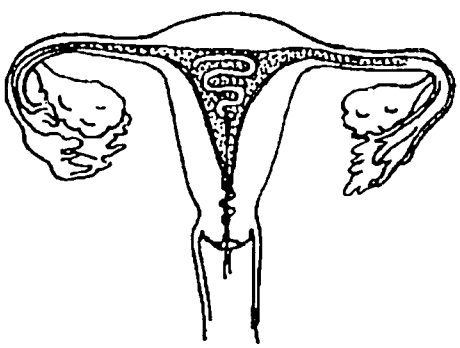

Fig.12.6 Lippes loop in the uterus.

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There are many kinds (26) of IUDs, however, the types most commonly available in Pakistan are the Lippes Loop and the Copper T. The Copper T provides slightly better protection and is associated with higher retention and fewer reported side effects than the Lippes Loop. Only the Lippes Loops are manufactured in Pakistan.

The IUD is very effective in preventing pregnancy, if women are screened well. IUDs are contraindicated (should not be used) in the following circumstances:

- Pregnancy.
- Heavy menstruation.
- Pelvic infection.
- Severe anaemia.
- Tumors of the reproductive system.

Women with any of the above conditions should be provided with an alternative method of birth control.

What should a Health Technician tell a prospective IUD user? A Health Technician should give out the following information:

- The use of an IUD requires that the woman go to a clinic or an IUD camp.
- The doctor will perform an internal examination to find out if her womb is suitable for an IUD.
- The woman should come to the clinic during her menstrual period or within a week after her menses.
- If the woman is breast-feeding, then the best time for IUD insertion is 2 to 3 months after delivery. She should not delay insertion until she gets her period.
- There may be some bleeding after IUD insertion, intermenstrual bleeding and somewhat heavier bleeding than regular menstrual flow during the two or three months after insertion.
- Mild to severe cramps and backache may occur during IUD insertion. This is more frequent in women who have a small uterus or those who have never been pregnant.
- The woman should feel for the string in her vagina to know that the IUD is in place. If she cannot feel the string, she should visit the clinic to determine the problem.
- The woman needs to come to the clinic for a follow-up visit after a few months.
- If she develops any persistent problems over a period of time, she should visit the clinic for consultation.

After it has been determined that the woman is a suitable candidate for an IUD, the following tasks need to be completed by the Health Technician:

1. Obtain a health history including menstrual history.
2. Wash hands.
3. Do a pelvic examination to rule out any abnormalities. The procedure for a pelvic exam is given in Chapter 6.
4. Insert the loop according to the procedure given at the end of this chapter if and only if you have been satisfactorily trained and authorized to perform the procedure.
5. Have the woman wash her hands and feel the string.
6. Review her responsibility in:
   - Checking the string periodically.
   - Reporting or coming back to the clinic with any unusual or persistent symptoms.
   - Returning to the clinic for follow-up visits as required.
7. Review with her possible side effects and what to do about them. Always stress the importance of returning to the clinic if she is concerned about anything relating to the IUD.
8. Inform her that in case of heavy bleeding, infection or when she is ready have another baby, the IUD needs to be removed.

Oral contraceptives (the pill) and injectable hormones. During the regular menstrual cycle, an ovum is released every month. However, if pregnancy results then no new ovum will be released. This is because an increased amount of certain hormones in the female body will automatically stop the ovaries from producing ovum.

Oral contraceptive pills are tablets consisting of hormones that, if taken regularly over a period of time, raise the hormonal level. The body responds to this higher hormonal level as if the woman were pregnant, and does not produce an egg. If there is no egg then pregnancy cannot occur. The pill works in this manner to prevent pregnancy.

Injectable contraceptives are also hormones but have a long-term effect. The injectable contraceptive used in Pakistan is Norigest.

If pills or injections are taken regularly, they are 99% effective. But if a woman misses one pill, or one injection, she

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can become pregnant. The pills and injections are not for everyone because there can be some complications. They are contraindicated for the following conditions:

- Any history of thrombophlebitis (clotting of blood or inflammation of the leg vein).
- A lump in the breast or breast cancer.
- High blood pressure.
- History of severe headaches.
- Breast-feeding of a baby up to 5 to 6 months.
- Liver, heart, kidney or other diseases.
- Blood disorders.
- Cancer or other abnormalities of the cervix.
- Suspected pregnancy.

Therefore, a complete health history, physical examination and some laboratory work (as indicated) must be completed before starting a woman on either of these two methods.

Dosage and method of administration of injectable hormones.

- Norigest comes in a dose of 200 mg in solution.
- These have to be administered deep in the muscle. The best place to give this is in the upper outer quadrant of the buttocks.
- The first dose has to be given within the first five days of the menstrual cycle.
- Follow-up doses are usually given every 12 weeks.

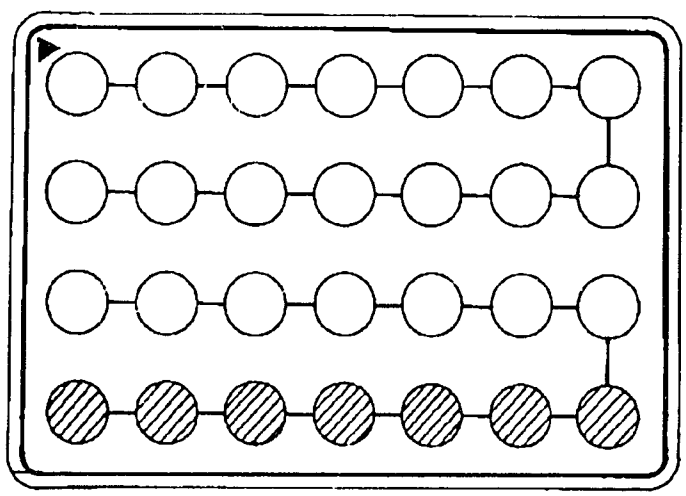


Fig. 12.7 A pill packet.

The pill comes in plastic bubble packs which usually have clear instructions on the package. However, these instructions must be discussed.

There are 28 pills in each packet; 21 are white and 7 are brown. The brown pills are inert (i.e., they do not contain any hormone). These brown pills generally contain a compound of iron. Having the 7 brown inert pills helps the woman to remember the routine of taking a pill a day.

The first (white) pill is taken on day 5 of menstruation. The first day of bleeding should be counted as day 1, and the first pill taken on day 5. One pill is taken daily thereafter until all 28 pills are finished. The new packet is started as soon as the old one is finished. For example, if the last pill was taken on Saturday, the new packet is started the very next day, Sunday. The menstrual period occurs while the brown pills are being taken.

If the woman visits the Health Worker after the 5th day of her menstrual cycle, she should be given a pill packet with the pills for the missing days removed. She should also be given condoms to be used along with the pill in the first cycle.

After explaining the use of the pill to the client, the Health Technician should demonstrate how to remove the pill from the packet, and also show which pill is the first to be taken.

When to take the pill. The pill is swallowed with a little water or milk and can be taken at any time of the day, but it should preferably be taken at the same time every day, for example, after evening meals or before going to bed. In this way, the woman will get into the habit of taking the pill just as she is in the habit of eating her evening meal or going to bed.

Regularity of use. Starting from day 5, the woman must take the pills correctly and regularly from one menstrual period to the next in order to avoid pregnancy. The pill must be taken every day without relation to the frequency or timing of sexual intercourse. This is the difference between the pill and other conventional methods (condoms, foam, etc) which are used at the time of intercourse.

Missed pills. If the woman does not take the pills regularly or forgets to take them, ovulation will not stop, so pregnancy can occur. If she reports to the Health Technician after having missed one or more pills, she should be provided with condoms to use for further sexual relations during that cycle of pills. She should also continue to take the pill.

If a pill is forgotten at night, it should be taken as soon as the woman remembers, during the night or the next day. The next pill should be taken at the regular time.

Women who have had a recent abortion or stillbirth should be advised to start the pills immediately, without waiting for a menstrual period. They will get their menstrual periods regularly with the use of the pills.

In the postpartum period, if the woman is not breast-feeding her infant, she can start the pills immediately. If she is nursing the baby, she should be advised to wait unt l the baby is 5 to 6 months old, as the pills may reduce lactation.

Follow-up. During the first visit (after taking the pill for a month) the Health Technician should determine whether the woman is taking the pills correctly by asking her to explain how she takes them.

If she has stopped taking them, find out why and discuss the reason. If she has had some side effects, manage as indicated. Always look for those symptoms and signs that indicate contraindications to the pill. If such signs are found, discontinue the pill. If no side effects occur, give her two packets for continuation and ask her to return in two months. On the next and following follow-up visits, she may be given three packets at a time if there are no contraindications.

She should have a thorough history and physical examination annually, including a pelvic examination, looking especially for any of the abnormalities listed at the beginning of this unit.

Both the pills and the injections prevent pregnancy in the same way by:

- Stopping ovulation.
- Increasing the thickness of the vaginal mucosa, thus decreasing the mobility of the sperm.
- Making the uterine lining less suitable for implantation.

If both pills and injections contain hormones, what should be the deciding factor as to which method to use? In addition to meeting the same criteria for using the pill, the following points also need to be considered for women utilizing injectable hormones:

- Make sure the woman has at least two children. This is because it is not definitely known whether a woman will be able to get pregnant after prolonged use of injectables.

- The menstrual cycle should be normal. The difference between the shortest and longest cycle should not be more than ten days; the number of days bleeding between 2 and 7 days.

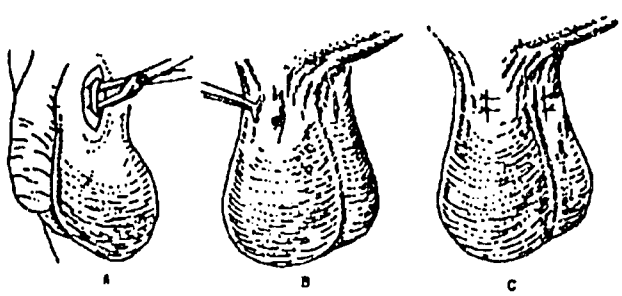
For breast-feeding mothers, the injection can be started whenever she desires. She does not have to wait 5 to 6 months as in the case with the pill.

Permanent methods of preventing pregnancy (vasectomy and tubectomy). Permanent methods of preventing pregnancy can be utilized by either a man or a woman. Permanent methods require operations and should be considered only by those couples who already have their desired number of children. This is because it is not generally possible to reverse the process, even though it has been tried and has been successful in some cases.

Permanent methods are also recommended for those women whose health may be endangered if they become pregnant again. Included in this group are women with a history of:

- Repeated postpartum haemorrhage.
- Repeated stillbirths.
- Episodes of eclampsia.
- Two or more caesarean sections.
- Active tuberculosis.
- Severe heart disease.

Vasectomy. A vasectomy is a minor surgical procedure performed on a man. The tubes which carry sperm are cut and the cut ends are tied separately. In this manner sperm cannot travel to a man's penis. The man will still ejaculate fluid but it will not contain sperm.



Vasectomy operation: A) Make incision on both sides and locate vas deferens; B) Cut off small portion of vas deferens and tie off the ends; C) Suture incisions.

Fig. 12.8 Vasectomy: The vas deferens is cut

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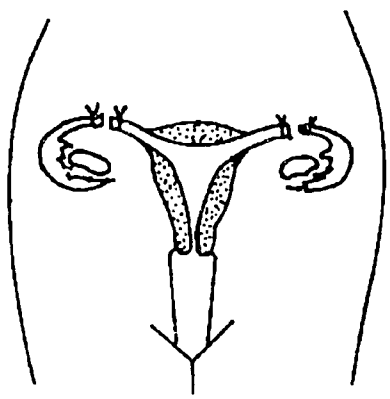
This is a very simple operation compared to a woman's because the tubes are close to the skin and not inside the abdomen. It can be performed in 10 to 15 minutes by a Medical Officer. The man can go home immediately after the operation and it does not cause any disability.

Note: There is a risk of pregnancy for three months after the operation. This is because those sperm which were released before the operation are stored, and it takes about three months to empty the sac. Therefore, a condom or other method should be used for the three months following a vasectomy.

Tubectomy or tubal ligation. This operation is conducted on the tubes leading to the uterus. As in a vasectomy, here too the fallopian tubes are cut in two places and tied. This procedure blocks the passage of the egg (ovum) from the ovary to the uterus, so there is no chance of pregnancy. Since the tubes are in the abdominal cavity, a small cut is made on the abdomen to reach them.



The woman's reproductive system after a tubectomy (sterilization).

Fig. 12.9 Tubectomy.

Follow-up. In both vasectomy and tubectomy, a few stitches are made on the skin with cotton or silk thread. The patient should return in 7 days to have the stitches removed.

- When the person returns in 7 days, check the site for any infection.
- If infection is present, determine the extent and manage accordingly.
- If infection is not present, take the stitches out.
- Discuss any concerns (s)he may have.
- Review appropriate instructions.

12.5 SIDE EFFECTS OF CONTRACEPTIVES AND THE HEALTH TECHNICIAN'S ACTIVITIES

Side effects are those effects or symptoms which are not desirable. As Health Technicians, you need to be aware of the fact that anything consumed or used internally as a contraceptive may produce undesirable effects. These effects are listed and described below.

TABLE 12.1 SIDE EFFECTS AND HEALTH TECHNICIAN'S ACTIVITIES

Possible side effects	Health Technician's activities
Irregular bleeding such as heavier menstrual flow, irregular period, spotting (bleeding) between periods.	- Inform the woman that this usually subsides in 2 to 3 months. If it continues for longer than 2 to 3 months or if the woman is concerned, refer her to the Medical Officer.
Reduction in menstrual flow.	- This can occur with hormones and is not a cause for concern.
Vaginal discharge:	
- Bloodstained.	- No treatment for 2 to 3 months. If persistent refer to Medical Officer.
- Smelly with fever and severe backache.	- Refer to Medical Officer.
- Backache and abdominal cramps.	- Give simple pain reliever and advise rest. If persistent, refer to Medical Officer.

Pregnancy-like symptoms such as nausea, vomiting, weight gain, fullness or tender breasts.	- Inform the woman that this could be due to the pill or injection and should subside gradually as the body gets used to the hormones.
High blood pressure (around 160/110), severe vomiting, visual disturbance, dizziness, jaundice, heavy bleeding, severe chest pain, swelling in the leg.	- If any one or more of these symptoms are experienced, refer her her to the Medical Officer immediately.

As Health Technicians, you need to pay attention to how people respond to the family planning method adopted by them. If they are at all concerned, you need to sit down and explore why. Further enquiry and discussion may provide clues as to the reason for the person's concern. Still further discussion will either relieve the anxiety or help you to refer the case to a Medical Officer.

12.6 THE HEALTH TECHNICIAN'S ROLE IN DELIVERING FAMILY PLANNING SERVICES

All Health Workers are supposed to be knowledgeable in available methods of family planning for both delaying and facilitating pregnancy. Family planning service means anything from giving information on methods available to actually prescribing a certain method or performing a certain procedure. Who does what varies greatly from province to province and even within the province from one locality to another. A general guideline for who in the health team does what in providing family planning service is given as follows:

TABLE 12.2 HEALTH WORKER'S ROLE IN FAMILY PLANNING

Family planning service	Who is responsible?	Are Health Technicians permitted to provide the service?
Information on methods	All categories of Health Workers	Yes
Information on where to go for family planning services	All categories of Health Workers	Yes

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TABLE 12.2 HEALTH WORKER'S ROLE IN FAMILY PLANNING

Family planning service	Who is responsible?	Are Health Technicians permitted to provide the service?
Suggesting or helping decide on a specific method	Any worker who has received training	Yes
Supplies condom, foam, jelly and cream	Sales person in shops, or a Health Worker working in a clinic where family planning service is provided	If you have been trained
Taking a health and menstrual history	Health Worker	Yes
Conducting a thorough physical examination	Medical Officer and those who have been specially trained in this area	If you have received special training in this area
Prescribing hormone contraceptives	Only Medical Officer	No
Giving injectable contraceptive	Any Health Worker	Yes
Inserting or removing IUDs	Those who have been trained to perform these procedures	Only if you have been trained adequately and authorized to do so
Tubectomy or vasectomy	Only Medical Officers who have been trained	No

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TABLE 12.2 HEALTH WORKER'S ROLE IN FAMILY PLANNING

Family planning service	Who is responsible?	Are Health Technicians permitted to provide the service?
Regular follow-up	Trained Health Workers may obtain history but Medical Officer will have to do the physical and pelvic exam	May obtain history and blood pressure only
Removal of stitches	Health Worker who has been trained	Yes
Follow-up of complicated cases	Medical Officer who is a member of the team	Yes, with Medical Officer

As Health Technicians, you need to keep a record of all your services, and family planning is no exception. Therefore, in addition to the records that are maintained in the clinic where family planning service is provided, you also need to keep a diary with the information you need to function in your role adequately.

12.7 PROCEDURE FOR THE PREPARATION OF AQUEOUS IODINE 1:2500 SOLUTION

Add Tincture of Iodine 2.5% BP to clean water until an orange colour appears. (There is no need to measure).

Fig. 12.10 Preparation of Aqueous Iodine solution.

12.8 PROCEDURE FOR DISINFECTING EQUIPMENT NEEDED FOR IUD INSERTION

Materials needed:

1. Tincture of Iodine (BP).
2. Tap water or clean well water.

Procedure:

1. Before each clinic session, put water in the instrument container, IUD tray and the basin for gloves.

2. Add iodine while stirring until an orange colour appears. There is no need to measure.

3. Place clean instruments in the container, the inserters and IUDs in the tray, and the gloves in the basin. After ten minutes all equipment is sterile and ready for use.

4. After the instruments and gloves are used, scrub and cleanse thoroughly with soap and water, and rinse afterwards with clean water. After inserters are used, rinse them in clean water.

5. Iodine solution exposed to air and organic material gradually loses its colour. This indicates loss of iodine. If the solution is clean, simply add more iodine until the orange colour returns; it is normally necessary to do this after every three hours.

6. Fresh solutions must be prepared before each clinic session and whenever necessary during clinic sessions. Do not attempt to save or store the dilute solution.

7. IUDs and inserters must only be kept in the solution during clinic sessions to prevent softening of the plastic. Keep loops and inserters dry between clinic sessions.

8. Metal instruments need to be boiled for twenty minutes.

12.9 PROCEDURE FOR INSERTING AN IUD

Supplies required:

1. A good light source (flashlight or lamp).
2. A steril speculum.
3. A pair of surgical gloves.
4. An examining table or bed.
5. Antiseptic sponges.
6. Lippes loops.
7. Introducers.
8. Sponge holding forceps.
9. 6" dissecting forceps.
10. Tenaculum.
11. Two kidney dishes or other metal pans.
12. Long curved scissors.
13. Bowl of 1:2500 aqueous solution iodine, or Dettol 1:50 or Sablon.
14. Chitle forceps.
15. Tray with lid for IUD and inserter.

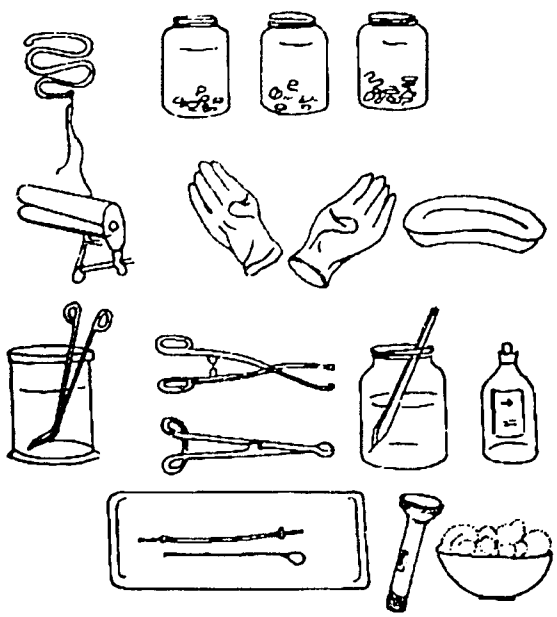

Fig. 12.11 Items needed for IUD insertion.

This procedure is to be done by a Health Technician only if you have been thoroughly taught and authorized to do so. All instruments should be germ free. The metal instruments and introducers used should be boiled for 20 minutes. If this is not possible, soak all the instruments in iodine solution for 20 minutes before using. The plastic loops cannot be boiled. They should be soaked in a 1:2500 solution of aqueous iodine for 20 minutes before using.

Insertion technique:

1. The woman is put on an examination table or bed after taking her history and after she has voided. The patient may support her knees with her hands (lithotomy position)
2. A bimanual pelvic examination is performed with washed clean-gloved hands in order to determine the size and position of the uterus and to exclude contraindications. The cervix is inspected with a speculum.
3. With the speculum in place, view the cervix and clean the cervix with a cotton ball dipped in aqueous iodine solution.
4. For the average multiparous, postpartum woman, size 30 mm "C" loop should be used. The size 31 mm "D" loop should be used in case of reinsertion after expulsion of size "C". The small size, 27.5 mm "B" should be used only in cases of hyperinvoluted uterus, in prolonged lactation amenorrhoea or when the client complains of bleeding and/or pain with a larger IUD.
5. After fixing the speculum, the gloves should be removed. Hands should be washed with soap and water and dipped in iodine solution for two minutes.
6. The sterile loop is loaded in the inserter with sterilized dressing forceps. (Threading the loop in the inserter with dressing forceps requires a little practice but is very simple when the technique is mastered).

Introducer ready for use

Fig. 12.12 Inserter with IUD in place.

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7. The inserter must not be loaded more than 5 to 10 minutes before insertion into the uterus, as the loop loses its shape when stretched for a longer time period.
8. Hold the inserter in the left hand with the black guard, the upper end of the inserter, towards you. With the right hand, grasp the loop with the sterile forceps. The large end of the loop (without thread) is introduced into the upper end of the black guard of the inserter and the loop is pushed into the barrel of the inserter. When the whole loop is in the inserter, it is further pushed with the help of the plunger toward the cervical end of the inserter. The thread will then protrude from the upper black guard of the inserter. Now the loop is ready for insertion into the uterus.
9. The cervical end of the inserter is pushed through the cervix into the uterus. The cervical black guard should rest over the external surface of the cervix. The inserter, loaded with the loop, is then rotated at a right angle so that the loop will be introduced into the uterine cavity in a frontal plane. This is important to avoid cramping pain.
10. The plunger, which is already one or two inches within the barrel of the inserter, is now pushed in all the way, extruding the loop into the uterine cavity. Insertion should be done with a firm, slow pressure on the plunger allowing the loop to recoil within the uterus. The plunger is then withdrawn completely to prevent its binding or pulling on the thread, after which the inserter is pulled out of the uterus.
11. The thread which extends outside the cervix does not need to be cut unless it is too long. The woman needs to be taught to feel the thread over the cervix.
12. Review with the woman how to feel for the string, what symptoms to observe and when to return to the clinic.

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12.10 PROCEDURE FOR REMOVING AN IUD

Removal of the IUD is indicated if the woman would like to have another baby or if some complication such as heavy bleeding or infection occurs.

Supplies:

1. A good light source (flashlight or lamp).
2. A pair of surgical gloves.
3. A sterile speculum.
4. An examining table or bed.
5. Antiseptic sponges.
6. An artery forceps.

Steps in the procedure:

The woman is placed in the position for a pelvic examination. Wipe the external genitalia with an antiseptic swab and insert the speculum gently as in the IUD insertion.

After exposure of the cervix and the IUD string, an artery forceps is used to grasp the thread. A gentle steady pull will cause the loop to come out.

GLOSSARY

Abortion: A spontaneous or induced expulsion of a human foetus during the first 12 weeks of pregnancy.

Abstinence: Voluntarily denying or refraining from an action.

Coitus interruptus: Intercourse that is purposely interrupted to prevent ejaculation of sperm into the vagina.

Condom: A sheath of rubber worn over the penis to prevent conception.

Contraceptive: Device or method to deliberately prevent conception.

Diaphragm: A molded cap of thin rubber fitted over the cervix to act as a mechanical barrier to conception.

Hyperinvoluted uterus: Reduction in size of the uterus below normal after childbirth.

Infertility: Not able to produce offspring.

Intrauterine device: A device inserted and left in the uterus to prevent conception.

Jaundice: Yellow pigment of the skin caused by bile deposits (often seen with liver disease).

Lactational amenorrhea: Loss of menses during breast-feeding.

Lithotomy position: Upon the back with legs bent and knees toward the abdomen.

Menopause: The period of natural cessation of menstruation.

Miscarriage: Spontaneous expulsion of the foetus.

Multiparous: Having had one or more previous deliveries.

Spermicide: Substance that can kill sperm.

Stillbirth: The birth of a dead foetus.

Thrombophlebitis: Inflammation of a vein with the formation of a blood clot.

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Tubectomy: Removal of all or a section of the fallopian tubes.

Vasectomy: Removal of all or a segment of the vas deferens.

SUGGESTED LEARNING ACTIVITIES

1. Motivate 10 women to adopt a family planning method.
2. Follow-up 10 women who are using contraceptive methods of different kinds.

REVIEW QUESTIONS

1. Explain how family planning services improve the health of the mother and family.
2. Explain what infertility means.
3. Describe the menstrual cycle.
4. What is the difference between the safe and fertile period?
5. Where would you refer a couple who are unable to become parents?
6. How does a condom prevent pregnancy?
7. How does foam and jelly prevent pregnancy?
8. What is an IUD?
9. When is an IUD contraindicated?
10. What are IUDs made of?
11. List the usual symptoms experienced by a woman who recently had an IUD inserted?
12. When are pills contraindicated?
13. What instructions would you give a woman who is being started on a pill?
14. When is the best time to insert an IUD?
15. How does the pill prevent pregnancy?
16. When should the pill be started after delivery?
17. Who is the hormone injection for, a man or a woman?
18. How frequently should the injection be given?
19. When do you start giving hormone injections?
20. When is a hormone injection contraindicated?
21. How many days a month does one need to take the oral contraceptive?
22. A permanent method of contraception is recommended for whom?
23. Describe vasectomy and tubectomy.
24. What instructions do you need to give a man immediately after vasectomy?
25. Describe the Health Technician's role in family planning.

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LEARNING ACTIVITIES RECORD

Name of student:_____

No.	Name of person motivate	Name of person on contraceptive
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

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EVALUATION FORM

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of Presentation	[ ]	Simple to understand
	[ ]	Difficult to understand
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

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PN-AEW 414

HEALTH DIVISION
GOVERNMENT OF PAKISTAN

PRIMARY HEALTH CARE PROJECT
HEALTH TECHNICIANS TRAINING GUIDE

BOOK III

The National Basic Health
Services Cell Health Division,
Government of Pakistan
In collaboration with the
Health Departments of
Baluchistan, Punjab, NWFP
and Sind Provinces
1988

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PREFACE

Much has happened in the last 10 years since the first curriculum for training Medical Technicians was written. The Rural Health Services has been expanded at an unprecedented speed. A Basic Health Unit/Rural Health Centre will be available in each Union Council by the year 1990. Each Basic Health Unit which was supposed to be managed by Medical Technicians alone now has one doctor. There has been a growing shift in health policy from curative to preventive, from urban to rural, and from sophisticated high technology and high cost care to Primary Health Care which caters to the basic minimum needs.

Pakistan has given high priority to provide Primary Health Care coverage to a maximum number of people in the shortest possible time. To achieve this, we need to improve our present health programmes and also bring in new innovative approaches to assure that adequate basic health services are easily available to every one. But we all know that the rural health facilities are not operational at an effective level at the moment due to many reasons i.e. in-accessibility of the facility, inadequate supplies, logistics, unmotivated public and improperly trained staff who run these facilities.

In order to provide adequately trained health manpower in rural health centers, an urgent need was felt to revise the curriculum of Medical Technicians to make it more task-oriented and preventive in orientation. The original curriculum for training medical technicians prepared in 1978 was adjudged curative-oriented in content, and difficult to be understood by a matriculate medical technician. Now the job description of a Medical Technician (redesignated as Health Technician) has been changed considerably. A major revision of the curriculum for training health technicians was, therefore, an urgent necessity.

This revised curriculum has been prepared for the training of health technicians who are very important members of the health team in the rural health services.

Known as "TASK ORIENTED TRAINING" the revision is based on:

i) Needs of the community related to health improvement and reduction of maternal and infant mortality.

ii) Training objectives related directly to the tasks.

iii) Tasks required to meet the health needs of the population served.

iv(Learning activities which will enable the students to perform the tasks in terms of the objectives, and

v) Evaluation of the students's training.

The training material is presented in three books containing a total of twenty chapters and is developed by a Pakistani Consultant, Prof. Mohammad Iliyas and the Federal Training Advisor for the Primary Health Care Project, Dr. Tara S. Upreti.

In developing the chapters, six modules previously prepared with the assistance from University of Hawaii Medical School during 1977 - 1980 have been used with variations to suit new requirements where appropriate. Besides these volumes, additional material has been obtained from the following sources:

- Werner, D: *Where There Is No Doctor*. Palo Alto, The Hesperian Foundation, 1985.

- World Health Organization: *Immunization in Practice - A guide for health workers who give vaccines*, Module 1 - 7, Geneva, WHO, 1984.

- World Health Organization: *The Primary Health Worker*. Geneva, WHO, 1980.

The final product of the chapters is based on extensive discussions and inputs by Federal Health officials, Dr. Mushtaq Ahmad Chaudhry, Dr. M. Zafar Ahmad, and Mr. Abdul Sattar Chaudhry as well as Provincial Health officials especially including the Directors of Health Services from all four provinces. The guide represents a consensus of all concerned in training and supervising Health Technicians.

The revised curriculum has also taken the guidelines from the following documents:

- The Alma Ata Declaration of Health For All by the year 2000.

- The Prime Minister's Five-Point Socio-economic Development Plan.

- The Sixth and Seventh Five Year Plans for Pakistan (Health Components).

- Consultants reports on curriculum requirements from 1982 onward.

The entire revised curriculum aims at strengthening the role of Health Technicians as a vital link between the community and the health facilities. As such the manual focuses mainly on preventive and promotive health technology applied to communities.

The revised portions of the chapters were completed during the workshops held in the four provinces where the participants were the Project Directors, Provincial Basic Health Services Cell, Senior District Health Officers, Programme Training Officers, Tutors, Medical Technicians, Health Inspectresses, and Principals of Schools of Public Health. Their names are shown separately in the attached sheet following the acknowledgement.

Considerable contributions have been made by the Advisory Committee members, the composition of which is shown on the list that follows. Rural Health Center staff, health educators, and health administrators from the provinces also contributed to the curriculum development.

Significant contributions have also been made by specialists in Paediatrics, Expanded Programme for Immunization, Malaria Control, Obstetrics, Health Educators and Nutrition. Their names are also listed in the list of subject Specialist.

In order to ensure that the curriculum remains up-to-date, action oriented, and appropriate to the community's needs, the Federal Advisory Committee has developed a monitoring plan. All the components of the Health Technicians' Training Programme in the classroom, hospital and the community will be monitored by the advisory committees constituted at the provincial level, the Primary Health Care Project Training Specialists, and the Federal Primary Health Care Training Advisor. For one full training cycle, progress reports will be submitted by these provincial committees to the Directors of Health Services. Based on such reports, the materials in the various chapters may be updated by the authors in future. In this way, the training Programme will continue to be pertinent in the provision of health services to the communities in the years to come.

It is our hope that all these efforts will prove to be a major step in assuring success in the Health System.

Dated, Islamabad
12th January, 1988.

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The Ministry of Health gratefully acknowledges the help, advice, and constructive criticism of dozens of people in the preparation of the Health Technician Training Guide.

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We are also most grateful to all those who attended the three Curriculum Workshops in each province. They include the Medical Superintendents, the District Health Officers, the Inspectresses of Health, the Medical Officers of Rural Health Centres, the Programme Training Officers, and the Tutors of Health Technician Training Schools. All of them read the chapters line by line and suggested improvements for simplicity of language, accuracy of material and applicability of the contents.

The untiring efforts of the Advisory Committee members are laudable. The committee was responsible to provide guidelines and directions on the format and content of the revised curriculum. The committee was mostly the first body to review the draft chapters. It also helped in identification of experts and materials available in the country which could be used in the revision of the curriculum.

Thanks are due to the Specialists from the fields of Paediatrics, Health Education, Expanded Programme for Immunization, Malaria Control and Obstetrics. The comments of these experts have been very helpful in the improvement of the respective chapters.

We appreciate the helpful suggestions of many colleagues in the Ministry of Health and other departments. Particular mention is justified for the hard work done by Dr. Mushtaq Ahmed Chaudhry, Dr. M. Zafar Ahmed and Mr. Abdul Sattar Chaudhry - the three musketeers of Primary Health Care Project in the Basic Health Services Cell who developed the original curriculum and are responsible for this necessary revision. They identified the needs for the revision, initiated the revision, monitored the progress, provided needed guidance at every step, read the revised chapters, and in some cases, even wrote certain chapters themselves.

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This revision of the Curriculum could not have been completed without the untiring and persistant hard work of months together by Professor Mohammad Iliyas and Dr. Tara S. Upreti. They have together woven into Health Technician Training Guide the work of a large and diverse group of the people.

We acknowledge with thanks different ideas, materials and designs, borrowed and/or adapted by us, from a vast body of available knowledge around the world the source of which is not acknowledged by name.

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To everyone who worked as a team in completing the revised curriculum successfully, we again express our appreciation for their contribution to improved training of health workers who deliver essential health services and minimize suffering in rural Pakistan.

Dated: Islamabad, 12th January 1988.

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INFORMATION ON HOW TO USE THE THREE BOOKS

This training guide is written for those students who are participating in Health Technician's Training Programme in Pakistan. It consists of three books. The first book has five chapters, second book consists of chapters six through twelve and the third book contains chapters thirteen through twenty.

Each book has a Table of Contents for all three books to inform the reader of location of other topics. In addition, a Tutor's Workplan is provided for each book following the contents. References for each book is provided at the end. Chapters in the books are organized in the following order:

1. List of objectives.
2. Contents of the chapter.
3. Procedures related to the subject.
4. Glossary.
5. Suggested learning activities.
6. Review questions.
7. Record of learning activities.
8. Evaluation sheet.
9. References for the particular volume.

TUTOR'S WORK PLAN
CHAPTER 13 THROUGH 20

Chapter/Topic	Time in hours							Venue of Experience	Person Responsible	Support and other material
	1st Sem		2nd Sem		3rd Sem		TOTAL			
	P	T	P	T	P	T				
13. Health Technician's Role in the Expanded Programme of Immunization	5	40	16	12	15	12	100	Static and Mobile Center.	C.D.D. Supervisor Vaccinator PTO and Tutor	
14. Environmental Health	10	30	50	12	46	12	160	RHC/BHU School Community	PTO and Tutor Physical Health Engineer	
15. The Health Technician's Role in the Management of - Common Conditions	5	25	36	12	30	12	120	Hospitals RHC Home visits	PTO and Tutor Medical Officer	Drugs and access to special programmes
16. The Health Technician's Role in the Control of Communicable Diseases	10	20	25	12	21	12	100	Hospital RHC/BHU Community	PTO and Tutor Medical Officer in Charge	Kit
17. The Health Technician's activities in providing First Aid Services	0	25	31	12	40	23	131	Home visits RHC/BHU	PTO and Tutor	
18. The Role of Health Technicians in the Utilization of Drugs	5	30	14	18	15	18	100	Hospital RHC/BHU Home visits	PTO and Tutor	Drugs and related supplies
19. Health Data and Statistics	5	15	8	12	8	12	60	RHC/BHU	PTO and Tutor Management Analyst	Plenty of forms
20. The Health Technician's Role in Referrals and in the Repair and Maintenance of the Health Facility	5	15	8	12	8	12	60	RHC/BHU Community	PTO and Tutor Management Analyst and Training Specialist	
							831			

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CHAPTER 13

THE HEALTH TECHNICIAN'S ROLE IN THE EXPANDED PROGRAMME OF IMMUNIZATION

Objectives After completing this chapter you will be able to:

1. Explain what the Expanded Programme of Immunization means.
2. Name six diseases for which vaccinations are available.
3. Describe the recommended vaccination schedule.
4. Describe and demonstrate the procedure for intramuscular, subcutaneous and intradermal injections.
5. Describe the Health Technician's activities in counseling mothers of children who are immunized.
6. Describe the organization and management of an immunization clinic in relation to the required number of staff and their activities.
7. List points that need to be followed in maintaining the potency of vaccines.
8. List all the equipment and supplies needed for an immunization clinic.
9. Describe the procedure for boiling and caring for syringes and needles used for immunization.
10. List possible reactions to the vaccines and describe the Health Technician's role in dealing with them.
11. Describe the procedure for carrying vaccines to a mobile clinic.
12. Describe the necessary record keeping activities.
13. Describe how you would evaluate your immunization clinics.

CHAPTER 13

THE HEALTH TECHNICIAN'S ROLE IN THE EXPANDED PROGRAMME OF IMMUNIZATION

In Pakistan, an Expanded Programme of Immunization (EPI) was launched in 1979 in order to immunize all children under five years of age. This programme did not accomplish much in the first three years. The 1982 evaluation of this immunization programme showed that only 2% of children under five were fully immunized. To correct this situation, a federally funded three year programme was launched in 1983, the Accelerated Health Programme (AHP) which also included control of diarrhoeal diseases and the training of Traditional Birth Attendants (TBAs), along with the immunization programme. The AHP utilized the three pronged approach consisting of fixed centres, outreach teams and mobile teams. By the end of 1985, the percentage of fully immunized children had risen to 23% for infants and 66% for children 12 to 23 months of age.

The Expanded Programme of Immunization is one of the vertical programmes of Primary Health Care. Efforts are now being made to integrate all vertical programmes, including EPI, at the RHC level. By integrating these services with Primary Health Care, Health Technicians have been given the responsibility of supervising vaccination activities at the static centres (RHC), outreach centres (BHU) and mobile teams. The Medical Officer, as the team leader, will be the supervisor at the RHC level.

Therefore, Health Technicians in their new role have to be knowledgeable and skilled in the following areas:

1. The vaccines for the six target diseases and when to give them.
2. Required equipment and sterilization techniques.
3. How to give the vaccines.
4. Health Technician's activities in counseling mothers whose children have been immunized.
5. How to organize an immunization session.
6. Motivating the community.
7. Preparing for an immunization session.
8. Conducting an immunization session.
9. Evaluating immunization activities.

These nine topics will be discussed separately in detail in this chapter and the activities required of Health Technicians will also be identified so that you are clearly oriented to your new role.

13.1 VACCINES FOR THE SIX TARGET DISEASES AND WHEN TO GIVE THEM

There are six important infectious diseases that are very serious and can kill or cripple children, even though some children survive and become immune. These six diseases are:

1. Poliomyelitis.
2. Measles.
3. Diphtheria.
4. Pertussis (whooping cough).
5. Tetanus.
6. Tuberculosis (TB).

The special thing about these diseases is that we can prevent them by immunization. The Health Technician gives a child a vaccine, that is, a weakened form of the disease causing micro-organisms given either by injection or a few drops by mouth. In response to this vaccine, the child's body produces antibodies without getting the disease. The child becomes protected against the disease without becoming ill.

How are vaccines made? Manufacturers make vaccines from the organisms that cause the disease, but they must change the micro-organisms so that they cannot harm people. They do this by:

- Using killed micro-organisms as in the pertussis vaccine.
- Using live micro-organisms that are weakened (attenuated) as in measles, polio and tuberculosis (the vaccine is called BCG).
- Using toxins (poisons) that the micro-organisms produce and changing them into harmless toxoids, as in tetanus toxoid and diphtheria toxoid.

Vaccines can be damaged and loose effectiveness Vaccines are damaged and ineffective if they are not maintained according to the recommendations. A vaccine is potent (able to make the child immune) if it is in good condition. If it is damaged, it loses its potency or power. All vaccines lose their potency after a certain time even with good care. An expiration date is printed on the vaccine container.

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Heat, sunlight and freezing can also damage vaccines. Heat and sunlight damage the live vaccines; freezing damages the killed vaccines and toxoids.

Note: If a vaccine is damaged by heat or by freezing, it cannot be made potent again and should therefore be discarded. The safest thing to do is to keep ALL vaccines at the recommended temperature, and out of the sunlight.

Other things that damage vaccines are disinfectants and antiseptics, including spirits and detergents. Disinfectants and antiseptics are used to kill germs but they also kill live vaccines.

If syringes and needles have been in contact with disinfectants, soap, spirits or antiseptics, they should be washed thoroughly before sterilization (30 minutes in boiling water).

How to store vaccines Vaccines are stored in a refrigerator at the correct temperature of between 0°C.to 8°C.

The live vaccines - polio, measles and BCG:

POLIO VACCINE

The micro-organism that causes polio is a virus. The vaccine is a clear pink or pale orange liquid. It comes in a special small bottle with a dropper cap. A few drops of vaccine is given straight from the bottle into the child's mouth. Oral polio comes frozen and should be kept frozen when not in use.

Oral polio is quickly damaged by heat so precaution should be taken to store the vaccine in the recommended range of temperature.

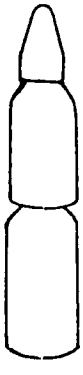
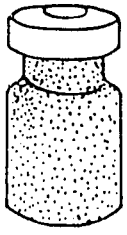


Fig. 13.1 Polio vial.

MEASLES VACCINE

The micro-organism that causes measles is a virus. The vaccine comes as a lump of dry material at the bottom of the container. This is called freeze-dried, because the manufacturers first froze the vaccine, and then dried it.



A freeze-dried vaccine stays potent for a long time if kept frozen. However, before injecting this vaccine it must be mixed with a special diluent solution. This kind of vaccine is then called a reconstituted vaccine. Reconstituted vaccines should be used quickly otherwise they lose their potency. The unused portion is discarded the same day. This vaccine is also easily damaged by heat.

Fig. 13.2 Measles vial.

BCG VACCINE

The BCG vaccine protects against tuberculosis (TB). It is made from a special weak but living mycobacterium called Bacillus Calmette Guerin, which gives it the letters B-C-G.

It is a live bacterial vaccine which is injected into the top layers of the skin. This is also freeze-dried, like the measles vaccine, and comes as a powder in the container.

It should therefore be reconstituted with diluent solution before injection.

After reconstituting it should be used quickly otherwise it loses its potency. This vaccine is most easily damaged by sunlight and therefore the containers are made of dark glass, to keep out the light.

Heat also damages BCG, but as long as the vaccine is dry, it can be refrozen.

Fig. 13.3 BCG vial.

The killed vaccines - diphtheria, pertussis and tetanus:

DIPHTHERIA TOXOID

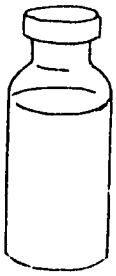
Diphtheria is caused by bacteria which produce a toxin. The vaccine is a toxoid, that is, a weakened diphtheria toxin.

DPT is damaged if frozen. It is also damaged by heat.

PERTUSSIS VACCINE

The micro-organism that causes pertussis (or whooping cough) is a bacteria. The vaccine is made from killed bacteria. It is the most easily damaged part of DPT, usually by heat.

TETANUS TOXOID



Tetanus is caused by bacteria which produce a toxin. The vaccine is a toxoid, that is, weakened tetanus toxin.

Tetanus toxoid (TT) is damaged both by freezing and by heat. This is the "T" part of the DPT vaccine.

Fig. 13.4 Tetanus toxoid.

DPT VACCINE

The bacterial toxoids and pertussis vaccine can be given as a 'triple' vaccine to children under five years of age.

Both DPT and TT come in liquid form, are given by injection and are kept cold without freezing. They can be damaged by freezing and you need to check the bottle for this (see below). If it is found to be damaged, do not use it.

VACCINE NEVER FROZEN *VACCINE FROZEN AND THAWED*

Immediately after shaking

Smooth and cloudy --->

<--- Not smooth. You can see granular particles.

30 minutes after shaking

Starting to clear --->

No sediment --------->

<--- Almost clear.

<--- Thick sediment.

Use this vaccine.

Do not use this vaccine.

Fig. 13.5 Testing DPT or TT vaccine for damage.

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Care of vaccines Vaccines must stay cold from the time they leave the manufacturer to the time of their use to be effective.

Before vaccines reach the health centre:

- They must be collected from the station where they are issued and stored at the correct cold temperature in a refrigerator.
- If they are carried to an outreach session, they must be transported in a vaccine carrier with ice.
- They must be kept cold during transit from one place to another.
- The vaccine must be placed in a cup of ice while the immunization of children is in progress.

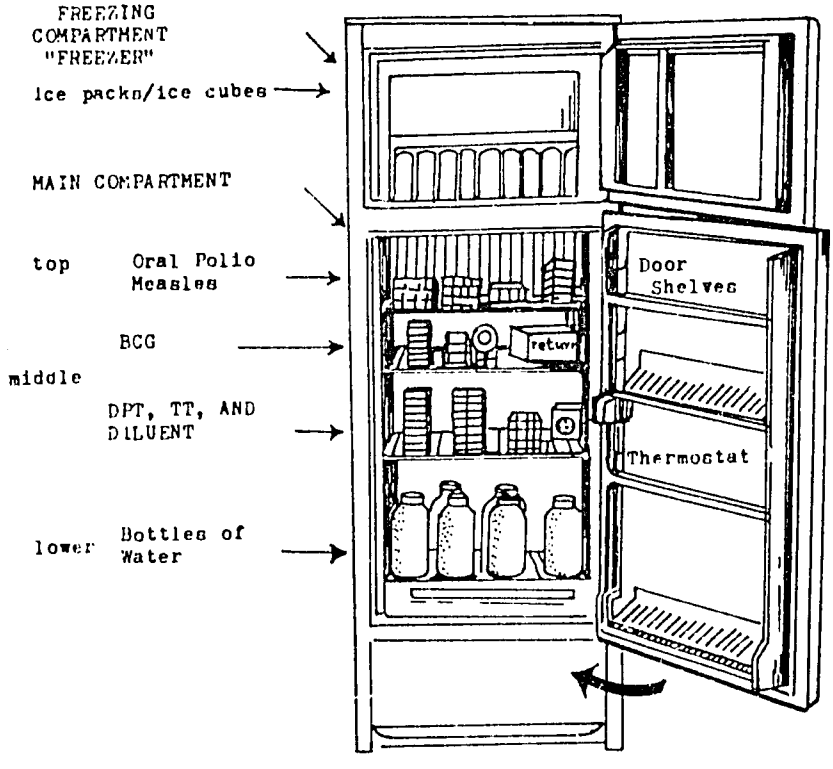

Fig. 13.6 A refrigerator showing vaccines stored correctly.

Once the vaccines are stored in the refrigerator the temperature is to be checked twice every day using a thermometer. Check the temperature in the morning and evening and keep a record of it.

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The immunization schedule When to give vaccines to children and women is given in the immunization schedule of Table 13.1.

An immunization schedule contains the following information:

- What vaccines are to be given.
- The desirable age at which to administer the first dose of each vaccine.
- The number of doses which should be given of each vaccine.
- The minimum time interval between successive doses of vaccines. There is no maximum time interval. Even if a year passes between successive vaccine doses do not begin the series of multiple doses of DPT, polio or tetanus again. Administer the next dose as if the minimum time interval has passed.

TABLE 13.1 IMMUNIZATION SCHEDULE

Vaccine	*Age at first dose*	*Dose*	*Number of doses*	*Minimum interval between successive doses*
BCG	Birth	0.05 ml	1	-
DPT	3 months	0.05 ml	3	1 month
Polio	Birth	Accord-ding to table on contai-ner.	3	1 month
Measles	9 months	0.05 ml	1	-
Tetanus Toxoid	15 years and child-bearing age women.	0.05 ml Accor-ding to instruc-tions on the label.	2	1 month

What about immunizing sick children? There are almost no contraindications but the following conditions should be observed:

- Do not give DPT vaccine to a child who had a severe reaction to a previous dose, especially if the reaction was a convulsion or shock within 3 days of the injection.
- Do not give a vaccine to a sick child if the mother seriously objects. Encourage her to accept, but don't force her. If you do force her, she may not come back.

13.2 *REQUIRED EQUIPMENT AND STERILIZATION TECHNIQUES*

Now that you have some knowledge about the six diseases which can be prevented by administering appropriate vaccines and when to give these immunizations, you need to be concerned about the logistics of conducting a vaccine clinic. The logistics include having the required materials and equipment in usable condition. This section deals specifically with what materials are required and how these should be cleaned and/or sterilized.

Materials required are:

- Syringes of two types:

  1. Glass or disposable syringes of 2 ml and 5-10 ml size. Whenever plastic disposable syringes are available they should be used instead.
  2. Omega or Tuberculin syringes.

- Three sizes of needles: a long 18 gauge for mixing, a 30 mm 22 gauge for intramuscular or subcutaneous injections and a 10 mm 26 gauge for intradermal injections.
- A sterilizing container with lid for boiling syringes and needles.
- A container with lid for boiled and cleaned syringes and needles.
- Gauze and forceps.
- Kerosene stove.
- Matches.
- Clock.
- Vaccines.

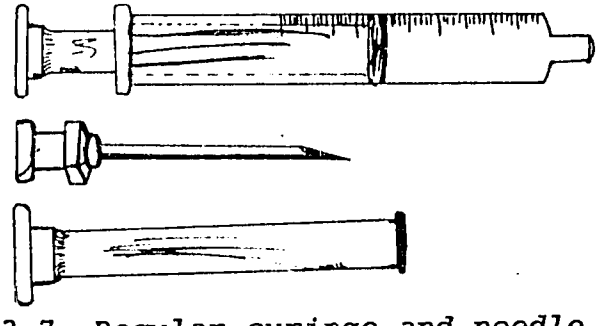

Fig. 13.7 Regular syringe and needle.

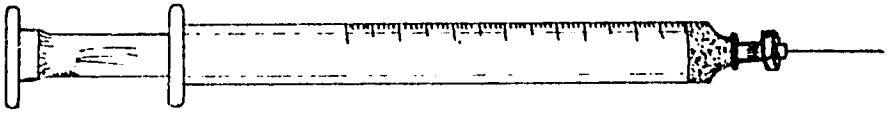

Fig. 13.8 Syringe for BCG.

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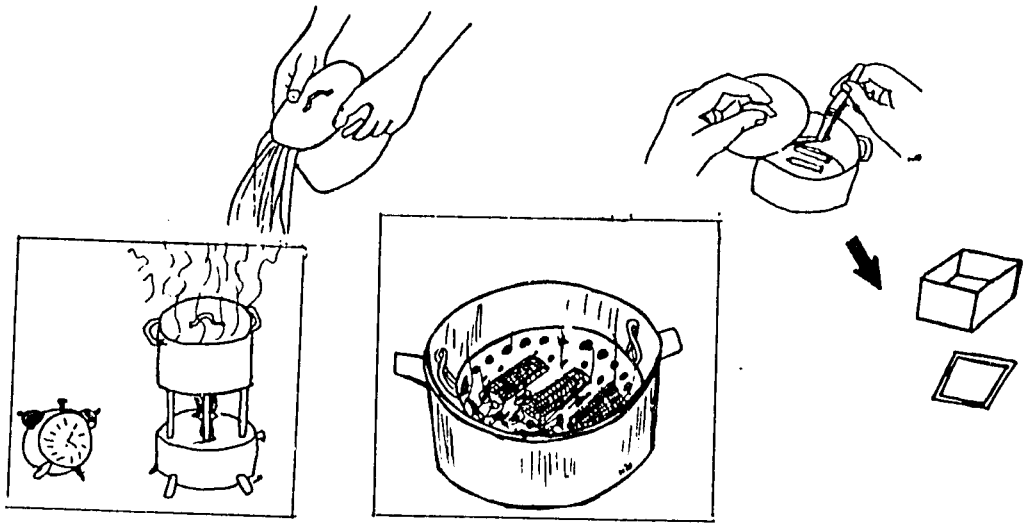

Fig 13.9 Boiling container with lid.

The clock is used to time the boiling period, the gauze for wrapping glass and needles for boiling, the forceps for lifting out syringes and needles and for putting the needle onto the syringe.

Sterilizing or boiling instruments:

- Collect the equipment needed for sterilizing syringes and needles:

  - kerosene stove
  - syringes and needles
  - clock
  - container with lid for boiling needles and syringes
  - container for cleaned needles
  - forceps
  - matches

- Separate the barrels and plungers of the syringes.

Fig. 13.10 Barrel and plunger separated.

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Wrap glass syringes in gauze or cotton cloth. If gauze is used, cut a 20 cm piece from a roll and use one piece for each syringe. Wrap the gauze around the plunger, and then around the barrel.

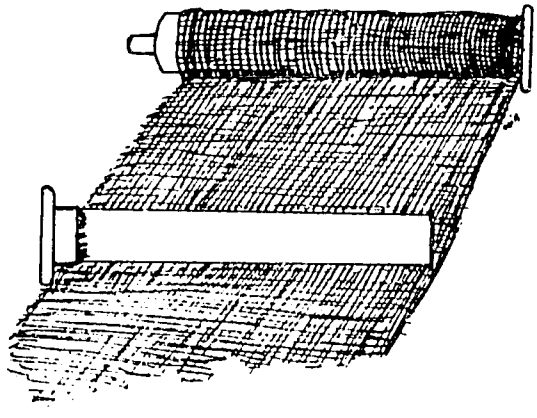

Fig. 13.11 Wrapping the barrel and plunger in gauze or cotton.

- Stick needles into a piece of gauze.

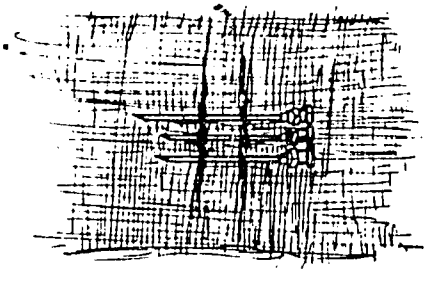

Fig. 13.12 Needles placed in gauze.

- Place the rack on the bottom of the container.
- Place syringes and needles on the rack.
- Tie the forceps to a string and place on top of the rack.
- Cover syringes and needles with at least 2 cm of water.
- Boil for 20 minutes. Use clock or timer.

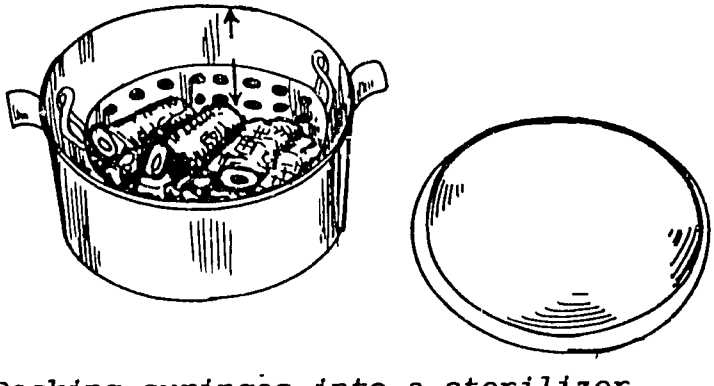

Fig. 13.13 Packing syringes into a sterilizer.

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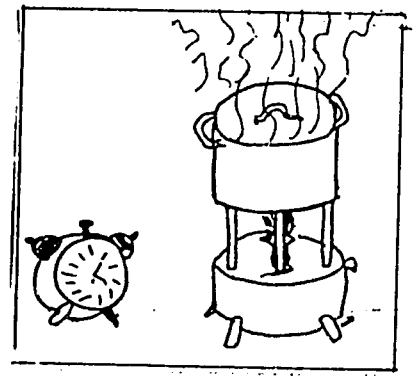

Fig. 13.14 Boiling for 20 minutes.

- Turn off the burner.
- Carefully pour out the hot water from the container holding the lid and saucepan firmly with both hands.

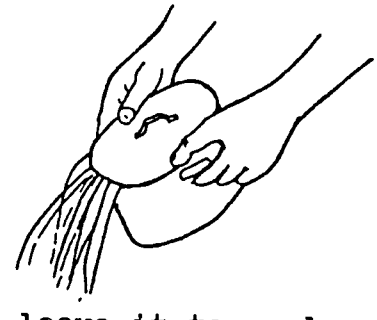

Fig. 13.15 Pour out hot water.

- Put the lid on firmly and leave it to cool.
- Wash your hands.
- Lift out the syringes and needles with the sterile forceps; place them into a sterilized tin.
- Put a lid on the tin.
- Do not use syringes and needles until they are cool.

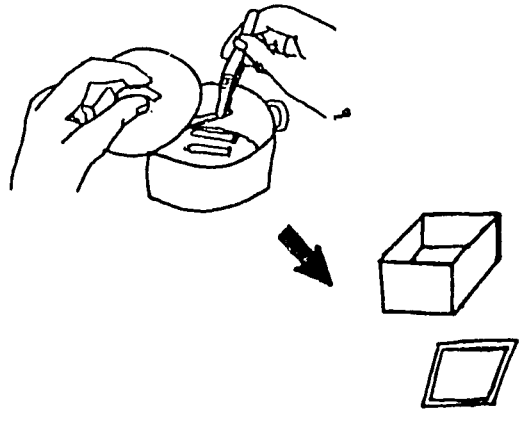

Fig. 13.16 Use forceps to remove syringes and needles.

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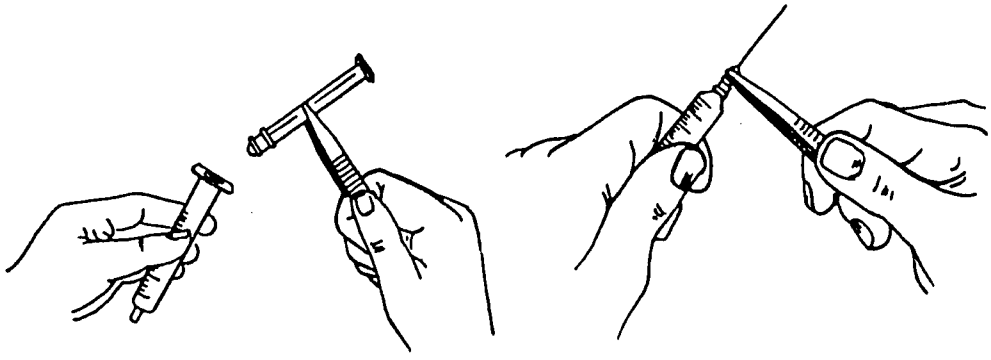

Fig. 13.17 Put the plunger into the barrel and the needle on the syringe.

- With the forceps, remove the syringe barrel and hold it with the fingers of the left hand.
- With the forceps, remove the plunger and insert it into barrel.
- Hold the barrel and plunger in the left hand and pick up the needle with the forceps and attach it to the syringe.
- To prevent contamination, rest the needle on the side of container.

DO NOT PUT FORCEPS OR NEEDLES ON ANY OTHER SURFACE THAN THE CLEAN CONTAINER

If the instruments used are not boiled for 20 minutes and/or are contaminated after boiling, infection may develop at the site of the injection. BCG needles can be sterilized by flaming the hub and tip.

13.3 HOW TO GIVE THE VACCINES

Vaccines are given either orally (by mouth) or by injection. Polio is given by mouth, DPT and TT are given intramuscularly, measles subcutaneously and BCG intradermally. The following section will describe each vaccine and how to give it.

Oral polio vaccine:

- Let the mother hold the child firmly.
- Open the child's mouth. Squeeze his cheeks gently between your fingers to make his lips point forward.

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Put 3 drops of vaccine straight from the dropper onto the child's tongue. To avoid contamination, do not allow the dropper to touch part of the child's mouth.

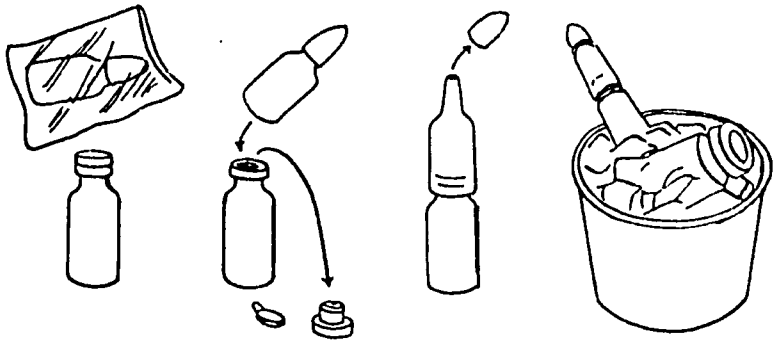

Fig. 13.18 *Dropper and vaccine, putting dropper on vaccine, OPV on ice.*

REMEMBER, FOR POLIO VACCINE:

Dose: 3 drops, 3 times, 4 weeks apart.
Keep vaccines in a cup of ice.
Throw vaccine away after one session.

Injectible vaccines As mentioned earlier, different vaccines are injected into different tissues. These tissues are: intradermal (into the top layer of the skin) for BCG, subcutaneous (just below the skin) for measles and intramuscular (deeply into the muscle) for DPT and TT. The position of the needle, when it is inserted into the body, determines the layer into which the vaccine will reach (see figure below).

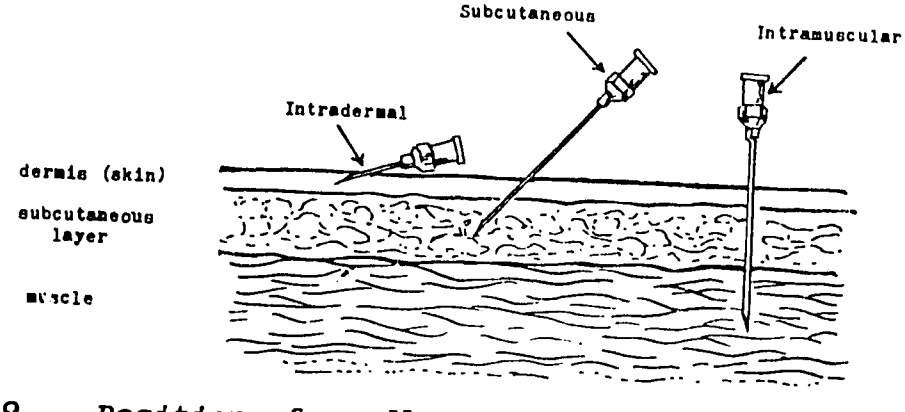

Fig. 13.19 *Position of needle for reaching different tissues: (1) Intradermal, (2) Subcutaneous, (3) Intramuscular.*

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Before injection, clean the area with soap and water. After injection, gently press the site with cotton wool until bleeding, if any, stops.

Filling the syringe:

- Check the label for the correct vaccine, making sure the vaccine has not expired.
- Shake the vial, so that the sediment mixes completely into the solution.
- Remove the center of the metal cap using an ampoule file.
- Stand the vaccine vial in a cup of ice or on an ice pack on the table.

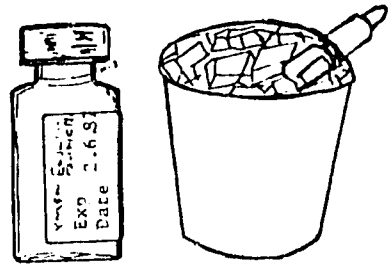

Fig. 13.20 *Check the label for expiration date and store in ice.*

- With forceps, take a sterile syringe (0.5, 1 ml or 2 ml).
- With forceps, fit a needle on the syringe (preferably a 0.5 ml syringe).
- Use a 5/8 inch 25 G needle for BCG.
  22 G needle for DPT, TT and measles.
- Clean the exposed rubber cap of the vial of reconstituted vaccine with spirit or alcohol.

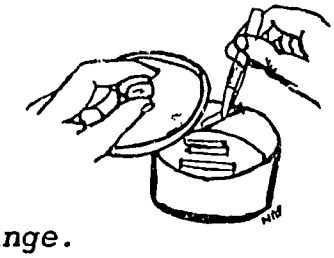

Fig. 13.21 *Taking out a sterile syringe.*

- Withdraw vaccine into the syringe.

BCG	0.1 ml
DPT	0.5 ml
Measles	0.5 ml

- Put the vial back into the cup of ice.

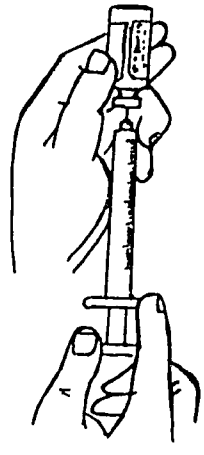

Fig. 13.22 Withdrawing the vaccine into the syringe.

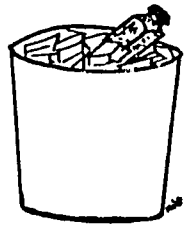

Fig. 13.23 Keep vial on ice.

- Expel any air bubbles from the syringe.
- Check that the dose drawn up is correct.
- Give the vaccine to the child immediately.

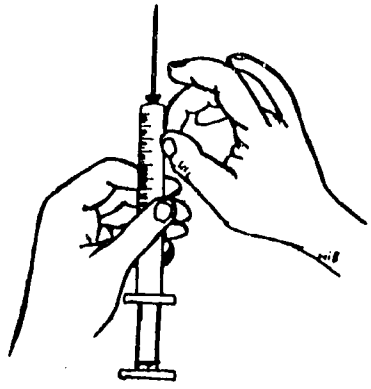

Fig. 13.24 Expelling air bubbles.

Giving an intramuscular injection (DPT or tetanus toxoid)
The best place to inject intramuscularly is the outer part of the child's mid-thigh. If you inject into the buttocks, you may cause paralysis of the leg, so in many countries, Health Workers prefer not to use that area. The arm muscles are rather small in children.

Fig. 13.25 Position of child for DPT vaccine.

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The best place for an intramuscular injection for a woman is the outer side of the left upper arm.

Fig. 13.26 *Place for giving tetanus toxoid to a woman of childbearing age.*

- Put your finger and thumb on each side of the injection site.
- Stretch the skin flat between your finger and thumb.
- Quickly push the needle straight down through the skin between your fingers. Go deep into the muscle.
- Withdraw the plunger a little to make sure that you are not in a vein.
- Press the top of the plunger with your thumb to inject the vaccine.
- Withdraw the needle.

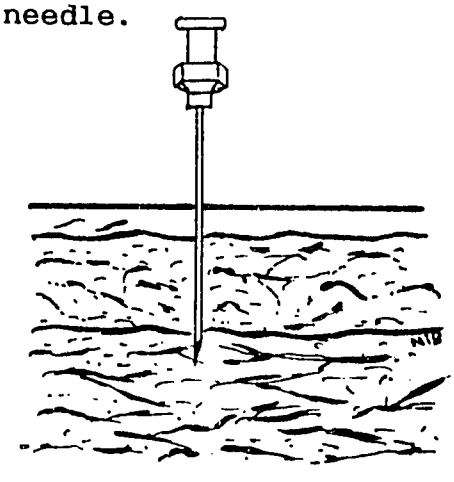

Fig. 13.27 *DPT in the muscle.*

REMEMBER FOR DPT VACCINE:

Give 0.5 ml, 3 times, 4 weeks apart, intramuscularly into the child's thigh.
Do not freeze the vaccine.

REMEMBER FOR TETANUS TOXOID:

Give 0.5 ml twice during pregnancy at least 4 weeks apart.
Do not freeze the vaccine.

Measles and BCG vaccines Both of these vaccines are freeze-dried and should be reconstituted with diluent. Make sure that the vaccine is cold enough when you use it. Do not freeze the diluent because the bottle will break.

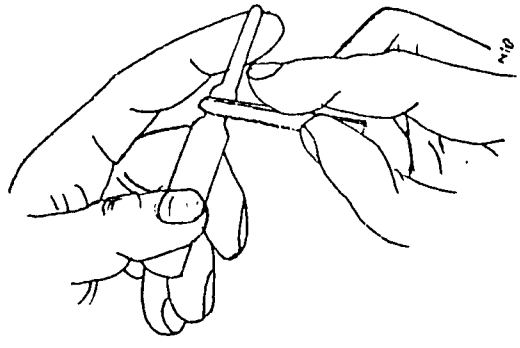

Fig. 13.28 "Scratching" the neck of an ampoule.

To reconstitute the vaccine, clean the outside of the diluent ampoule with alcohol-moistened cotton wool and hold it in a piece of clean cloth or gauze. Gently break off the top after scratching the neck with the file. Put the needle of the syringe through the opening into the ampoule and pull up the barrel to extract the liquid in a 5 cc syringe.

- Tap the vaccine ampoule or vial so that all the vaccine powder falls to the bottom.
- Lift off the metal cap of the vial or break the neck of the ampoule, depending on the vaccine.
- Insert the needle of the syringe containing the diluent and push all diluent into the vaccine vial.
- Draw the vaccine with diluent slowly into the syringe and inject it slowly back into the vial or ampoule a few times to mix it. Now it is ready to be administered.
- Put the mixing syringe and needle into sterile/boiled dish. This syringe can be used to reconstitute another ampoule of vaccine.

How to position the baby (This description is for the left arm, some programmes use the right arm).

- Sit the baby on his mother's lap.
- Tuck his right arm away around her body.
- Mother's left arm goes around the baby, to support his head.
- Her left hand holds his left shoulder:
- Her right arm holds his legs out of the way.
- Her right hand holds his left hand.

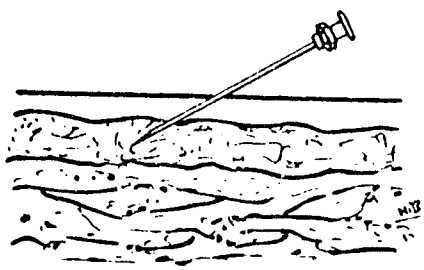

Fig. 13.29 Measles vaccine given subcutaneously.

Giving the measles vaccine:

- Gently pinch the skin of the outer part of the child's upper arm with your fingers.
- Push the needle into the pinched-up skin, not straight in but at an angle.
- Do not push the needle in too far.
- To control the needle, support the adaptor end of the syringe with your thumb and finger while you push the needle in.

Fig. 13.30 Inserting the needle; injecting the vaccine.

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- Withdraw the plunger to check for blood. If the needle has entered a vein, blood will come into the syringe. Withdraw the needle, discard it and get another sterile syringe and needle.
- Press the plunger with your thumb to inject the vaccine and withdraw the needle.

REMEMBER FOR MEASLES VACCINE:

Give 0.5 ml once at 9 months of age.
Heat and light quickly damage reconstituted vaccine.

Giving a BCG vaccine:

- Have the mother hold the baby on her lap as for measles vaccine.
- Have the vaccine ready in an Omega syringe.
- With your left hand, hold the baby's left arm away from the body and stretch the skin by pulling it towards you.
- Clean the area.
- Insert the needle just under the top layer of skin (intradermal).
- Press the plunger to inject the vaccine.
- Withdraw the needle.
- Flame the needle to sterilize it if it will be used again.

REMEMBER FOR BCG:

The dosage is 0.05 ml from birth to 1 year. A normal reaction starts with a small red tender swelling of about 10 mm or more in two weeks. This may become an ulcer and heal by itself leaving a permanent scar, a proof of BCG vaccination.

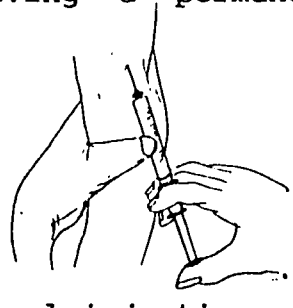

Fig. 13.31 Intradermal injection of BCG.

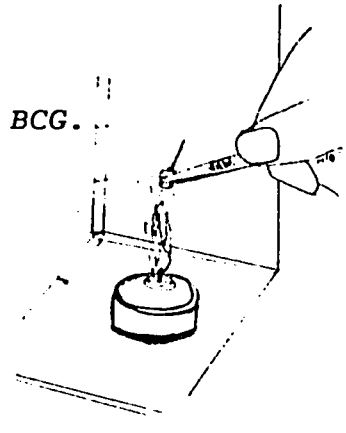

Fig. 13.32 Flaming the BCG needle.

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13.4 *COUNSELING MOTHERS WHOSE CHILDREN HAVE BEEN IMMUNIZED*

Some children develop symptoms or reactions after receiving a vaccine and mothers need to be informed of these symptoms and what to do about them. The following table lists some of the side effects of the vaccines and the Health Technicians's related activities.

TABLE 13.2 VACCINE REACTIONS AND THE HEALTH TECHNICIAN'S ACTIVITIES

	Vaccine reactions	*Health Technician's activities*
Polio:	There are usually no side effects from polio.	
DPT:	Many children develop fever the evening of the day they receive immunization. This usually stops after 24 hours.	- Advise mothers to give fever reducing medicine if temperature is above 30 C. Give 1/4 tablet of Disperin and instruct mother to crush it and give to the baby with some water.
	Some children develop reactions to the metal of the needle. If the needle is not sterile or if you do not inject the vaccine deep enough, an abscess may form. This abscess disappears within two weeks.	- Inform mother that this abscess usually disappears within two weeks, but the mother needs to observe it daily to make sure it is decreasing in size. - If it is not healing and redness or red lines develop and spread from the swollen area, the child must be taken to the Medical Officer. - Apply cold compresses to the area.
	Convulsions or shock are very rare but they can occur.	- Explain to mother that convulsions or shock are rare. - Inform mother that this is due to the "pertussis" part of the vaccine and children who react with shock or convulsions should never get DPT again. These children should get DT vaccine to complete the series.

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TABLE 13.2 VACCINE REACTIONS AND THE HEALTH TECHNICIAN'S ACTIVITIES

Vaccine reactions		*Health Technician's activities*
		- Children over five years of age are usually immune to whooping cough so they need only DT.
BCG:	A small red tender swelling about 10 mm across appears at the place of immunization. This swelling may become an abscess and develop an ulcer which heals by itself.	- Inform mother that this is a normal and desirable reaction - Advise mother not to put anything on the sore and to leave it open or cover it with a dry dressing only.
	Severe local inflammation or a deep abscess may occur. Sometimes the lymphatic glands in the neck and axilla swell. (This severe reaction may be due to: injecting the vaccine too deeply under the skin rather than on the top, too large a dose or using an unsterile needle.	- If the reaction is localized, no treatment is needed except for a dry dressing. - Advise mother to see the Medical Officer if the lymphatic glands are involved.
	BCG scar.	- Inform mother that it takes about two weeks for the scar to develop at the site of immunization. This means the vaccine was effective. - If in two weeks a scar does not develop, give another dose of vaccine and inform the mother of the reason for this.

TABLE 13.2 *VACCINE REACTIONS AND HEALTH THE TECHNICIAN'S ACTIVITIES*

Vaccine reaction		*Health Technician's activities*
Measles:	Fever and rash may develop for 1-3 days about one week after the vaccine.	- Inform mother that this is a mild form of measles and should be treated the same way as a DPT reaction. - Give baby plenty of liquids and continue with the regular feeding pattern. - If the rash is severe and fever lasts for longer than three days, consult a Medical Officer.

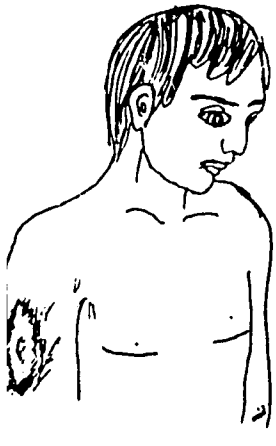

Fig. 13.33 *An abscess.*

13.5 *ORGANIZING IMMUNIZATION SESSIONS*

In order to organize immunization sessions you must first have some idea as to how many children need vaccinations and how many contacts are necessary to complete the series. You must also know where and how to obtain the needed vaccines and where to hold the sessions.

To estimate the number of children needing immunization, you may use the rough estimate suggested by the World Health Organization that 3% to 4% of the total population consists of children less than one year of age. Therefore, if the BHU serves a population of 10,000 people then the number of children under one year is:

$$\frac{10{,}000 \times 3}{100} \text{ or } 4 = 300 \text{ or } 400$$

But not all children above one year of age are vaccinated. So a rough estimate of 5% of the total population requiring a complete series of immunization is not unrealistic. Thus in a BHU serving a population of 10,000 people, 500 children will require immunization within a year. If we want to know how many per month, we can divide 500 children by twelve months:

```
      41.7
12)   500
      48
       20
       12
        80
```

Between 41 and 42 children need to be immunized each month.

To determine how many contacts are necessary for a child to complete the immunization series, you need to refer to the time schedule of immunization.

A minimum of four contacts per child is required to complete the series. So if you want to know how many contacts you need to have per month, multiply 41 (expected number of children) x 4 (expected number of contacts).

41 x 4 = 164 contacts per month.

From this information, you can calculate the maximum number of immunization sessions that will be required. To get this information, divide the number of contacts per month by the minimum number of contacts recommended for one session. The recommended minimum number of contacts is 10. Therefore:

$$\frac{164}{10} = 16.4 \text{ immunization sessions per month.}$$

In order to cover 500 children in your area, you need to hold 16 or 17 immunization sessions per month.

These sessions may be held at the BHU and or in the community or in both places. The most important point to keep in mind in planning these sessions is where the attendance would be greater. Then you can proceed with any plan similar to the one in Table 13.3. When you schedule an outreach clinic in the community, make sure that the community is far enough from the BHU so that children from the farthest place can come to the outreach center.

TABLE 13.3 *EXAMPLES OF THREE ALTERNATE PLANS FOR HOLDING FOUR IMMUNIZATION SESSIONS PER WEEK*

DAY	*PLAN A*	*PLAN B*	*PLAN C*
SATURDAY	BHU	BHU	OUTREACH
SUNDAY	-	BHU	OUTREACH
MONDAY	OUTREACH	BHU	OUTREACH
TUESDAY	BHU	OUTREACH	BHU
WEDNESDAY	OUTREACH	-	-
THURSDAY	-	-	-

13.6 MOTIVATING THE COMMUNITY TO PARTICIPATE IN IMMUNIZATION CLINICS

While you are determining the number of immunization sessions you need to immunize the young children in one community fully, you also need to work with the adults of that community so these planned sessions are utilized. In other words, you or other members of your team must motivate the residents of the community to come these sessions. How do you go about motivating the community?

Motivation means the desire to do something. For example, hunger and thirst motivate all people to look for food and drink.

If a person's hunger and thirst are not satisfied, he continues to get more hungry and thirsty and may even become weak and sick. With this knowledge and experience, a person who feels hungry or thirsty begins to think about food and drink and proceeds to obtain them. The hunger and thirst moves (motivates) him to get the food. Unless a person feels the need himself, he will not be motivated to fulfill that need even if the resources to meet the need are available. In other words, motivation (the desire to do something) is what makes a person reach out to existing resources to meet the felt need. Since

hunger is felt by everyone, all persons will look for food. But not all people are well informed about how to protect children from the six communicable diseases. In order to convince the community or to make them feel the need to immunize children, they need to know the following:

- The amount and degree of suffering and death that can result from the six diseases.
- Protective agents (vaccines) against these six diseases are available.
- If a complete series is given, children are protected against these diseases for life.
- Vaccines are safe.
- The deaths of many young children can be prevented by immunizing them.

NEED		EXISTING RESOURCES
Young children exposed to six communicable diseases.	MOTIVATION	- Trained manpower to conduct immunization clinics. - Vaccines available for six communicable diseases.

The following tasks will help you to inform the people about the above points so that they can become motivated and involved in the immunization sessions:

- Identify those people who are either given the responsibility or have assumed the responsibility for the welfare of the community such as the chief of the tribe, religious, political or other leaders, school teachers and parents whose children have been vaccinated.
- Demonstrate by using real cases, films, slides, posters and pamphlets the amount and type of suffering caused by these diseases. For example, distress with whooping cough, paralysis from polio.
- Convince people that prevention is better than cure through health education sessions at the BHU, RHC or community.

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13.7 PREPARING FOR AN IMMUNIZATION SESSION

An immunization session may be held anywhere as long as three requisites are met:

- There must be children who need to be immunized.
- There must be trained Health Technicians to conduct the sessions.
- The required immunizations and other materials must be in safe and usable condition.

Immunization sessions may be held at the RHC, BHU or any sites in the community. Since the RHC and BHU are your territory, organizing and conducting sessions there is easier than an outreach session. You need to involve the community in planning as well as conducting an outreach session. You can involve the community by visiting it and meeting the community leaders and jointly agreeing on the dates and places for your sessions. You need to express to them the need for their assistance in making sure the children are there on the agreed upon dates. You also must return on those days without fail with all the necessary staff and materials, other than what the community has agreed to provide.

One or two days prior to a community immunization session, begin to collect and pack everything you need. Everything except for vaccines can be packed several days before. Vaccines should be packed just before starting on the trip. You will need the following items for each clinic plus the items listed in section 13.2.

Injection items:

- Sterile syringes: 10 ml.or 5 ml 1.0 ml or 2.0 ml and tuberculin.
- Sterile needles: mixing, intramuscular/subcutaneous, intradermal.
- 2 pairs sterilized forceps (with string loop).
- Sterilized container to hold forceps.
- 2 sterilized dishes to put syringes on (one for mixing syringes, one for injecting syringes).
- 2 dishes for swabs (1 dry, 1 wet).
- Small metal file to open ampoules.
- Insulated container ("Thermos") or plastic cup for ice to stand vaccines in while you use them.
- Silver foil to protect vaccines from sunlight.
- Cotton wool in a container (to clean and to press injection site).
- Gauze or cotton cloth to hold ampoules.

Cleaning materials:

- A box or paper to collect rubbish (you can make this from folded newspaper).
- A bag to take rubbish away.
- Hand washing items: soap in a plastic container, a clean towel.
- A bowl or bucket for water (borrow from the community if possible).

Records:

- Immunization schedule.
- Growth charts or immunization cards.
- Immunization tally sheet (or other local record).
- Immunization register (or local equivalent).
- Date stamp.
- Stamp pad.

Health education material:

- Posters and pamphlets (to give out to people to take home).

The immunization kit should contain all the above materials except for the vaccines.

From the number of children expected to come to the clinic, estimate the number of syringes, needles and vaccines you will need. The following tables will help you determine the quantity of each.

TABLE 13.4 THE NUMBER OF SYRINGES AND NEEDLES NEEDED

Item	Number of expected children							
	10	20	30	40	50	60	80	100
10 ml or 5 ml syringes	3	3	3	3	3	3	3	3
Mixing needles	3	3	3	3	3	3	3	3
1.0 ml or 2.0 ml syringes	11	19	27	35	43	51	67	83
Intramuscular/sub-cutaneous needles	15	25	35	40	50	60	80	100
Omega syringe	2	2	2	2	3	3	3	3
BCG needles to use with Omega	6	6	6	6	12	12	12	12
"One dose" BCG syringe	5	7	9	11	13	15	19	33
Extra BCG needles to use for TT if given	12	12	12	12	24	24	24	24

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TABLE 13.5 NUMBER OF VIALS OF VACCINE TO TAKE TO EACH SESSION*

Number of children expected	*Required number of vials*	*Other*
Less than 30 children	2 vials of each vaccine.	Take one spare vial of vaccine and one ampoule of diluent for each vial of measles and BCG.
30 - 50 children	3 vials of each vaccine.	
More than 50 children	More than three vials.	

*Most vaccine vials contain 20 doses except Measles which contains 10 doses.

Transportation of vaccines Vaccines may be carried in insulated vaccine carriers or cold boxes that have very thick walls and lids. These containers are made of material which does not allow heat to pass through and keeps the vaccines cool if:

- Enough ice is placed inside the container.
- The lid is put on tightly.
- The container and lid do not have any cracks.

Containers need to be cared for properly to be effective. For example, dropping them or knocking them around or placing them in sunlight may damage them or make them less effective.

Vaccine carriers do not make things cold. They can only keep them cold.

Vaccines are considered damaged if during the journey:

- The ice melts.
- The temperature inside is warm.
- The lid is off or loose.

How to pack the vaccine carrier Check the vaccine carrier to make sure that:

- The lid fits tightly.
- There are no cracks.
- The refrigerator is working properly. Check the temperature and record it on the chart.

Take the ice pack and/or ice cubes from the freezer and leave them on the table for 5 to 10 minutes to warm them a bit. If the ice pack is too cold, it may freeze DPT. When the outside of the ice pack is wet and not frosty, arrange the packs and/or ice cubes in the vaccine carrier as discussed below.

Arranging the ice cubes in a vaccine carrier You must only use ice cubes in bags:

- Put a bag of cubes at the bottom of the carrier.
- Put the vaccines on the ice.
- Put a bag of cubes on top of the vaccine vials.

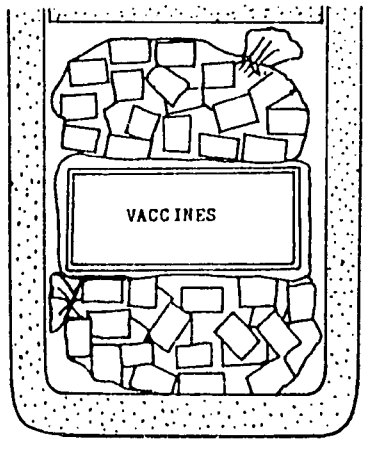


Fig. 13.34 *Vaccine carrier with bags of ice cubes above and below vaccine vials.*

Packing the vaccines:

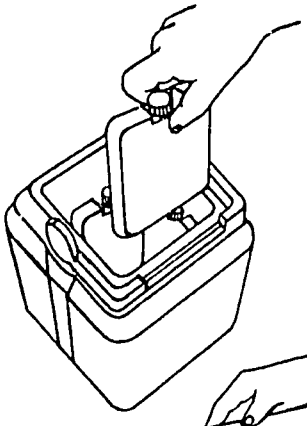
- Pack first the vaccines that you took to your last immunization session but which you did not use (keep them in a special box in the refrigerator marked "return").
- Take the oldest vaccines that have been in your refrigerator for the longest time.
- Look at the label of each vial and check the expiration date. If the expiration has passed, do not use the vaccine. Take it out of the refrigerator and record it as "wasted."
- Close the refrigerator door.

USE THE RETURN VACCINES BEFORE THE OTHERS
USE THE OLDEST VACCINES FIRST

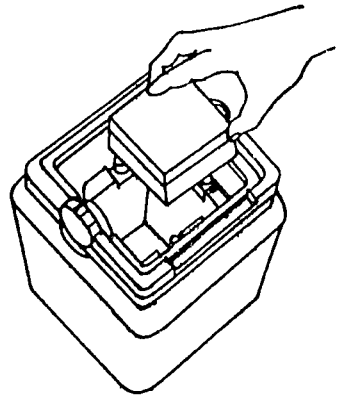
Putting the vaccines into the carrier:

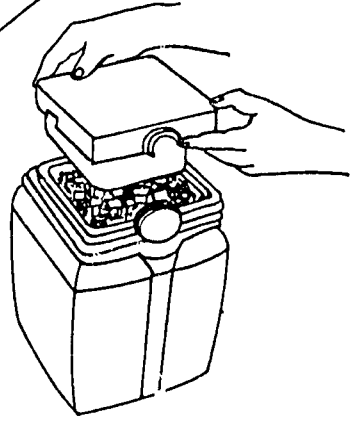
- Put the vaccines in the middle of the ice.
- Put a thermometer with them if possible, so that you know what the temperature is.
- Put newspaper, cardboard or plastic foam all around the DPT and TT vaccines, between them and the ice packs. Do not let DPT and TT vaccines touch the ice, they might freeze and get damaged.
- Put a bag of ice cubes or some ice packs on top of the vaccines.
- Close the lid tightly.
- Keep the vaccines and diluent in the vaccine carrier until you are ready to use them.

1. Put one ice pack inside each of the 4 walls of the carrier or a bag of cubes on the bottom.

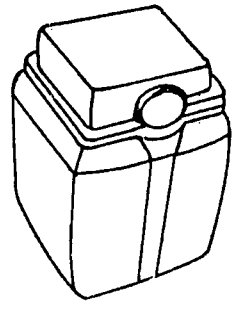


2. Put the vaccine vials, diluent and thermometer in the middle.





3. Put a plastic bag of ice cubes on top of the vaccine.



4. Close the lid tightly.

How long can you keep vaccines in a vaccine carrier? Usually, you should only carry vaccines in a carrier for one working day. Vaccines can stay at below 8 C for a maximum of 36 hours if:

- You keep the lid on tightly.
- You leave all the ice packs and ice cubes inside the container.
- You keep the carrier in the shade.

So if you are very careful, you can keep vaccines in the carrier for one night and use them the next day.

How to keep the vaccines cold on the immunization table? You must stand opened vaccines in a cup or insulated pot of ice, or on an ice pack while you immunize. The ice cubes or an ice pack for the table must come from your vaccine carrier. Because you take out some of the ice, the inside of the vaccine carrier becomes warm more quickly. However, the vaccines should remain at less than 8 C for one working day.

If you need to use the vaccines the following day you must leave four ice packs and a bag of ice cubes in the carrier. Therefore take extra ice for the immunization table. Either put an extra ice pack in the carrier or put another bag of ice cubes below the vaccines.

A VACCINE CARRIER CAN KEEP VACCINES COLD FOR 36 HOURS
IF
YOU KEEP THE LID ON TIGHTLY
YOU LEAVE ALL THE ICE INSIDE
YOU KEEP IT IN THE SHADE

Going to the immunization session You may use a public bus, a bicycle or any suitable conveyance. Pack your immunization kit and your vaccine carrier firmly onto the back of your cycle or other transport.

- Keep the vaccine carrier shaded if possible.
- Go straight to the place for the session.
- Do not stop or delay on the way or the vaccines may become warm.
- Do not go dangerously fast.

Reliability and punctuality:

- Being *RELIABLE* means going on the day that you said you would go
- Being *PUNCTUAL* means arriving at the time that you said you would arrive.

Make sure that the people know you are coming and exactly when you will be there.

Why is it important to be reliable and punctual? If you are reliable and punctual people will believe in your immunization programme. If you do not arrive, and the session is late or cancelled, people will lose interest and they will not come next time.

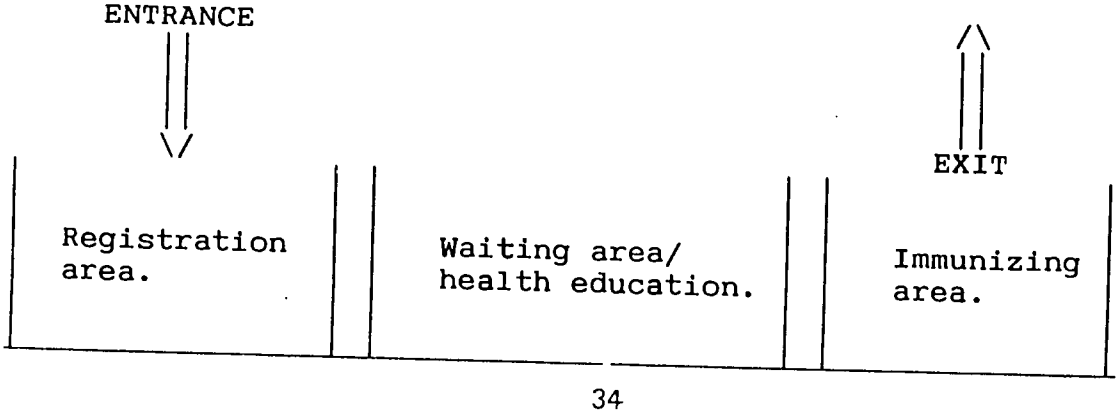
What do you do if you cannot go to a session? If you cannot make a session send somebody to apologize and to explain what has happened. Tell the people when you will come again and be sure to go next time.

13.8 CONDUCTING AN IMMUNIZATION SESSION

In addition to selecting the sites and dates for the immunization clinics, the community should also provide people to help during the session. This should be discussed and agreed upon. You may need one to four persons depending on whether you are coming alone or bringing your team. It is always a good idea to have at least two people from the community: one at the entrance and one at the exit point. These people should arrive before you and begin to set up the area.

When you arrive at the site of the immunization session, helpers from the community should be there organizing three separate areas. They need to meet you and other members of the team who will be working during the session. Introduce yourself and have others do the same. Assign each person a task and make sure they know what to do.

In setting up the immunization area arrangements should be made as illustrated so that all the people enter from one side and exit from the other. Health education sessions may be conducted in the waiting area.



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A minimum of two tables are required and arrangements should be made for the community to provide these on the clinic days. The tables will hold all material needed during the session.

Registration One person needs to greet each child's guardian/parent in a friendly manner and obtain the immunization card or growth chart if they have one. Otherwise, the person at the registration area helps fill out a new card with the child's name, date of birth and other information on it. Also each child should be checked for BCG scars and the need for any further immunization should be determined at this time.

The mother should be asked if she has had tetanus toxoid injections and if so how many. If she has had two, compliment her on this. If she has had only one, she should be encouraged to get a second one during this session.

Health education and information The mother then goes into the waiting area where a Community Health Worker or Student Health Worker should be giving brief health education sessions, answering questions or having discussions with those who are waiting. ORS packets should be kept here and a demonstration of ORS preparation should be conducted. Mothers should be encouraged to take some ORS packets home for use in case of diarrhoea.

Immunization Wash your hands, unpack the immunization kit and place all of the required items within easy reach on the table. Other things go under the table. Put vaccines, syringes and cotton in the left corner, extra vaccines in the middle and forms, stamping pad, pens on the right side of the table. Reconstitute measles and BCG vaccines.

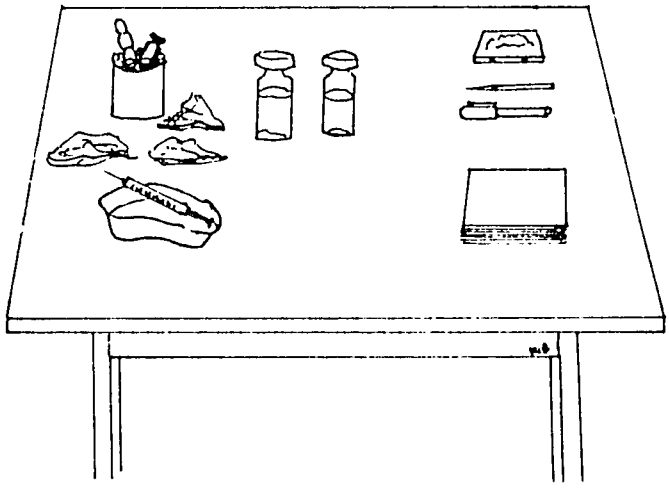

Fig. 13.35 Placing supplies on the table.

Write the place where you are holding your session and the date at the top of the sheet at the beginning of your session. Then, each time you give a vaccine, cross off one of the "O"s along the line for that vaccine like this:

PLACE: Girnir Village DATE: 22 June 1984

	Less than 1 year old			1 year and older		
BCG	~~OOOOO~~	~~O~~OOOO	OOOOO	~~OO~~OOO	OOOOO	OOOOO

To know how many children you have immunized, add up all the "O"s that have a line through them. If there are many, you can count up in groups of five.

As the mother and child are leaving, the person at the exit station should check the card to make sure that the child has received the immunization he or she needed and:

- Inform the mother of what the child received.
- Make sure the mother knows when the next immunization is needed.
- Advise the mother to keep the card safely and to bring the card next time.
- Ask the mother if she has any questions.

13.9 *EVALUATION OF THE IMMUNIZATION PROGRAMMES IN YOUR AREA*

The purpose of an evaluation is to know:

- How successful your work is.
- What is needed to improve the programme.
- What help is required from your team leader if there is one or from the supervising officer.

How much time does an evaluation take? You need about 15 minutes once a week and an hour once a month.

Weekly evaluation This is done by answering the following:

- Were the immunization sessions held according to a previously prepared plan?
- Were the vaccines sufficient?
- Was the refrigerator temperature in the safe range (0 C to 8 C)?

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Have the mother sit on the chair near the left hand side of the table, holding the baby on her lap:

- Review the immunization card and determine what the baby needs.
- Explain to both mother and child what you are going to do. Make sure she understands what each immunization is for.
- Inform the mother that the usual reaction following immunization is brief and of a minor nature.
- Tell her when she needs to return again.
- Give polio vaccine first. This is because after an injection, the child usually begins to cry and refuses to cooperate.
- Give other vaccines by injection and put the used needles and syringes in the designated container.
- Record the immunizations you have given on the child's card.
- If required, fill out the tally sheet. An example of a tally sheet follows.

THE TALLY SHEET

Many countries use a tally sheet because it is quicker and simpler than keeping detailed records of each immunization. Also, it is easier to count the immunizations given.

A tally sheet consists of lines of "00000"s in groups of 5.

- There are separate lines for each dose of each vaccine given.
- There is a separate section to record vaccines given to children 1 year of age or older.

PLACE: DATE:

		Less than 1 year old			1 year and older		
BCG		00000	00000	00000	00000	00000	00000
DPT	1	00000	00000	00000	00000	00000	00000
	2	00000	00000	00000	00000	00000	00000
	3	00000	00000	00000	00000	00000	00000
POLIO	1	00000	00000	00000	00000	00000	00000
	2	00000	00000	00000	00000	00000	00000
	3	00000	00000	00000	00000	00000	00000
MEASLES		00000	00000	00000	00000	00000	00000
TT	1	00000	00000	00000	00000	00000	00000
	2	00000	00000	00000	00000	00000	00000

- Was the immunization status of all women of childbearing age as well as all children (sick or well) who came to the BHU or RHC checked?
- Was the vaccination of those not immunized carried out?
- Were they informed of when to come back?
- Was the equipment sufficient?

If there are no major problems, the immunization programme is working effectively.

If there are problems, identify the cause and try to correct it, or bring it to your supervisor's attention.

Monthly evaluation Certain statistics can be calculated to give you a clearer picture of how your programme is working:

- What percentage of target children were immunized in one month? For the first DPT dose (DPT 1) this is calculated as follows:

$$\frac{\text{Number who received DPT 1}}{\text{Target for month}} \times 100 = \%\ \text{immunized with DPT 1}$$

- What percentage of children who received DPT 3 also received measles vaccine?

$$\frac{\text{Number who received measles vaccine}}{\text{Target who had DPT 3}} \times 100 = \%\ \text{of children who have received DPT 3 and measles vaccine.}$$

- Are children who are sick from the target diseases coming to the clinic? Keep a record of the children who come to your clinic with measles or pertussis. Count up the total every month and make a simple chart. Compare each month with the same month of the previous year. See if the number of cases decrease year by year.

Ask why each child with one of these diseases was not immunized:

- Why did the mother not bring the child for immunization?
- Was the child not immunized because it was sick?
- Did the child have the vaccine and it did not work?

Decide what action to take in each case.

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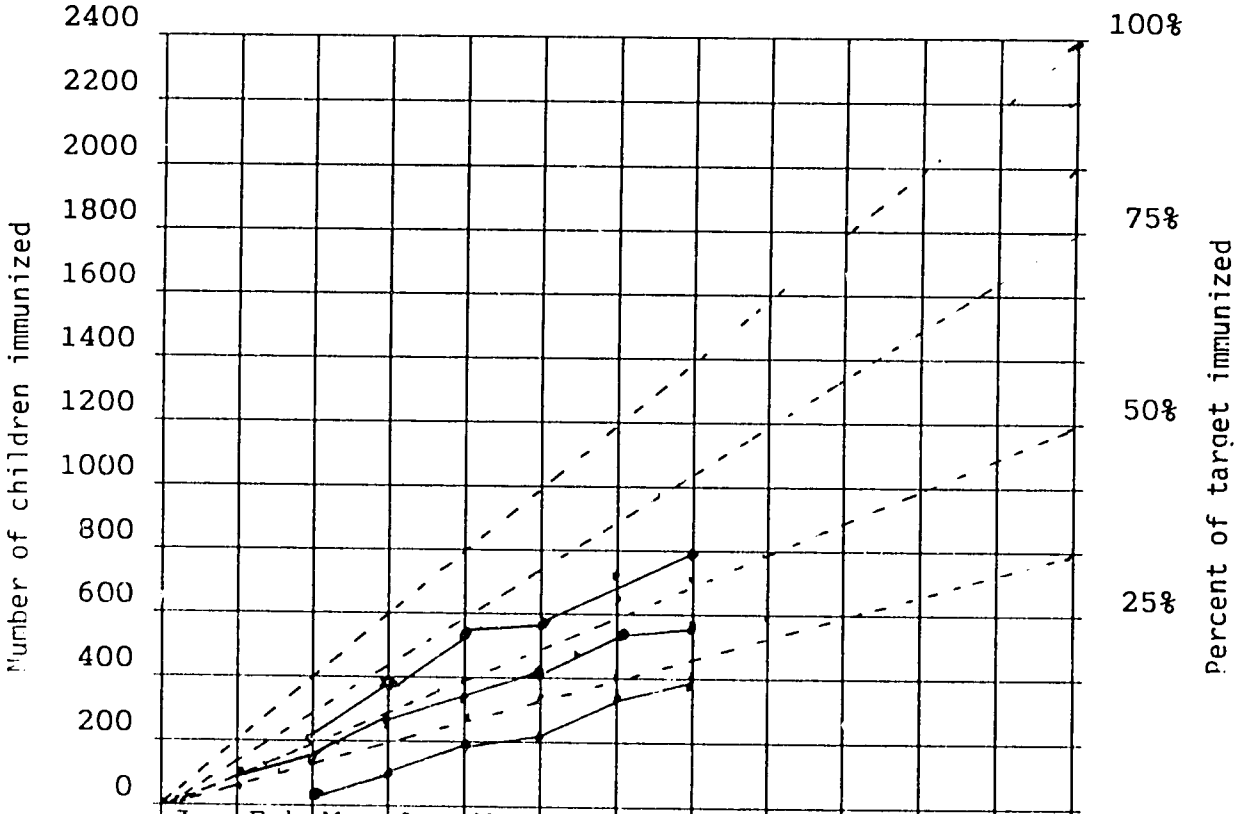
Work out what percentage of the monthly target population of children and mothers you have immunized with each vaccine. When you look at these figures after several months, you can see approximately what percentage of children you are immunizing, whether it is a large or small and if the number is increasing or decreasing.

The immunization monitor chart You can use a special monitor chart which shows the same information in more detail. In some ways the monitor chart is like a child's growth chart; it shows you whether the number of immunized children in your area is growing. You need help from your supervisor to start the chart, but then you can fill it in and read it for yourself.

Understanding the chart Study the chart in the following figure. There are twelve squares going across the chart indicating the twelve months of the year and twelve squares going up and down indicating the number of target children immunized and the percent of the target reached (the percent scale).

The beginning of the year is on the left, and all the lines are at 0, because no children should be immunized at the beginning of the year. The lines rise as they go across the chart, showing the growing number of children who are immunized as the year passes.

Year 1984 Health Centre - Valla
Vaccine DPT 1, 2, 3. Target Pop: 2400



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
DPT	100	100	200	150	0	100	150						No. immunized in one month.
1	100	200	400	550	550	650	800						Cumulative total for year.
DPT	50	90	100	70	0	150	100						No. in month.
2	50	140	200	310	310	400	560						Cum. for year.
DPT	60	70	100	50	0	100	70						No. in month.
3	60	130	230	280	280	380	450						Cum for year.

Fig. 13.36 Immunization monitor chart.

Preparing the chart for your population Fill in the target number scale using your own numbers.

First calculate your yearly and monthly target population. Then use those numbers to make the target number scale on the left side of the chart. This is how you do it:

- Put 0 on the bottom line.
- Move up one space and write the number for one month's target.
- Move up one more space and write the number for two month's target.
- Continue to move up one space at a time; each time add to the previous number the monthly target number.
- When you reach the top space, fill in the target number for 12 months, that is, the yearly target number.
- You can see the yearly target is opposite 100%.

The chart in the figure is filled in for a yearly target of 2400 children.

Write the months of the year from January to December. These go along the bottom of the chart.

Filling in the chart You can use the chart to monitor one or several vaccines. Make a separate line on the chart for each vaccine. Fig. 13.36 is filled in for all three doses of DPT. Below the chart you can see some rows of spaces. Here, you write the number of doses that you gave of each vaccine, using two rows of spaces for each vaccine. In the top row of spaces, write the number of doses that you gave in each month separately. You can see in the figure they gave 150 doses of DPT 1 in July.

In the lower space, write the total number of doses that you have given thus far this year. That is all the previous months and this month added together. This is called the "cumulative total."

You can see that the cumulative total number of doses of DPT 1 from January to July was 800.

Drawing the line on the chart:

- Find the vertical line at the end of the month.
- Follow that line until you are opposite the number on the target number scale that is the same as the cumulative total for the vaccine.
- Make a dot.
- After some months, join the dots to make a line for each vaccine.

Interpreting the chart See which % line your own cumulative total line is near. That will tell you approximately what percentage of your target population you are immunizing as the year passes.

How successful is your programme?

- If your line is between the 75% and the 100% target lines your programme is very successful. Few programmes are this successful.
- If your monitor line is between the 50% and the 75% target lines, your programme is moderately successful.
- If your monitor line is below the 50% target line your programme is somewhat successful.
- If your monitor line is below the 25% target line your programme is not successful at all.

What do you do if you find that you are reaching less than 50% of your target? You must try to find out why.

Ask yourself these questions:

- Are you doing what you promised you would do. Are you reliable and punctual?
- Are your sessions easy and pleasant to attend? In some places the market day is a good day. In other places, market day is a bad day. In some places the early morning is a good time. In other places the afternoon is better.

Ask other workers in the clinic:

- Do they know of any reason why people do not come.
- Don't forget to ask superiors, people might say things to them that they would not say to you.

Ask the people:

- Ask people who do come to the clinic why they come (it may give you an idea about how to encourage others to come).
- Ask if they know why mothers don't come.
- Ask ordinary people in the village or market why people won't come.

Ask the community leaders:

- Do they know of any problem that people have with your immunization programme?
- If you notice that nobody from a certain area or village comes to your session, talk to the community leaders to find out if there is a special reason for this.

Discuss the problem with your supervising officer and decide what you can do about it.

GLOSSARY

Abscess: A localized collection of pus in any part of the body.

Ampoule: A small glass vial that can be sealed.

Antibody: Protein substance made by the body to fight foreign substances such as viruses and bacteria (germs).

Antiseptic: An agent that prevents the growth of micro-organisms.

Attenuated: Reduced virulence or potency of micro-organisms.

Bacteria: Micro-organism that can cause disease.

Contraindication: A symptom or circumstance indicating the inappropriateness of a form of treatment.

Convulsion: Involuntary muscular contractions and relaxations of one part or the whole of the body.

Diluent: Making thinner or less concentrated; to dilute.

Disinfect: To free from infection by killing micro-organisms.

Expiration date: The point at which a substance is no longer usable.

Gauge: The diameter of the needle of a syringe.

Intradermal: Administered within the layers of the skin.

Intramuscular: Administered within a muscle.

Mycobacterium: A bacteria that causes tuberculosis and leprosy.

Reconstituted: To restore to its full condition by the addition of water or solution.

Sediment: The substance settling at the bottom of liquid.

Sterilization: To free from micro-organisms.

Subcutaneously: Administered right beneath the skin.

Toxin: A poisonous substance produced by an organism.

Toxoid: A toxin that is rendered incapable of causing disease but can still induce the formation of antibodies.

Ulcer: An open sore or lesion on the skin or mucous membranes of the body.

Vaccine: Killed or modified virus or bacteria used to prevent or treat certain infectious diseases.

Virus: Micro organisms that cause a variety of infections.

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Suggested learning activities:

1. When in the static centre of an RHC or District Headquarters Hospital, be responsible for maintaining records of refrigerator temperature using a thermometer twice a day for one week. Check the temperature when you come on duty and when you leave.
2. Prepare and pack all material needed for a mobile immunization clinic (minimum of five sessions).
3. Help plan and conduct five mobile immunization clinics.
4. Give immunizations.
5. Help keep records of five immunization sessions.

Review questions:

1. What is meant by the Expanded Programme of Immunization?
2. List the diseases for which vaccinations are available and state when each should be started, how many doses should be given and at what interval.
3. What is meant by the potency of a vaccine? How is the potency lost?
4. Describe how to store vaccines.
5. When would you discard/throw away vaccines?
6. Would you vaccinate a sick child?
7. When would you use disposable syringes and when would you use glass syringes?
8. What do you need to consider in using glass syringes?
9. What size needle and syringe would you use for giving:

   - Intradermal injections.
   - Subcutaneous injections.
   - Intramuscular injections.

10. Describe the procedure for cleaning, wrapping and boiling syringes and needles.
11. Describe how you would give a Polio vaccine.
12. How much (dose) of following vaccines is to be given?

    - Polio
    - Measles
    - DPT
    - DT
    - TT
    - BCG

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13. What information and advice should Health Technicians give to mothers/fathers whose children have been vaccinated?
14. Describe all possible reactions from vaccines and give your activities for each.
15. Before you plan a site for an immunization session, what two types of information do you require?
16. How do you estimate the number of children in your area?
17. What is the minimum number of contacts required for a child to complete an immunization series?
18. What information do people need to be convinced about the value of immunizing children?
19. What is the ideal site for an immunization clinic?
20. What records and health education materials are necessary for an immunization clinic?
21. Describe the method of packing vaccines in a vaccine carrier.
22. How long can you keep a vaccine in a vaccine carrier?
23. Describe ways to keep the vaccine cool on the immunization table.
24. Describe the Health Technician's activities in conducting an immunization session.
25. What do you need to keep in mind when setting up the immunization area?
26. Where can health education classes be conducted?
27. What is a tally sheet and how can you use it?
28. What is an immunization monitor chart and how do you use it?
29. How do you evaluate your immunization programme?

LEARNING ACTIVITIES RECORD

Name of student_____

ONE WEEK ACTIVITY

		Date	Date	Date	Date	Date	Date	Date	Date
Checking the temperature of the refrigerator with vaccines for one week.	AM								
	PM								

A MINIMUM OF FIVE OF EACH ACTIVITY

	Date and place	Date and place	Date and place	Date and place	Date and place
Preparing and packing for an immunization session.					
Conducting an immunization session					
Keeping a record of an immunization session.					

RECORD OF IMMUNIZATIONS GIVEN

Polio										
BCG										
DPT										
TT										
Measles										

EVALUATION FORM

*CHAPTER*_____

Organization of content [ ] Appropriate
[ ] Inappropriate

Method of presentation [ ] Simple to understand
[ ] Difficult to understand

Amount of content [ ] Adequate
[ ] Inadequate

Any other comments:

Write a paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 14

ENVIRONMENTAL HEALTH

Objectives After completing this chapter you will be able to:

1. Describe what environmental health means.
2. List various disease causing organisms and briefly describe them.
3. Discuss diseases caused by:

   - Bacteria.
   - Parasites.

4. Describe three major sources of infection.
5. Discuss why water is a source of life as well as of infection.
6. Describe the water cycle and how contamination occurs.
7. State what the cleanest source of water is and give reasons.
8. List various types of dry and wet refuse.
9. Give reasons for the need to dispose of excreta and refuse adequately.
10. Describe the various methods used for the disposal and treatment of excreta and refuse.
11. Describe how insects transmit disease and list the diseases they are responsible for.
12. Describe how Health Technicians manage environmental health problems at three levels.
13. Discuss the Health Technician's activities at the community level.
14. Describe the procedure for chlorination of water.
15. Describe methods of making water safe for drinking.

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CHAPTER 14

ENVIRONMENTAL HEALTH

Before we can discuss environmental health, we must understand what is meant by the environment. Environment is a word used to describe all living and non-living things and conditions in and around a person which influence his being. The environment has a direct influence on the well-being or health of a person. Our surroundings can affect our well-being in either a negative or positive way. Experience with various environmental factors and scientific advancements leads us to believe that we can alter some of these factors to improve our health status. Environmental health deals with these factors in the environment and how they affect our health.

As Health Technicians you should be familiar with those environmental factors within and around us which cause disease and ways to prevent those diseases. This chapter will deal with:

1. Organisms that cause disease.
2. Water as a necessity of life and as a source of infection.
3. Refuse and excreta as sources of infection.
4. Insects as transmitters of infection.
5. The Health Technician's activities in controlling the spread of disease at the individual, family and community level.

14.1 ORGANISMS THAT CAUSE DISEASE

The human body harbours many living organisms, such as bacteria, viruses, parasites and fungus. Some parasites are large enough to be seen by the eye, however, other parasites, as well as bacteria, viruses and fungus can only be seen through a microscope and so are called micro-organisms.

Although many organisms are capable of producing disease, not all are harmful to the body. Non-pathogenic micro-organisms do not cause disease under normal circumstances. Outside the body they may serve useful purposes, like making curd, cheese, bread, alcohol and breaking down refuse and sewage. The harmful or disease

causing organisms are called pathogenic and are sometimes referred as germs.

There are four main types of organisms that can cause disease:

Bacteria These are one-celled organisms that are capable of causing many infectious diseases. They come in many shapes and are named accordingly: cocci (round), bacilli (rods), spirochetes (spiral).

There are three types of cocci: diplococci, which come in pairs and cause such infections as pneumonia, gonorrhea and meningitis; staphylococci, which come in clusters and cause boils and food poisoning; and streptococci, which are in chains and also cause pneumonia and other infections.

Bacilli cause such serious diseases as tuberculosis, leprosy, tetanus, diphtheria, typhoid fever and whooping cough. Spirochetes cause syphilis.

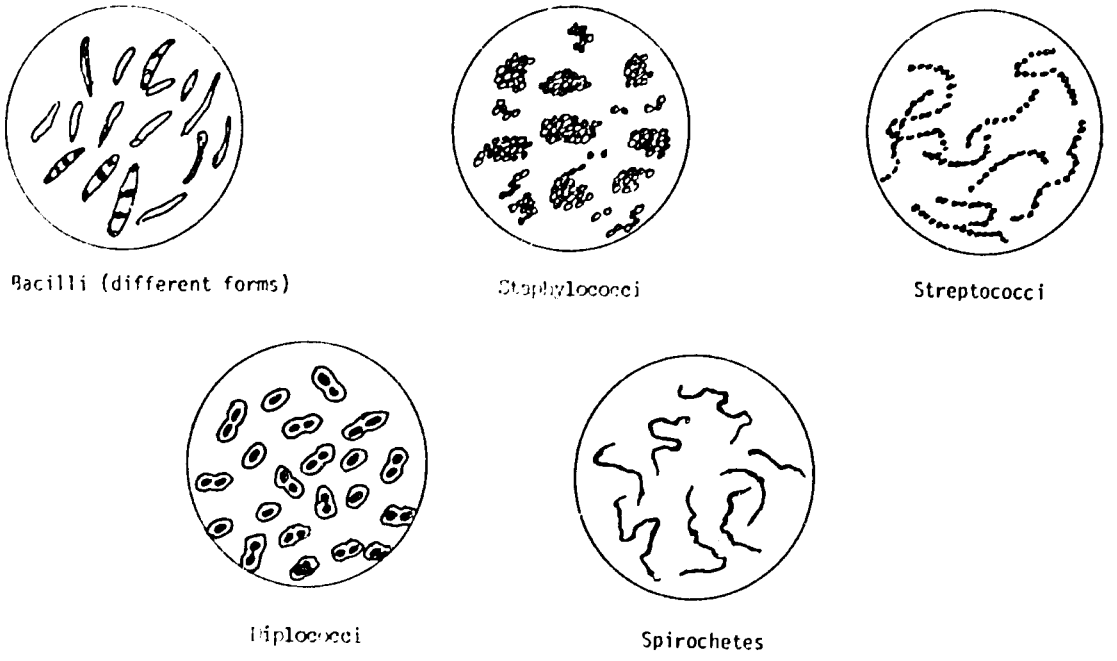

Fig. 14.1 Shapes and types of bacteria.

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Fungus These microscopic plant-like organisms cause diseases like thrush and ringworm. As yeast and mold they are used in making bread, wine and penicillin.

Parasites Microscopic parasites are called protozoa. These organisms are responsible for malaria and dysentery.

Parasites are always harmful, since they depend on another living system for their sustenance. They cannot survive outside the host (the living system that sustains them). Some parasites, like worms, are quite large while others, like amoebas, are microscopic. Parasites usually live in the gastrointestinal tract and hatch from eggs to develop and mature inside the body.

Viruses These are the smallest micro-organisms that cannot even be seen with an ordinary microscope. They cause diseases like the common cold, measles, polio, chickenpox and rabies. Although bacteria, parasites and fungus can be treated by antibiotics and other medicines, there is no treatment as yet for the virus.

Micro-organisms, whether they are non-pathogenic or pathogenic, are present everywhere in our environment. They are present in our body, in the air, in refuse, in water and in some foods.

If food and water become contaminated by pathogenic micro-organisms, they become sources of infection. When a person eats or drinks contaminated food or water, he ingests organisms which develop and multiply and cause disease. The most common diseases caused by micro-organisms and parasites are described below. Viral diseases and fungal diseases have been discussed in other chapters.

DISEASES CAUSED BY BACTERIA

Typhoid fever This systemic disease is caused by the typhoid bacillus which is ingested via water or food, often contaminated by flies. The symptoms include fever, loss of appetite, a general feeling of tiredness, a slow pulse, rose spots on the trunk and constipation rather than diarrhoea.

The diagnosis of typhoid fever is made by a blood, faeces or urine test. Typhoid bacilli are found in the blood early in the disease and in the faeces and urine after the first week of infection.

Cholera This is a serious acute intestinal disease characterized by the sudden onset of vomiting, profuse watery stool, rapid dehydration and collapse. The disease can become very serious and may even result in death within a short period. The source of infection is water or food that is contaminated, often via flies. The diagnosis is made by the identification of Cholera vibrios bacteria in a stool examination.

DISEASES CAUSED BY PARASITES

Amoebic dysentery This parasitic infection may take many forms. There may be no symptoms, mild abdominal discomfort and diarrhoea alternating with constipation, chronic diarrhoea with mucous and some blood or acute dysentery with blood, mucous and pus in the faeces. The diagnosis is made by identifying the organism or cysts in the stool.

Guinea worm disease This is caused by a worm which may be as long as one metre and very thin. This worm usually migrates from the stomach or intestine to the subcutaneous tissue, usually of the leg. The source of infection is contaminated water. Young larvae of the Guinea worm are discharged into water from skin lesions, usually of the leg or foot of an infected person. In the water, these larvae are not visible to the eye. They are swallowed by tiny cray fish known as cyclops. When a person drinks water containing infected cyclops, larvae are liberated in the stomach or intestine where they mature into the adult stage and reach the subcutaneous tissue to release the eggs. The diagnosis is made by identifying the larvae under the microscope or by identification of the worm itself.

Pinworms Pinworms are very small, thin, round worms that enter the intestine and cause mild symptoms. They usually affect children of three years of age and older. The main symptom of this disease is itching around the anus at night. The eggs of the pinworm usually enter a person's body by mouth via contaminated food or hands and leave the body via the anus. Pregnant female worms migrate down to the anus during the night to release eggs. This is what causes itching during sleeping hours.

Fig. 14.2 A pinworm.

Roundworms (ascariasis) These are large, round worms about 8 to 12 inches long. When these worms are present in the body, a person usually has vague symptoms of abdominal pain, vomiting, restlessness, disturbed digestion and sleep. The first definite sign of this disease is the presence of worms in the stool or vomitus.

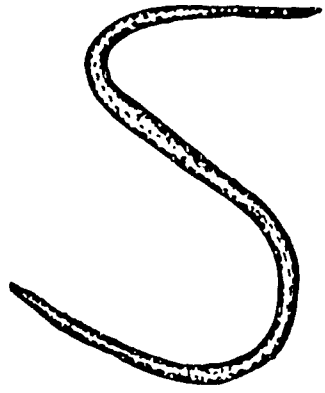

Fig. 14.3 A roundworm.

Hookworm A person suffering from hookworm is chronically ill with a variety of vague symptoms. Hookworms attach themselves to the intestinal walls and suck the blood, causing anaemia. Hookworm eggs usually enter the body through the skin of the foot via contaminated soil and are excreted in the faeces.

Fig. 14.4 A hookworm.

Tapeworms These are long flat worms that attach to the intestine. Segments of the worm are passed in the stool. If the head is passed, this assures the elimination of the rest of the worm. Tapeworms are very difficult to treat. The source

of infection is usually soil contaminated with eggs. The eggs are ingested and the tapeworm matures in the body.

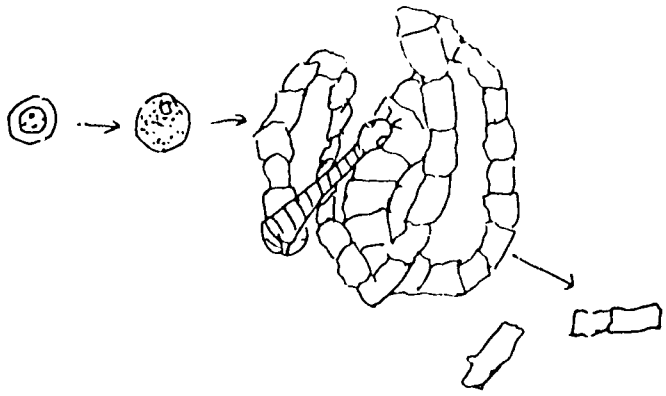

Fig. 14.5 A tapeworm.

Malaria This is also caused by a parasite. Details are covered in the communicable disease chapter.

Most organisms need warmth, moisture and darkness to grow and multiply. Bacteria multiply by dividing in half. They produce spores which can survive in unfavourable conditions and are difficult to destroy. Bacteria also produce toxins (poisonous substances) which affect different body tissues.

Certain steps can be taken to inhibit or destroy these disease causing micro-organisms which contaminate food and water. Bacteria are destroyed by high temperatures, therefore boiling for 10 minutes will kill most of these heat sensitive organisms. Cold will slow down their growth, so food should be stored in a cold area. Most organisms grow best in a neutral or slightly alkaline medium, an acid medium will prevent their growth. This is the reason for pickling. Bacteria also like darkness and most are destroyed by sunlight.

Pathogenic micro-organisms are often spread by insects. Flies carry disease causing micro-organisms from refuse (dirt or excreta) on their legs and contaminate food or water. Mosquitoes spread disease by biting and drinking the blood of an infected person which contains parasites and then biting a healthy person. These parasites live and grow in mosquito s and are transmitted through the bite. Other insects can carry infective organisms the same way.

The source of infection can therefore be contaminated water, contaminated food, refuse or insects.

14.2 *WATER, A NECESSARY ELEMENT OF LIFE AS WELL AS A SOURCE OF INFECTION*

Water is basic to life; no one can live without it. More than half of our body weight consists of water. A village or community cannot survive without a water supply either. Water is needed for:

- Drinking and cooking.
- Washing and cleaning.
- Growing food.
- Fire-fighting, industrial use and for generating electricity.

Where do we get our water? There are three main sources of water:

1. Rain.
2. Surface water: any water on the surface of the ground such as streams, rivers, canals, ponds or lakes.
3. Ground water: water that come from beneath the ground such as underground springs and wells. In certain parts of Pakistan, there are artesian or "Karez" wells (flowing underground streams tapped by a dug well).

These three sources of water are part of the water cycle, a continuous circle of water from the sky to the surface to the ground. As rain falls from the clouds, part of the water remains on the surface of the ground and part becomes ground water. Eventually the ground water reaches the earth's surface again. Heat from the sun causes this water to evaporate and again form clouds. In this way the water continues its cycle. This cycle determines the quality and quantity of water available for our use.

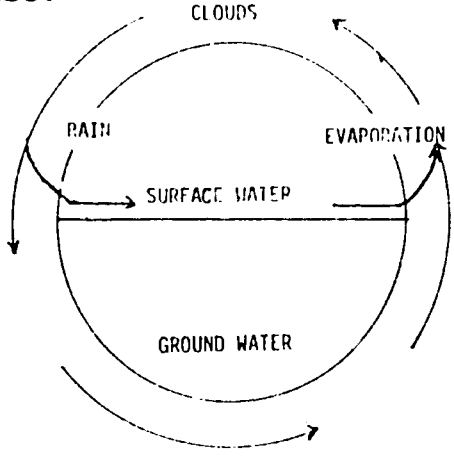

Fig. 14.6 The water cycle.

During this cycle, water can become contaminated. Rain water is of high purity. However, as it falls it picks up some dust in the air. The contamination of water by dust is still minimal. When water comes into contact with the surface of the ground, it can become very contaminated, especially in highly populated areas where excreta is disposed of in the streets or fields.

People take their drinking water from moving surface water (streams, rivers, canals), still surface water (ponds, lakes) and ground water (springs, underground streams tapped by wells). However, the best water system is piped water going directly from surface or ground water into or near to the home.

The most common water sources in rural Pakistan, in order of common use, are as follows:

PUNJAB	*N.W.F.P*	*SIND*	*BALUCHISTAN*
1. Hand pumps (drilled wells).	1. Dug wells.	1. Hand pumps (drilled wells).	1. Springs (Open).
2. Dug wells.	2. Ponds, canals, streams, lakes, rivers.	2. Dug wells.	2. "Karez" (fast flowing underground streams, taped by a well).
3. Canals, rivers, ponds.	3. Hand pumps (drilled wells).	3. Canals, ponds, rivers.	3. Dug wells.
4. Springs.	4. Springs.	4. Springs.	4. Lakes.

The quantity of fresh water The quantity of fresh water determines its availability for personal and food hygiene purposes. The definition of "water for personal and food hygiene purposes" is that water which a person uses in washing himself and his clothes, in flushing a water sealed privy, in washing food, cooking utensils and the food preparation area. A person will always collect and carry enough drinking and cooking water to meet the needs of the family no matter how long it takes or how difficult the journey to and from the water source, but this is not necessarily so when it comes to drawing water for personal hygiene purposes. When there is a decrease in the quantity of water available or if it is too

difficult to obtain, there is an increase in disease rate since less water is used for hygiene purposes. The two most common water sources in rural Pakistan are surface and ground water. Both of these sources are usually located quite a distance from residential areas. Water needs to be carried by humans or animals from the source to the house. One way to safeguard against disease is to make sure that sufficient water is supplied to the house via pipes connected from the water source.

The quality of the fresh water supply When we think of water quality, we are primarily concerned with the quality of drinking water which directly affects our health. In reviewing the "cycle of water," rain water is initially of high quality. As the rain falls, it picks up some dust in the air, but the contamination of the rain water by dust is minimal. It is when the rain comes in contact with the surface of the ground that the water becomes highly contaminated, especially in populated areas where there is ar absence of human excreta disposal facilities.

The taste, appearance and smell of water are factors we all use to determine whether or not to use a water source. Some minerals in water can cause an unpleasant taste or appearance and people will not like using this water for drinking. Similarly, certain types of salts render water unfit for washing clothes and for cooking purposes. This is called hard water.

Piped water is the best type of water to use for drinking, cooking and other uses. This is because the water in a pipe does not come into contact with the surface of the ground and therefore, does not become contaminated. If piped water is unavailable, families need to be instructed to boil drinking water for 10 minutes to destroy disease causing organisms.

It is clear that there must be a sufficient quantity of fresh water of good quality (uncontaminated) if the health status of a community is to be improved. Therefore, the community should be educated about this and encouraged to get a piped water supply system or a well-fitted hand pump in or near the house. Then sufficient water would be available. Health Technicians should identify the water supply problems in each area, bring them to the attention of the community leaders and help them properly install pumps or wells.

In order to help you work with the community, guidelines for the proper construction and maintenance of hand pumps and

wells and for making surface water safe for drinking are discussed.

Rules for installing a hand pump or a dug well:

1. The distance of the dug well or pump from the privy/latrine/refuse pit should be 25 feet (8 metres).
2. The water should be chlorinated after drawing.
3. The platform should be constructed with water-tight material.
4. The drainage ditch should be 100 feet (32 metres) from the well and should be connected to a street drain, disposal tank, community pond or irrigation system for final disposal.
5. The pump should be properly fitted. There should be no leaks or holes allowing contaminated water to enter the well.

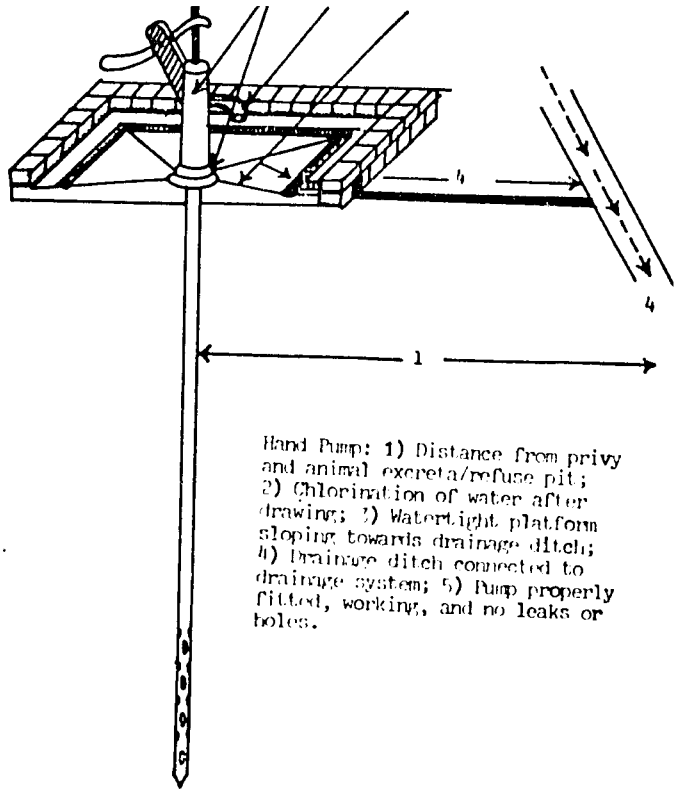

Fig. 14.7 ***Proper construction and maintenance of a hand pump.***

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There are two main problems which you may confront with wells/pumps in the community. The well may be either too close to or downhill from a privy, animal excreta pit or refuse pit, or the water may not be chlorinated. The following table describes these and other problems that may be encountered when assessing the safety of wells and pumps as well as other water sources such as rivers, streams and canals.

TABLE 14.1 PROBLEMS WITH WATER SAFETY AND THE HEALTH TECHNICIAN'S ACTIVITIES

Problems	*Health Technician's activities*
HAND-PUMP/DRILLED WELL	
1. The distance from the privy, animal excreta pit or refuse pit is less than 35 feet on flat ground or less than 25 feet downhill. (Bacteria in the excreta travel through the soil to the ground water and contaminate it).	- Advise closure of well and tell community to get water from a safer source until a new well is constructed. - Chlorinate all sources of drinking water. - Advise sealing of privy. - Inform supervisory staff about this problem.
2. Water from the hand-pump has not been chlorinated after its installation.	- Chlorinate the well (see procedure).
3. Platform is not constructed with a slope toward a drain.	- Advise reconstruction of a platform with a water-tight material like cement concrete, which slopes toward a drain.
4. Final disposal of waste water from the platform is non-existent.	- Advise the construction of a drain running 100 feet from the hand-pump to connect with a street drain, disposal tank or irrigation system.
5. Pump fittings on the elevated platform are not adequate and contaminated water enters the well.	- Advise replacement with proper pump fittings so that leaks or holes are not present.

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TABLE 14.1 PROBLEMS WITH WATER SAFETY AND THE HEALTH TECHNICIAN'S ACTIVITIES

Problems	*Health Technician's activities*
DUG WELL	
Problems 1 and 2 of hand pumps/drilled wells are applicable for dug wells as well as are the additional problems below:	- Same as for hand-pumps or drilled wells.
1. Accessible to animals; presence of floating material on water.	- Advise cleaning of the well and provision of parapet wall.
2. Water-tight lining of the well is inadequate.	- Advise provision of an adequate water-tight lining .
3. Improper sloping of platform and no parapet wall.	- Advise sloping the platform for drainage and building a parapet wall 3 feet above the ground level.
4. No drainage ditch for final disposal.	- See problem 4 for hand-pumps.
5. Inadequate water-tight cover. Hand-pump generator pump not present.	- Provide water-tight cover with provision for chlorination. - Arrange and install hand-pump generator pump.
6. Improperly fitted cover with leaks and holes allowing contaminated water to enter well.	- See problem 5 for hand-pumps.

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TABLE 14.1 *PROBLEMS WITH WATER SAFETY AND THE HEALTH TECHNICIAN'S ACTIVITIES*

Problems	*Health Technician's activities*
RIVERS, STREAMS AND CANALS	
1. Water is not clear, transparent and odourless.	- Clear water does not necessarily mean safe water. It may be contaminated due to washing and bathing, animal excrement or use of insecticides upstream. Therefore, advise boiling of all water.
2. Contamination upstream or near the point of drawing water.	- Health education by the Health Technician/Community Health Worker should focus on relocating the point of drawing water. - Advise removal of cause of contamination.
3. Absence of a filtration system.	- Begin a health education campaign for the provision of filtration system.
4. No chlorination or boiling of water.	- Advise about the need for chlorination/boiling.
SPRINGS	
1. Absence of chlorination or boiling.	- Educate on the need for chlorination or boiling.
2. Absence of trench around spring.	- Advise the building of a trench 45 feet uphill and around the spring to divert water. - Ensure commitment by the community to dig and maintain the trench. - Supervise maintenance.

TABLE 14.1 PROBLEMS WITH WATER SAFETY AND THE HEALTH TECHNICIAN'S ACTIVITIES

Problems	Health Technician's activities
3. Absence of collection structure (reservoir) with overflow pipe.	- Health education concerning the need for the construction of a collection structure. - Motivate community to provide financial and labour assistance and maintenance. - Seek technical assistance from Public Health Engineering Department. - Monitor construction and maintenance. - Advise community to protect water source from rodents and animals by the use of a screen or fence.

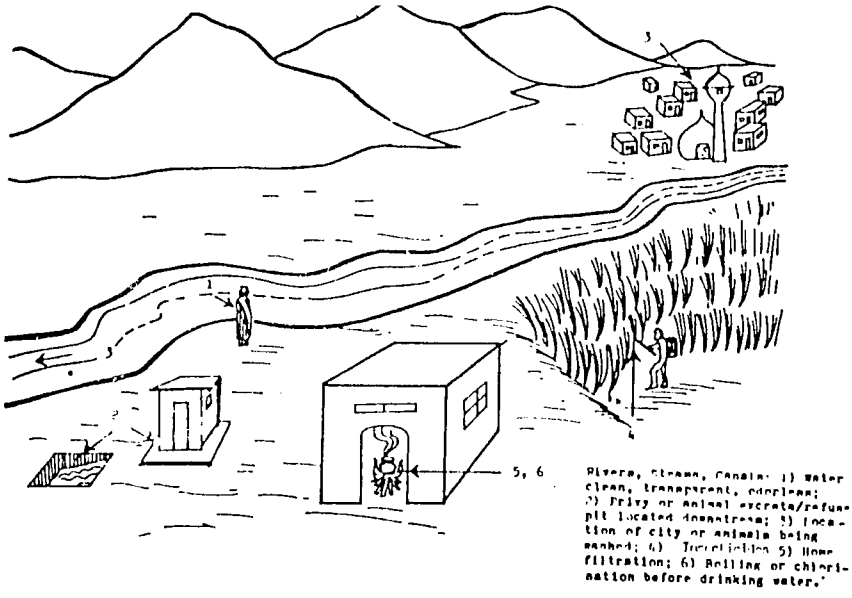

Fig. 14.8 *Making surface water (rivers, streams and canals) safe for drinking.*

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14.3 *REFUSE AND EXCRETA AS SOURCES OF INFECTION*

Water and soil become contaminated with disease-causing organisms if there is no proper system for the disposal or treatment of refuse and excreta. Refuse means any kind of waste material, wet or dry. Excreta means urine and faeces. Some examples are given below:

Dry or solid refuse:

1. Garbage, kitchen waste, left-over food.
2. Rubbish, plastic and rags, broken glasses, bottles and tins, waste paper.
3. Animal dung.
4. Weeds, grass and leaves.
5. Ashes from burning wood, cow dung and charcoal.
6. Dirt from sweeping.
7. Dead animals.

Wet or liquid refuse:

1. Waste water from the house: from bathing and washing clothes, foods and other things.
2. Waste from public wells or washing places.
3. Waste from cattle sheds and market places.
4. Waste from small industry.

If not disposed of or managed properly, refuse becomes a nuisance and results in:

- A breeding place for insects and rats.
- The growth of disease-causing organisms (contamination).
- Unpleasant sights and smells.
- Falls and other accidents due to wet things like fruit skins on the path.

Excreta In developing countries, excreta is not disposed of or treated properly. Excreta is usually disposed of in two ways:

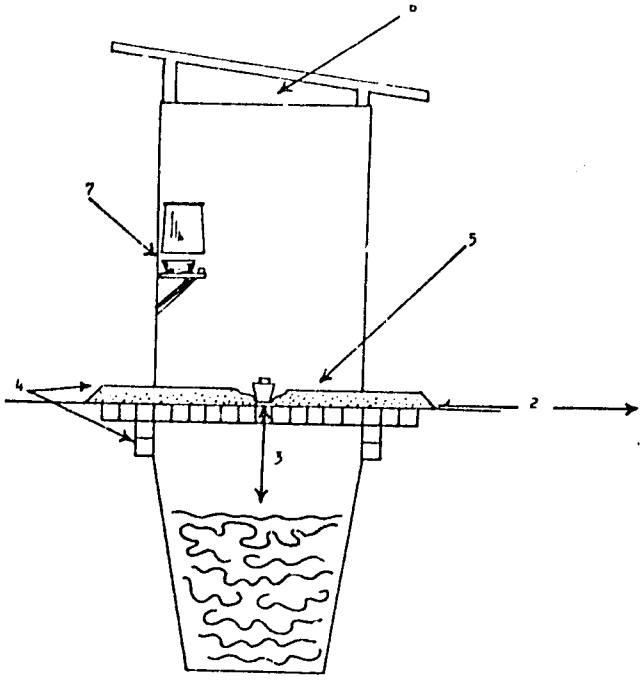
1. People defecate on the ground and leave it uncovered.
2. People defecate in one place and the faeces is then carried elsewhere and used as fertilizer. This is called the carriage system.

Urban areas use a water carriage system. Excreta and wet refuse are collected in large sewer pipes and transported to a central location as untreated sewage.

People need to be shown how to properly treat or dispose of excreta and refuse. If excreta is not treated or disposed of properly, it will contribute to the spread of the following conditions:

- Diarrhoea.
- Typhoid.
- Cholera.
- Dysentery.
- Pinworms, roundworms, hookworms and tapeworms.

It has been found that a privately owned latrine is the best way of disposing of excreta in terms of cleanliness and convenience. There are three type of latrines: sanitary latrines, simple latrines and service type latrines.



Pit Privy: 2) Distance from water source; 3) Depth of excreta; 4) Elevated slab support, no holes or cracks; 5) Floor slab and pan clean; 6) Ventilation; 7) Soap and water for washing hands.

Fig. 14.9 Sanitary latrine.

Sanitary latrine The water-seal pit latrine is the best type of sanitary latrine. In constructing this type of latrine, two points should be kept in mind. First, the latrine should be at least 15 to 20 metres from the home and water

source. Secondly, there should be space for a second pit when the first one is full. This latrine consists of:

1. A squatting plate made of cement concrete that is three feet square and two inches thick.
2. A pan which has a smooth surface and slopes from front to back.
3. A trap which is a bent pipe three inches in diameter and connected to the pan. It holds water and acts as a water seal. The water seal prevents the smell of excreta from entering the pit and keeps away flies.
4. A connecting pipe about three inches wide and three feet long which connects to the trap and slopes down to the pit.
5. The pit or dug well should be one metre square or one metre in diameter and 2 1/2 metres deep. It must be provided with a strong cover below ground level which is covered with earth. Inside the pit, the excreta is made harmless by anaerobic bacteria.
6. A superstructure screen is used for privacy and can be made of any material.
7. Water is used for flushing and washing.

Once the latrine is constructed, individuals have to be taught about their responsibility in its maintenance. If the latrine is used and maintained properly, it can last three to four years for a family of five. Each time the latrine is used for defecation, it must be flushed with one litre of water. The squatting place should be washed frequently and kept clean and dry. Disinfectant should not be used. This would destroy the action of the bacteria in the pit.

When the pit is full, the latrine can no longer be flushed. A fresh pit may be dug and connected to the latrine structure. The old pit should be left for six months; then the contents may be dug up and used as manure.

Simple latrine This type of latrine is recommended for areas where there is a shortage of water or when a sanitary latrine cannot be constructed. To construct a simple latrine:

1. Dig a pit 20 metres from the house and water source. It should be 1/2 metre wide and 1 to 2 metres deep.
2. Make a platform of wood or cement with a hole in the center. Place this over the pit. Make a wooden cover with a handle to fit the hole.

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3. Use screens to surround the latrine. Screens should be built in such a way that they can be moved along the trench.
4. After each use, lime, ashes or soil should be thrown in the pit to reduce the smell and flies.
5. As the pit is filled up dig another one next to it and move the screen.
6. The latrine should be kept clean by careful use and frequent washing.

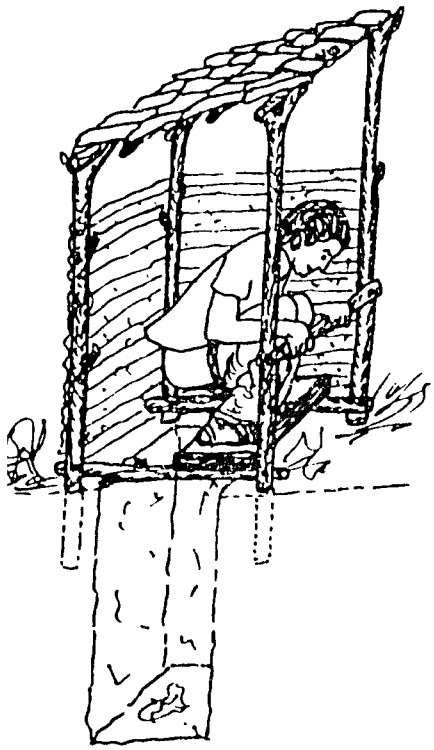

Fig. 14.10 A simple latrine.

Service type latrine Buckets or containers are used for defecation or urination and the buckets are then emptied. This is recommended when a person is too sick to go out and use a latrine.

Proper use and care of latrines can minimize the contamination of water and eliminate this source of infection. Proper disposal of refuse will have the same effect.

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14.4 DISEASES TRANSMITTED BY INSECTS

Not only are contaminated soil, water and refuse sources of infection but insects can carry pathogenic micro-organisms and either transmit them to humans or further contaminate food and water. Flies, for instance, are a source of infection for typhoid, cholera and dysentery by contaminating food or drink. Eliminating flies will greatly reduce the risk of these infections. The following table shows what insects are responsible for the spread of various diseases. Mosquito control is discussed fully under malaria in the chapter on communicable diseases.

TABLE 14.2 INSECTS AND THE DISEASES THEY TRANSMIT

Insects	*Diseases*	
Flies	Typhoid fever Cholera Diarrhoea Dysentery Worms	Amoebiasis Gastroenteritis Poliomyelitis Conjunctivitis
Mosquitoes	Malaria Filaria (elephantiasis)	
Lice	Typhus Trench fever Relapsing fever Dermatitis	
Bugs	Dermatitis	
Fleas	Plague	

Insect control This is primarily the responsibility of individuals within the community, with the assistance of Health Technicians.

A common breeding place for insects is stagnant water. Used water from households will collect in front of the house if there is no facility for its proper drainage. This will result in a breeding place for insects. The community should be provided with street drains which lead the water away from the village for disposal. As for lice, fleas and bugs, if adequate personal hygiene habits are developed and frequent bathing and washing of the hair is maintained, this will not be a problem.

Proper latrine construction, utilization and maintenance is also a very important means of preventing the breeding of

insects, especially flies. The fly goes through four stages of development: egg, larva or maggot, pupa and adult fly. The development from the larva stage to the adult fly takes about one to two weeks. Obviously, flies breed and multiply rapidly. Flies like to lay their eggs on matter such as faeces, garbage, rotten food, sugar mash and any other material that is either smelly, fragrant, sweet, fishy or rotting. Sanitary management of any place containing such matter is a must. The control of human and animal faeces is important. Latrines, if properly constructed and maintained, can help to prevent flies from breeding in human faeces. Fencing around stables and barns and cages for chickens and ducks helps to contain animal faeces to a small area where it can be collected and treated.

Compost pit One way to control fly breeding areas is to help families make a pit for depositing animal excreta and refuse. Depending on the seasonal conditions, compost makes an excellent fertilizer and is ready in three to five months. You as Health Technicians can guide families in constructing and maintaining a compost pit.

The fact that composting makes a good fertilizer may be the major motivation for community members to construct such a pit. A site needs to be selected for construction. In addition, a health education campaign concerning fly control should be carried out. Even if people are interested in using a compost pit, and committed to digging and maintaining it, in some areas of the Punjab there is just not enough private land for the construction of such a pit and other alternatives have to be found.

The location of a refuse or compost pit is very important, it cannot be dug just anywhere. Most important is the location of the pit in relation to the drinking water source. The pit should be 33 feet (12 metres) downhill from the drinking water source. In addition, it should be located 100 to 200 feet (32 to 64 metres) downward of the house and on low level ground if possible. If the pit must be emptied, fill the site with dirt and locate a new pit site.

The pit should be 6 feet long and 3 feet wide with a sloping bottom (ramp-type) running from a minimum depth of 1 foot to a maximum depth of 4 1/2 feet. Such a pit can be dug larger and deeper, depending upon the needs of the family. If the pit is filled before the contents are ready to be used as fertilizer, a second pit can be dug.

It is essential to cover the contents of the pit each time

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manure or refuse is added with a layer of dirt and water. This will prevent flies from breeding in the manure and refuse and prevent the pit from becoming useless.

Proper care of the refuse pit is the responsibility of each family and should be periodically checked by members of the health team like yourself or a sanitary inspector during visits to the community.

Additional steps for fly control Concrete poured over areas surrounding latrines and lavatories will seal off cracks and prevent maggots from entering the soil. Avoid applying lime to areas around latrines since lime has a tendency to hasten maggot penetration (into the soil) and pupae development.

The following may help eliminate adult flies:

- Fly swatting. Attract flies with strong smelling matter before swatting.
- Preparing a poisonous bait for killing flies by crushing tobacco leaves and adding a rice gruel or congee or preparing a solution of 0.1% DDT and adding to gruel, soup stock, rotton fruits or vegetables. Leave exposed to flies.
- Spraying with insecticides. Crush the leaves of the castor plant, dilute the extracted juice and use as a spray or make up a solution of pyrethrum for the same purpose.
- Ten millilitres of 80% DDT added to water to make 8000 ml of solution can be sprayed over fly breeding areas.
- Flies can be smoked out of houses by burning wild grass. Food and clothing should be stored elsewhere while the house or barn is being smoked.
- A wire screen should cover the food cupboard. Exposed food should also be covered.

14.5 THE INFLUENCE OF HEALTH TECHNICIANS ON ENVIRONMENTAL HEALTH

Health Technicians can affect and improve environmental health at three different levels: the individual, family and community level. An individual's behaviour affects the family's health status and the family's resources and behaviour affect the individual. Therefore, the Health Technician's activities at the individual and family level are discussed as one. Improving the environmental health status of an individual and family will contribute to the improvement of the environmental health of the community.

In working with individuals and families you need to emphasize some or all of the following points according to whether they are relevant and appropriate to the situation:

- Washing hands with soap and water after rising in the morning, after defecating and before handling or eating food.
- Bathing at least once a day in hot climates, or after working hard. This will help prevent skin infections, dandruff, acne, itching and rashes.
- Brushing the teeth every day.
- Wearing shoes where hookworm is present.
- Not allowing chickens, ducks and other animals into the house.
- Cleaning up at once if children or animals defecate near the house. Teach children to use a latrine or to go further from the house.
- Hanging of blankets, sheets and clothes often in the sun will help control bed bugs. Pour boiling water on the cot and wash clothes on the same day.
- Delousing of the whole family if one member has lice will prevent the problem from spreading to the whole family.
- Covering the mouth when coughing or sneezing and not spitting.
- Cleaning/sweeping/washing the house often. Filling in cracks and holes in the floor or walls will keep roaches, bed bugs and scorpions out.
- Boiling of all drinking water will kill most of the disease causing organisms.
- Protecting food by keeping it in cabinets with wire screens or covering it to prevent flies and other insects from contaminating it.
- Washing fruits before eating.
- Eating only well-cooked meats.
- Not eating food that looks or smells bad.
- Keeping separate dishes for those who are sick and boiling them before use.
- Having sick people sleep apart from other family members.
- Vaccinating all children for the six immunizable diseases.
- Cutting the fingernails frequently to keep them short.
- Treating persons with communicable diseases as soon as possible.
- Completing any treatment plan.
- Keeping wells and public water places clean.

- Not letting animals go near water that people use for drinking.
- Not defecating, washing clothes or throwing garbage into the drinking water source.
- Burning all garbage that can be burned.
- Using latrines for defecation.

On a community level, education is the best tool Health Technicians have in influencing environmental health. The community should be educated and motivated to:

- Assess their environmental health needs.
- Identify resources to meet those needs.
- Implement an agreed-upon plan.
- Continue the newly initiated activities.
- Evaluate existing environmental health activities.

You can help community leaders become aware of the extent of their environmental health problems by identifying any problems in the water supply system, assessing the availability of an adequate disposal system for excreta and other wastes and controlling insects. Discuss the problems which existed when you first started, what the families in the community have accomplished in the period you have been working together and what needs to be done now to improve the environmental health of that community (village). This approach is more effective than the traditional approach of community surveys.

Health Technicians are a link between the community and health care delivery services. As a link, you must help both the community and the health officials realize any environmental health needs and facilitate their working together to improve the overall condition of environmental health. Your biggest contribution is in working with individuals and families in making available water safe to drink, teaching the proper disposal method for excreta and in the control of insects. Improving the environmental health behaviour of the individual and family will lead to a healthier community.

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14.6 PROCEDURE FOR CHLORINATION

Chlorine is a chemical that kills bacteria and the eggs of parasites and thereby makes water safe for drinking. A common source of chlorine in Pakistan is bleaching powder. When added in small amounts to drinking water, it will kill bacteria and parasite eggs without being harmful to man.

Chlorination with bleaching powder is a cheap and reasonable temporary step for making dug well water safe for drinking until other needed improvements are made.

Chlorination of hand pump (drilled) wells is not recommended. This is because of the problem of pump damage during disassembly so that bleaching powder can be added to the well water. Five parts per million (PPM) of chlorine should be added to the well water after the pipe has been drilled but before the pump is attached. In this way, any contaminants that may have entered the well during the drilling process are controlled.

Bleaching powder is an unstable compound of chlorine gas passed through lime. It contains 25% to 35% of free chlorine. The percentage of chlorine will decrease if the bleaching powder is exposed to air, therefore, the container in which the powder is stored must be kept tight when not in use.

Chlorination of a dug well As the common source of drinking water in most villages is a dug well, Health Technicians should be familiar with the procedure for its chlorination and teach the community to practice the same.

Calculating the amount of water You must first determine the amount of water in the well to know how much bleaching powder to add. Tie the well rope to a bucket (or stone) and lower the bucket until it touches the bottom of the well. Mark the rope at the point it touches the top of the parapet wall (this is point "A"). Pull up the bucket until it breaks the surface of the water. Stop at this point and again mark the rope where it touches the top of the parapet (this is point "B"). Measure the distance between the first mark ("A") and the second mark ("B"). This is the depth of the well water, for example ten feet deep. Next, measure the diameter of the well (the distance across the mouth of the well at the widest point), for example five feet across.

Formula: Diameter x Diameter x Depth x 5 = amount of water in the well.
eg, 5 x 5 x 10 x 5 = 1,250 gallons.

Determining the amount of bleach Now that you have determined the amount of water in the well (1,250 gallons) you must decide if the well is to be chlorinated to meet safe water requirements under normal conditions or under epidemic condi ions. These include the outbreak of waterborne diseases such as enteric fever, cholera, amoebic dysentery, gastroenteritis or infectious hepatitis. If there is an epidemic outbreak of any waterborne disease, you must first notify the appropriate health authorities for assistance through your supervisor, and mobilize existing health workers in the immediate area (ie, CHWs).

To maintain the amount of chlorine in the well at a minimum of one/PPM (1 part chlorine per 1 million parts of water), three PPM (2 oz of 25% chlorine bleaching powder) is added to the well for every 1,000 gallons of water.

Example 1:

The formula shows that the well contains 1,250 gallons. This well requires 2.50 oz of bleaching powder:

$$2 \text{ oz} \times 1.25 \left[\frac{1{,}250 \text{ gallons}}{1000}\right] = 2.50 \text{ oz}$$

Do not forget that the amount of water in a well will increase during the wet season and decrease during the dry season, so you will have to adjust calculations for this.

Health workers and supervisors have already measured the water quantity and determined the normal (or epidemic) monthly chlorine requirements for many of the dug wells in your area of activity. You should consult with them concerning this information and for assistance in making calculations if you are unable to do so.

Chlorinate the well after using the above two formulas for determining water and chlorine content. When at all possible, chlorination of a well should be done in the evening after the community members have drawn their water for the day.

Chlorination procedure:

1. Calculate the amount of water in the well.
2. Determine the amount of bleaching powder required to chlorinate the well.

3. Chlorinate the well: mix the bleaching powder with some water in the bucket. Lower the bucket into the well and shake the rope up and down to empty the contents.
4. Check the chlorine content.

Checking the chlorine content There are two ways to check chlorine content. A rough estimate of the amount of chlorine in the well can be done by the Health Technician or community member who has been taught the procedure. No special equipment is needed.

To roughly estimate the chlorine content, wait for two hours after the bleaching powder has been added to the well water. Take 1/2 glass of well water and add two crystals of potassium iodide. Shake well and then add one level teaspoon of freshly prepared starch solution (the potassium iodide and starch solution will be supplied by the DHO). If a blue colour appears, the chlorine dose is sufficient. If the colour is a deep opaque blue, there is too much chlorine in the water. In this case, take out 25 to 50 buckets of water and instruct the community members not to use the well for three hours so the chlorine can be diluted. If there is no colour, or if there is a faint blue colour, the amount of chlorine is insufficient and an additional 1/4 of the previous amount of bleaching powder must be added.

A second method of measuring chlorine content is more accurate. An instrument called a comparator, which is supplied to you by the District Health Officer, is used. This instrument contains a standardized brown liquid in a tube (control). Water is collected in the empty tube of the comparator and two drops of reagent of ortholodine are added. The colour is compared with the control tube by the comparator. The reading on the top right column tells you the level of chlorine in the water.

The role of the community in the management of the water supply Community members should be motivated to be responsible for the maintenance of the water source. The user must detect any possible leaks in the pump or any other problems and undertake corrective measures.

In the case of dug wells, periodic chlorination must be part of the normal routine of the community health worker.

The Health Technician should clearly inform the owner of the well and the community that it is primarily their responsibility to maintain the source of water, including the pump. Try to avoid:

- False reports of the well being chlorinated.
- False readings of the chlorine content or residual chlorine.
- Reluctance of community members to drink chlorinated water because it tastes different.

Any problems should be reported to your supervisor and assistance should be sought from sanitary patrol members, the sanitary supervisor or the sanitary inspector.

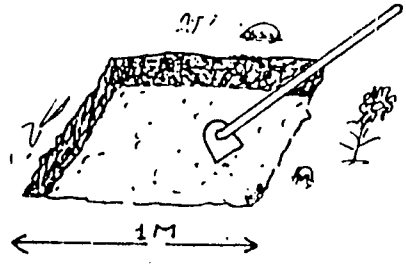
Cleaning a well A dug well should be routinely cleaned, desilted and subsequently chlorinated. The best time to do this is at the end of summer when the supply of water is low and it is easy to remove all the water.

Steps during epidemics During a waterborne disease epidemic, educate and encourage people to do the following:

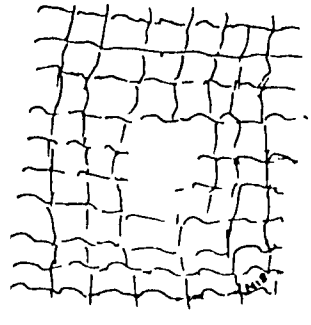
1. Boil drinking water, even if it has been chlorinated, because the residual chlorine level may be low.
2. All drinking and eating utensils should be washed with soap and water after being used.
3. If privies are not available, encourage the "cat scratch" method for covering faeces, followed by washing hands with soap and water.
4. Use available prophylactic treatment such as immunization.
5. People should be made aware of the associated symptoms and signs of the disease and seek assistance if any develop.

14.7 *PROCEDURE FOR CONSTRUCTING A SIMPLE LATRINE*

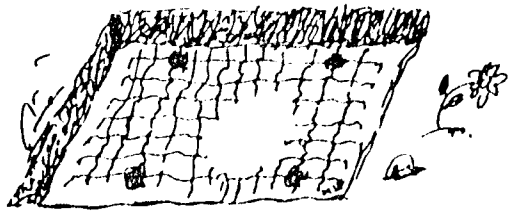
Step 1: Dig a square pit about one metre wide and 7 cm deep. Keep the bottom of the pit smooth and level.



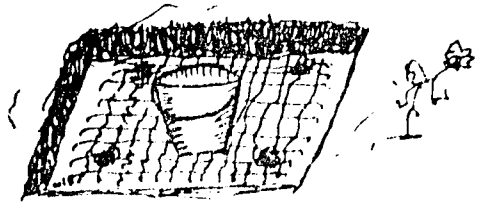
Step 2: Make a wire grid of one metre square to fit over the pit. Wires may be 1/4 to 1/2 cm thick and 10 cm apart. Cut a 25 cm hole across the middle of the grid.



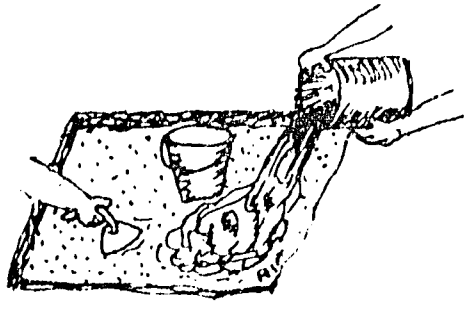
Step 3: Place the grid over the pit. Bend the ends of the wires, or put a small stone at each corner so that the grid is 3 cm off the ground.



Step 4: Place an old bucket in the hole of the grid.



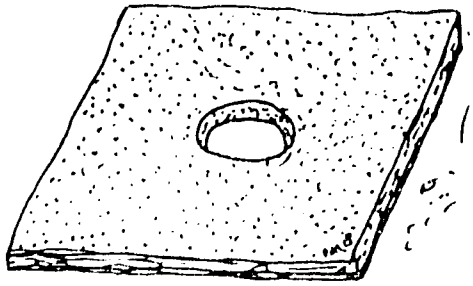
Step 5: Mix cement, sand and gravel with water: one shovel of cement, two shovels of sand, three shovels of gravel. Pour the mixture into the pit until it is about 5 cm thick.



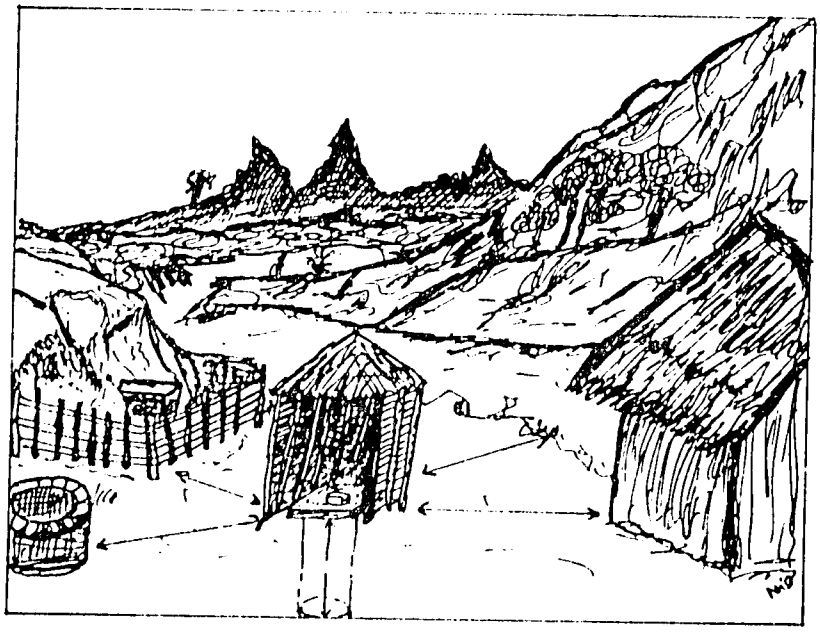
Step 6: Remove bucket after 3 hours when the cement is beginning to harden.

Cover cement with a damp cloth, sand, hay or a sheet of plastic and keep it wet.

Remove the slab after 3 days.



Step 7: Place the slab over a round hole in the ground. Dig the hole a little less than 1 metre across and between 1 and 2 metres deep.



To be safe, the latrine should be at least 20 metres from all houses, wells, springs, rivers or streams. If it is anywhere near where people go for water, be sure to put the latrine downstream.

The latrine should be kept clean. Wash the slab often and teach children and others not to get it dirty.

Make sure the hole in the slab has a cover and that the cover is kept in place. A simple cover can be made of wood.

If you prefer to sit when you use the latrine, make a mold or use two buckets of different sizes, one inside the other.

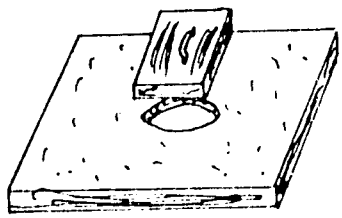


Fig. 14.11 Cover the latrine, make a simple seat.

GLOSSARY

Bacteria: Micro-organisms occurring in many forms and capable of causing disease.

Catchment area: Area which catches or collects water.

Chlorination: Process of sterilizing water by adding chlorine.

Compost: A mixture of decaying organic matter, such as manure and leaves, used as fertilizer.

Contamination: To make impure or unclean by contact.

Environment: The circumstances and conditions that surround one.

Epidemic: The unusual and sudden prevalence of a disease in a given area or locality.

Excreta: Human or animal waste matter, such as urine and faeces.

Fungus: A microscopic plant-like organism.

Ground water: Water that comes from beneath the ground such as wells and underground springs.

Hookworm: A parasitic worm with a hooked mouth which fastens itself on to the intestinal wall.

Host: An organism that harbours and provides nourishment for a parasite.

Micro-organism: An animal or plant of microscopic size.

Non-pathogenic: Not capable of causing disease.

Parasite: An organism that grows, feeds and is sheltered on or in another organism.

Pathogenic: Capable of causing disease.

Pinworm A small worm that infects the human intestines and rectum, especially in children.

Pollution: Contamination of the soil, water or atmosphere by harmful substances.

Refuse: Any discarded or rejected thing; trash.

Roundworms: Intestinal parasitic worms.

Sanitary: Free from pathogenic organisms or other substances harmful to health.

Surface water: Water on the surface of the ground such as rivers, streams and canals.

Tapeworms: Long flat worms that are parasitic in the intestines of animals including man.

Vector: Organisms which carry germs from one host to another.

Virus: A pathogenic submicroscopic organism.

Suggested learning activities:

1. Help the RHC, BHU and school staff set up a drinking water supply system in each facility.
2. Help schools with the construction of appropriate latrines for students and staff.
3. Assist the RHC/BHU staff with the construction of latrines for visitors to use.
4. Assist the RHC/BHU staff in assessing the need for an adequate disposal system for dry and wet refuse and help with its construction.

Review questions:

1. What is environmental health?
2. How do different types of organisms spread disease?
3. List four factors responsibile for the spread of disease.
4. Why are intestinal worms called parasites?
5. What is the difference between a bacteria and a virus?
6. What common diseases are caused by bacteria and worms?
7. How do worms get inside the body? What changes occur in worms inside a person?
8. How can a family keep from being infected with worms/parasites?
9. How are worms and bacteria destroyed?
10. Why is water important to our life?
11. How does water become contaminated?
12. What can be done to make contaminated water safe for drinking?
13. What is a water cycle? What happens in this process?
14. What water sources are common in the four provinces?
15. What is the best type of water for drinking and why?
16. Name or list five rules for installing a hand pump or a dug well.
17. How do you make surface water safe for drinking?
18. If water is suspected to be contaminated, what can be done to make it safe?
19. Why are refuse and excreta sources of infection and of concern to health authorities?
20. What is the usual practice of excreta disposal in rural Pakistan.
21. What can you do to minimize the spread of disease through excreta?
22. What types of latrines are possible to construct in rural areas?
23. What do individuals and families need to be taught regarding the maintenance of a latrine once it is constructed?
24. How do flies and mosquitoes spread infections?
25. How can various types of insects be controlled?
26. Describe the Health Technician's activities in the management of environmental health.

LEARNING ACTIVITY RECORD

Name of student_____

Facility	Latrine construction	Drinking water supply	Refuse disposal system
1.			
2.			
3.			
4.			
5.			
6.			

Write down the name of the facility where you helped establish a latrine, a drinking water supply and a refuse disposal system.

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EVALUATION FORM

*CHAPTER*_____

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of presentation	[ ]	Simple to understand
	[ ]	Difficult to understand
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write a paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 15

THE HEALTH TECHNICIAN'S ROLE IN THE MANAGEMENT OF COMMON CONDITIONS

Objectives After completing this chapter you will be able to:

1. Identify the six common groups of conditions that people generally suffer from.
2. Identify at least five specific conditions in each group.
3. Describe the Health Technician's activities in relation to the following common conditions:

   - Headache.
   - Earache.
   - Toothache.
   - Backache.
   - Stomachache.

4. Describe the Health Technician's activities in relation to respiratory problems associated with coughing.
5. Describe the Health Technician's activities in the management of the following skin conditions:

   - Dry skin.
   - Allergic reaction.
   - Prickly heat.
   - Boils.
   - Scabies.
   - Ringworm.

6. Describe the Health Technician's activities in the management of goitre and diabetes.
7. Describe the Health Technician's activities in the management of the following bowel and bladder related problems:

   - Constipation.
   - Hemorrhoids.
   - Inability to empty bladder completely.
   - Frequent urination.
   - Suspected infection of the urinary tract.

8. Describe the Health Technician's activities in the management of the following symptoms:

- Fever.
- Vomiting.
- Chest pain.
- Jaundice.
- Inflamed gums.
- Swelling of parts of the body.

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CHAPTER 15

THE HEALTH TECHNICIAN'S ROLE IN THE MANAGEMENT OF COMMON CONDITIONS

As you go out in the community, you are going to come in contact with people who are well as well those who are not well. Thus far, the curriculum has focused on the discussion and description of well people and how to maintain their well-being. This means that only health promotive and illness preventive areas have been discussed except for complications occurring during pregnancy, childbirth and problems in small children.

However, Health Technicians must also deal with older children and adults who get sick occasionally. You may be the only Health Worker in the community, so you need to be equipped with the necessary knowledge and skills to manage common and minor conditions. This chapter will provide you with information on the commonly occurring conditions and what you can or cannot do to manage them.

Until now you have been told that diagnosing a disease and prescribing a drug is the responsibility of the Medical Officer. However, in this chapter, and the chapters on communicable diseases and trauma emergency and first aid, you are being asked to prescribe certain drugs. This is not in contradiction to the concept that only Medical Officers prescribe drugs and diagnose diseases. You are not required to make a diagnosis of a specific disease and select a drug for its treatment. Instead you are being taught to recognize certain conditions based on their symptoms, and follow the treatment plan, including drugs, that has been developed for you. In this way you can help people with simple and minor problems early so that the problem does not become complex due to delay in treatment.

In this chapter only necessary information is provided. You are therefore encouraged to consult other reference books such as *Where There Is No Doctor,* the textbook from the previous training programme and any other books to increase your knowledge in these areas.

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15.1 COMMON CONDITIONS

The following five categories of conditions are covered in this chapter in table form for easy reading and reviewing:

1. *Aches and pains* There are five conditions in this category. These are headache, earache, toothache, backache and stomachache.

2. *Respiratory problems* Five types of coughing and spitting conditions are included in this category. These are coughing and spitting of a few days duration with less than 38 degrees centigrade temperature, coughing and spitting with a temperature higher than 38 degrees centigrade, cough lasting for weeks or months, cough with blood and chest pain and cough with wheeze.

3. *Skin problems* Six conditions are dealt with: dry skin, allergic reaction, prickly heat, boils, scabies and ringworm.

4. *Metabolic conditions* This covers the topics of goitre and diabetes.

5. *Bowel and bladder related problems* Covered here are constipation, hemorrhoids and faecal impaction under bowel problems and inability to completely empty the bladder, frequent urination and suspected urinary tract infection under the bladder conditions.

6. *Other common conditions* These include fever, nausea and vomiting, chest pain, jaundice, inflamed gums and swelling of the feet and other parts of the body.

Tables 15.1 to 15.6 provide essential information on the management of the above conditions as well as the drugs of choice. Dosage, methods of administration and the side effects of these drugs are not covered in this chapter. Therefore, you are required to consult the chapter on essential drugs before using any.

15.2 THE MANAGEMENT OF ACHES AND PAINS

TABLE 15.1 ACHES AND PAINS

Condition	*Health Technician's activities*
1. *Headache* Can be simple and temporary and present as mild, moderate or severe for many reasons.	- Give paracetamol. - Suggest rest. - Suggest application of cool, wet cloth to the forehead.
It can become more frequent, severe or accompanied by other symptoms such as vomiting or blurred vision. Causes of this type of headache are trauma, sinus infection, dental problems and high blood pressure.	- Take temperature, pulse and blood pressure and discuss findings. - Give paracetamol. - Suggest medical care for diagnosis in order to get proper treatment. The cause of this type of headache needs to be discovered since each cause requires different treatment. Therefore the person must be seen by a Medical Officer.
Headache due to anxiety and stress starts gradually in the back of the neck or back of the head. The person may feel pressure like that of a tight band. Headache similar to this is also experienced by women prior to or during menstruation.	- Encourage the person or family to associate this type of headache with certain activities which may bring it on (the cause of the tension), such as an exam or someone specific coming to the house. - Encourage the person to take paracetamol when the headache starts. - Advise getting involved in recreational activities that relax him or her.
2. *Earache* may be due to the accumulation of ear wax or an infection. If the pain is due to infection, it will be severe and may be accompanied by other symptoms.	- Give paracetamol and apply warm compresses locally. - Remove wax by inserting a cotton bud and rotating it three or four times. If this does not remove it, instill 2 to 3 drops of soda glycerine and leave for a day. Next day, if the

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TABLE 15.1 ACHES AND PAINS

Condition	*Health Technician's activities*
	wax is near the surface and easy to reach remove it with a blunt forceps or a wax removing scoop. If wax is not near surface, wait until it eventually works itself out. - In the case of inflammation or infection, suggest a five day course of penicillin or its equivalent and instill earache drops such as lidosporin or xylocaine. - If the person is not improving within 48 hours after taking the antibiotic, refer him to the Medical Officer.
3. *Toothache* is usually experienced after eating or drinking hot or cold foods and sweets. This is usually due to a decayed tooth or an infection around a tooth or teeth.	- Advise rinsing mouth with warm water with a little salt added. - Give paracetamol. - Immerse cotton swab in clove oil and pack it around the affected tooth. This will provide temporary relief. - In the case of infection, start on general antibiotic therapy. - Refer to the dental surgeon in case of decay or infection and explain that medical doctors are not trained to treat dental problems. Therefore, the person must see a dental surgeon.
4. *Backache* may occur for a number of reasons such as lack of exercise, tension, pulled muscle, pressure on the nerve, slipped disc or urinary tract infection. Pain can be dull, sharp,	- Suggest taking paracetamol and applying heat locally to the area of pain. - Suggest sleeping on a hard surface. - Suggest rest or exercise depending on what you feel is required.

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TABLE 15.1 ACHES AND PAINS

Condition	*Health Technician's activities*
gnawing and continuous or intermittent.	- If pain persists, suggest visiting an orthopaedic doctor for diagnosis and specific treatment.
5. *Stomachache* refers to pain in the abdominal area and is categorized in three ways. First is the pain due to indigestion or gas.	- Suggest simple exercise such as working. - Reduce food intake and limit it to light and easy to digest items. Follow the suggestions for diarrhoea treatment from an early chapter. - Suggest food cooked without any or with minimal amounts of oil, ghee or spices. - Give antacid if needed.
Second is inflammatory pain which is due to an infection. This pain is constant and the person remains silent and moves little because movement increases pain. The pain also increases with pressure and is often localized to one area. (Pain can be caused by appendicitis, gallbladder infection or stones, hepatitis, gastroenteritis or urinary tract infection).	- Give a pain killer like paracetamol. - Apply warm compresses or heat to the abdomen. - Refer to the Medical Officer for diagnosis and proper treatment.
Third is spasmodic pain (colic) which is due to sustained contractions of smooth muscles. The pain is intermittent and the person is restless. There is no tender area. This can be caused by attacks of kidney and gallbladder stones.	- Give an antispasmotic drug. - Give a pain killer. - Refer to the Medical Officer immediately.

15.3 THE MANAGEMENT OF RESPIRATORY PROBLEMS

TABLE 15.2 RESPIRATORY PROBLEMS

Type of respiratory problem	*Health Technician's activities*
1. Coughing and spitting of a few days duration with one or more of the following symptoms: - Temperature less than 38 degrees centigrade. - Runny nose (thin discharge like water, thicker like the white of an egg or yellow and smelly). - Sore throat: person feels pain at the back of the throat every time he swallows.	- Give paracetamol for 3 days. - Suggest and demonstrate gargling with warm salt water. - Encourage rest. - Encourage family to give lots of fluids in any form: soup, tea, "sharbat," lassi. - Suggest continuing with normal foods. - See the person on the fourth day. If he is better, advise continuation of above. If not, follow plan from 2.
2. If the person's temperature is over 38 degrees centigrade.	- In addition to the above, start penicillin treatment for 5 days. - See the person on the second day. If he is improving, continue with same treatment for 5 days. If not improving refer to the Medical Officer.
3. If the person has been coughing for weeks or months, this may be serious. or 4. Coughing with: - Blood. - Difficulty in breathing. - Pain in chest. - Phlegm which smells bad.	- Send the person to the Medical Officer for a definite diagnosis. - Ask the person or a family member to contact you after (s)he has been to see the Medical Officer. - Follow-up with a home visit to find out what diagnosis was made and what treatment was prescribed.

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TABLE 15.2 RESPIRATORY PROBLEMS

Type of respiratory problem	*Health Technician's activities*
	- Explain to the family what the diagnosis means and how to follow the treatment. - Continue to have periodic contact with the family either at the RHC/BHU or through home visits to assess progress and to help as indicated. - Teach the sick person to cover his mouth while coughing and to spit any discharge on a paper or handkerchief which can be burned or washed or into a container. - Instruct the family on how to dispose of discharge by washing or burning.
5. Person is coughing and wheezing. This could be due to asthma or allergy and may also indicate the presence of fluid in the lungs.	- If the Medical Officer is not available, give aminophylline 100 mg tablets two to three times a day. If the condition is severe, give 2 cc (500 mg) aminophylline by deep intramuscular injection. - Encourage the person or family members to identify those factors such as food, drink or any situation that makes symptoms worse or precipitates an attack of severe wheezing and difficulty in breathing. - Instruct the person or a family member to try and avoid these precipitating factors as much as possible.

15.4 THE MANAGEMENT OF SKIN PROBLEMS

TABLE 15.3 SKIN PROBLEMS

Type of skin problem	*Health Technician's activities*
1. *Dry skin* is skin that is rough and flaky instead of shiny. A person with dry skin will experience itching on one or several parts of the body.	- Advise keeping the skin clean by washing. - Advise external application of grease such as vaseline, almond oil mixed with lemon or glycerine and rose water before going to bed. - Wash with soap and water in the morning. - Inform person the condition should improve within two or three days.
The skin may continue to be dry even after continuous treatment with grease.	- Refer to a skin specialist if available or a Medical Officer.
2. *Allergic skin reactions* occur when there is an inability to tolerate certain substances. These substances may be any one of the following: . Drugs such as penicillin or others. . Food such as seafood, fruits or vegetables. . Plants such as nettle. . Animals such as cats, dogs, horses. . Insect bites. . Cosmetics.	- Have the person associate the skin reaction with: . What (s)he has eaten/ consumed. . What (s)he has come into contact with. - Advise him to avoid consuming or using the substance which causes the allergic reaction. - If it is due to a drug like penicillin, that person should never get that drug again and should inform the doctor that (s)he is allergic to it so that a substitute drug can be prescribed.
A person with an allergic reaction will experience: . Severe itching either localized or all over the body. . A rash may be present. . Breathing may be affected.	- For immediate relief of symptoms give one of the antihistamine drugs available, eg Pinton or Incidal. - For itching and rash apply calamine lotion 2 to 3 times a day.

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TABLE 15.3 SKIN PROBLEMS

Type of skin problem	*Health Technician's activities*
3. *Prickly heat* occurs during summer months. There is a red, itchy rash on the skin around the neck, back, arms and under the breasts. Clothing made of synthetic material makes it worse.	- Suggest frequent bathing. - Avoid clothes made of synthetic material. Wear light cotton clothes. - Apply talcum powder or calamine lotion after bathing.
4. *Boils* are infections of the hair follicles and can occur on any part of the body. They are characterized by a raised skin surface with a small or large lesion which may be red, warm, tender and swollen with a yellowish head because of pus. Boils may be single or multiple.	- Suggest that the person wash the affected area with soap and water and dry with a clean cloth or towel without rubbing. - Advise warm compresses to the area which may open the boil so pus can be released. - Clean discharge of pus with soap and water. - Instruct the person: "Do not squeeze the boil." - Most boils heal and go away in a few days.
Boils can become chronic and upsetting to an individual, especially an adolescent or a young adult.	- Emphasize the need for frequent washing with soap and water and keeping the area clean. - Refer to a skin specialist.
5. *Scabies* are caused by a minute parasite which finds its way into the deep layer of the skin and lives there causing severe itching and irritation. Body parts usually affected are: . Between the fingers. . On the hand and wrist. . Under the arm (axilla). . Buttocks. . Ankles. . Genitals. Skin lesions may be localized or generalized.	- This can be prevented by keeping oneself clean, bathing frequently and using soap and water. - Instruct the family to apply a preparation of benzyl benzoate emulsion, Tetnasal soap or Crotamiton emulsion to the affected areas by following the steps given below: . First, the person should take a thorough bath to remove dirt and soften the skin.

TABLE 15.3 SKIN PROBLEMS

Type of skin problem	*Health Technician's activities*
Usually affects young children.	- The emulsion should be applied all over the body except the face and head. - Have person wear clean, loose, cotton clothes. - Application of the emulsion should be repeated every day for two or three days. The person should not bathe during this time. - A bath is recommended on the fourth day. Bedding and clothing should be completely changed. - If the infection is not completely gone, treatment should be repeated after one week. - All infected members in the family should be treated at the same time.
6. *Ringworm* is a fungal infection. The lesion is circular with raised margins which contain small blisters. A person will experience itching and burning. Ringworm can occur on the body or head. When it is on the head you may notice broken hair or absence of hair along with the circular patch.	- Instruct the family that ringworm can be prevented by frequent washing of the head and body with soap and water. - Advise the family to apply Tineafax ointment or Tinaderm to the infected area of the body (not the head) after washing. - For the head, apply Whitefield's ointment. - The above treatment may be adequate for mild to moderate cases. - For some moderate to severe cases, Griseofulvin may be given in a dose of 20 mg/kg/day. - Instruct family that towels, clothes, hair brushes, combs used by a person with ringworm need to be washed with soap and water before being used by others.

15.5 THE MANAGEMENT OF METABOLIC CONDITIONS

TABLE 15.4 METABOLIC CONDITIONS

Condition	Health Technician's activities
1. A *goitre* is an enlarged thyroid gland and presents itself as a small or large growth on the front portion of the neck. It is caused by an iodine deficiency. In the mountainous regions of Northern Pakistan such as District Hunza, Gilgit and Chitral, iodine content is low in water and soil. Therefore plant and animal products used as food are also low in iodine content. Swelling is the only symptom.	- Inform people that those who have goitre cannot be cured completely but suggested treatment will stop a goitre from getting larger. Those who do not have a goitre yet will not develop one if the suggested preventive treatment is followed. - Encourage use of iodized salt such as "Markhor." This salt is supplemented with iodine. - In addition, 5 to 10 drops of "Lugol's" solution in a glass of water once a day is recommended in areas where iodine content in food is known to be low.
2. *Diabetes* is a chronic condition that develops when not enough insulin is produced by the internal gland called the pancreas. When a person has diabetes, his body is unable to handle sugar. Sugar levels in the blood increase and sugar is passed in the urine. A person with diabetes will also experience the following symptoms: . Increased thirst. . Passing excessive amounts of urine. . Loss of weight (especially in children).	- If you run into a situation where an individual tells you he has recently become increasingly thirsty and also urinates frequently, check his urine for sugar. - If sugar is present in the urine, refer him to a Medical Officer immediately for proper diagnosis. (The procedure for the urine test for sugar is covered in Chapter 6). - He may need to be referred to a teaching or District Headquarters Hospital where there are a variety of services available. - If you know of a hospital that provides special service for diabetics you may want to refer this person there.

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TABLE 15.4 METABOLIC CONDITIONS

Condition	*Health Technician's activities*
	- Have the person come back to you after going to the hospital to inform you of his diagnosis and treatment plan. - If the diagnosis is diabetes, then the person's life will be determined by the following three factors: . Diet. . Drug. . Discipline. Discipline means that the person has to strictly follow the prescribed diet, take the prescribed medication and keep all medical appointments to determine how his body is adjusting to therapy. - You as Health Technicians need to read more about diabetes to continue to help the person.
Hypoglycaemia occurs when a diabetic person has not enough sugar in the body and too much insulin. During this time (s)he may feel weak, nauseous and may even faint.	- Inform the person of the two types of reaction he may experience if his sugar is too low. These are: . Hypoglycaemia. . Acidosis. - Advise him to carry some sweets like chocolate and toffee at all times to eat to avoid fainting or passing out. A sweet drink is also recommended (but not with a sugar substitute). - Refer the person to his own physician or to the hospital.
Hyperglycaemia occurs when there is too much sugar in the system and in this case the diabetic needs to take more insulin.	- Refer to Medical Officer.

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15.6 THE MANAGEMENT OF BOWEL AND BLADDER PROBLEMS

TABLE 15.5 BOWEL AND BLADDER RELATED PROBLEMS

Condition	Health Technician's activities
1. *Diarrhoea* is covered in Chapter 11 as a problem of children. Some information applies to adults as well.	- Follow the suggestions given in Chapter 11 and modify your activities accordingly.
2. *Constipation* is a condition in which stool is not passed routinely. The person may complain of pain or discomfort during defecation because of faeces being hard instead of soft.	- Advise the drinking of plenty of water and eating of lots of vegetables daily. - If the above does not help recommend the use of a laxative like liquid paraffin or Cremaffene at night before going to bed. - If that does not help, give an enema (procedure is given at the end of the chapter). - If constipation becomes chronic or difficult refer the person to the hospital.
3. *Hemorrhoids* or piles are veins around the rectum that become swollen. They can be internal (cannot be felt) or external around anus which can be felt and seen. This condition usually results from straining during defecation, chronic constipation, prolonged sitting or standing or an anal infection. A person with hemorrhoids complains of the prolapse of a small fleshy mass and experiences itching with blood in the stool.	- Inform the person that hemorrhoids develop and get worse if straining during defecation and constipation continues. - Advise drinking plenty of fluids and eating fresh fruits and vegetables containing roughage. - If the above does not help, advise taking stool softener. - Refer to Medical Officer if problem continues. - Advise keeping rectum clean by washing with water after defecation.

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TABLE 15.5 BOWEL AND BLADDER RELATED PROBLEMS

Condition	*Health Technician's activities*
4. *Faecal impaction* occurs when stool becomes hard and cannot be excreted due to pain or hardness. This mass of stool then blocks other stool from moving downward. If the stool is not removed it can cause obstruction in the intestine and result in other complications.	- You need to either remove the faeces manually or teach a member of the family to do so. (Procedure for manual removal of impaction is given at the end of this chapter.) - In addition to removing the impacted faeces, you must emphasize the need to drink plenty of liquid and to eat plenty of fruits and vegetables as preventive measures.
5. *An inability to empty the bladder completely* may result from numerous causes such as obstruction of the urinary tract by a stone, an enlarged prostate gland in males or neurological problems.	- Explain that there are many causes for this and the person needs to go to the hospital to identify the specific cause so that this may be corrected. - Emphasize the need to continue to drink plenty of fluid to prevent infection.
6. *Frequent urination at night*. This problem is bothersome because it disturbs sleep.	- Suggest that the person limit his/her fluid intake from late afternoon on and drink plenty of fluids in the morning and early afternoon. - If a person is taking a diuretic, medicine to get rid of water from the body, suggest that this be taken in the morning. - If the above suggestions do not help, then refer him to the hospital.

TABLE 15.5 BOWEL AND BLADDER RELATED PROBLEMS

Condition	*Health Technician's activities*
Suspected *infection of the urinary tract.* A person will give some or all on the following symptoms: . Frequency of urination. . Burning on urination. . Cloudy urine. . Pain below the umbilicus or lower back pain. . Fever.	- Advise drinking plenty of liquids. - Advise taking Bioalkali, two teaspoons in a half cup of water, two to three times a day to make urine more alkaline. - Start antibiotic therapy for five days at six hour intervals. - Refer to Medical Officer if no improvement in 2 to 3 days.

15.7 THE MANAGEMENT OF OTHER COMMON PROBLEMS

TABLE 15.6 OTHER COMMON PROBLEMS

Problem	*Health Technician's activities*
1. *Fever* is an elevation in body temperature. Temperature over 38 degrees centigrade (100 degrees fahrenheit) is considered to be a fever. Average normal temperature is 37°C.(98.6°F.). Fever is an indication that the body is fighting an infection due to a virus or bacteria. There is no specific treatment for a virus. Antibiotics are recommended for a bacterial infection.	- Instruct a person with a fever to stay in bed until the temperature has been normal for 24 hours. - Encourage drinking 16 to 20 glasses of liquid per day. - Instruct the person to eat anything he desires and can digest. - Give paracetamol to reduce fever. - Advise frequent bathing or cold sponge bath. - If the person does not improve or continues to have a fever of over 101° F. for longer than three days refer him to the Medical Officer or hospital.

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TABLE 15.6 OTHER COMMON PROBLEMS

Problem	*Health Technician's activitie*
2. *Vomiting and nausea* usually occur together. In some cases, such as with increased intra-cranial pressure, the vomiting is sudden and without nausea. Nausea and vomiting can be simple and of short duration or long lasting.	- Suggest the person rinse the mouth thoroughly after vomiting and drink as much liquid as can be tolerated. - Start on solid food gradually. - Recommend rest. - For moderate to severe vomiting, refer the person to the Medical Officer or the hospital.
3. *Chest pain* can be caused by an infection, injury or other reasons. Mild chest pain may be relieved by supportive measures. Severe chest pain can be serious.	- Suggest raising the head and shoulders with extra pillows. - Suggest lying down on unaffected side. - Give paracetamol for a day or two. - Suggest rest, increased fluid intake and observation of other symptoms. - Must refer to the Medical Officer or hospital for prompt diagnosis and treatment.
4. *Jaundice* is a condition indicating that the liver is not working properly. A person with jaundice will have a yellow tinge to their skin. The nail beds and whites of the eyes will also be yellowish. It is very important to identify the cause of jaundice.	- The person suffering from jaundice must be referred to the hospital so that a diagnosis can be made and proper treatment started. - Follow-up on the diagnosis and treatment plan (with the person or family). Explain to them what the diagnosis means and help them to follo the treatment plan. - The patient must rest and develop good personal hygien habits. - Nails should be cut short. - If the person suffers from itching, regular bathing and the use of talcum powder or calamine lotion is suggested.

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TABLE 15.6 OTHER COMMON PROBLEMS

Problem	*Health Technician's activities*
	- The patient should drink plenty of fluids. - Instruct the family to give a high protein and carbohydrate and low fat diet. - If a person is experiencing nausea or loss of appetite have him brush his teeth before eating. This way he will be able to eat more.
6. *Inflamed gums* are swollen gums with or without bleeding.	- Instruct the person to brush the gums as well as the teeth gently. - Rinse the mouth with warm salt water. - Encourage the person to eat plenty of fresh fruits. - If the problem becomes chronic and persistent, refer him to the dentist.
7. *Swelling of the feet* and other parts of the body. Swelling of the feet is seen in pregnant women, elderly people and small children with anaemia.	- Instruct the person to sit or sleep with the feet elevated. - If this relieves the swelling, advise continuation. Otherwise refer to the Medical Officer to find the reason for the swelling and to provide appropriate treatment.
8. *Swelling on the face* for a reason other than injury or insect bite indicates a serious problem.	- This person must be referred to the hospital or the Medical Officer.

Only some of the more common conditions have been covered. There are many other conditions which you will see and it is not possible to describe all of them in a text such as this. When you come across other situations, it is hoped that you follow the same principles described in this chapter. You should first determine if the condition is simple or complex and of what degree: mild, moderate or severe. Health Technicians can try and relieve problems of a mild and moderate nature in some cases. But if you feel you are not sure how to deal with the problem, then it must be referred to the hospital or a Medical Officer. All severe cases must be referred.

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15.8 PROCEDURE FOR GIVING AN ENEMA

Necessary articles:

- Rectal tube # 22 or 24 French.
- Enema can or a funnel and a pitcher.
- A tube clamp.
- Lubricant.
- Waste basin or kidney dish.
- Old cloth to protect the bed.
- 500 to 1000 cc of warm soapy water.

Procedure:

- Explain the procedure to the person.
- Have the person lie on the bed on his/her side with the anal region exposed.
- Hang the irrigating can or hold the funnel with tube about 18 inches or 45 cm above the anus.
- Expel any air in the tubing by allowing a small amount of water to run into the waste basin.
- Insert the rectal tube (after lubricating it) slowly and gently up to 10 cm or 4 inches.
- Let the solution flow into the rectum slowly.
- Instruct the patient to hold the water in for a few minutes.
- Tell the patient to get up and defecate. If the enema produces good results, one enema may be enough. Otherwise another one may be given within a short time or later depending on the availability of the person giving the enema.
- Assemble, clean and store all articles.

Caution: Do not allow air to get into the rectum.

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15.9 PROCEDURE FOR THE MANUAL REMOVAL OF FAECAL IMPACTION

Items required:

- Rubber gloves (2).
- Lubricant.
- Waste basin.

Procedure:

- Explain the procedure to the person.
- Have the person lie on her/his side.
- Wash hands and a put glove on the right hand. Save the other glove in case this one tears.
- Lubricate your fingers.
- Tell the person to take deep breaths.
- Insert the index finger into the rectum, break the faeces and take it out in small pieces.
- Reinsert the finger until you take out as much as possible.
- Clean the person.
- Wash and rinse the glove.
- Wash your hands.

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GLOSSARY

Acidosis: A disturbance of the acid-base balance in the body in which there is an accumulation of acid (as in diabetic acidoses).

Alkaline: Having the properties of a base.

Antihistamine: An agent that counteracts the effect of histamine and can thus treat allergies.

Asthma: Reversible constriction of the bronchial smooth muscles resulting in difficulty in breathing.

Boil: Infection of a hair follicle or the subcutaneous skin layer.

Chronic: Long drawn out disease state.

Diabetes: A disorder of carbohydrate metabolism characterized by insufficient insulin and high levels of blood sugar.

Diuretic: Substance that acts to increase the flow of urine.

Emulsion: A mixture of two liquids not mutually soluble.

Enema: Injection of water into the rectum and colon to empty the lower intestine of faeces.

Goitre: An enlargement of the thyroid gland.

Hemorrhoids: Dilated blood vessels in the anal region.

Hyperglycaemia: Increase in blood sugar above normal levels. This condition increases the susceptibility to infections.

Hypoglycaemia: Deficiency of blood sugar.

Insulin: A hormone secreted by the pancreas essential for the metabolism of glucose (sugar).

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Intracranial pressure: Pressure within the cranium or skull due to bleeding or oedema.

Prickly heat: Noncontagious red rash with itching, usually seen in hot weather.

Ringworm: A red, ringed rash due to a fungus.

Scabies: A highly communicable skin disease caused by a mite.

Spasmodic: Characterized by spasms.

Trauma: An injury or a wound.

Suggested learning activities:

When you are on your hospital rotation, make sure you are assigned to take care of some individuals who have the common conditions covered in this chapter. Keep a record such as the one below:

No.	Type of condition	Health Technician's major activity
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

Review questions:

1. What can a Health Technician do for:

   - A headache.
   - An earache.
   - A toothache.
   - A backache.
   - A stomachache.

2. What would you tell a person who is suffering from a toothache and you suspect he has caries or an infection?
3. To whom would you refer a person with backache?
4. If a person comes with colicy pain and is restless what would you do?
5. Do all persons with a cough require the same treatment?
6. How would you distinguish coughs and what would you do for each type?
7. What can be done for dry skin in old age?
8. What is an allergic reaction and how can a person be helped?
9. Describe the following skin conditions and the Health Technician's activities for each:

   - Prickly heat.
   - Boils.
   - Scabies.
   - Ringworm.

10. What two metabolic conditions are covered in this chapter? Describe the Health Technician's role for each.
11. What does "iodized salt" mean and how does it help to keep people healthy?
12. What symptoms would lead you to suspect diabetes? What steps would you take when you suspect that a person has diabetes?
13. Why do we need to treat a diabetic person?

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14. Describe the following conditions and the Health Technician's activities in their management:

- Constipation.
- Hemorrhoids.
- Faecal impaction.
- Inability to empty the bladder completely.
- Suspected urinary tract infection.
- Fever.
- Nausea and vomiting.
- Chest pain.
- Jaundice.
- Inflamed gums.
- Swelling of hands and feet.
- Swelling of face.

EVALUATION FORM

*CHAPTER*_____

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of presentation	[ ]	Simple to understand
	[ ]	Difficult to understand
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write a paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

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CHAPTER 16

THE HEALTH TECHNICIAN'S ROLE IN THE CONTROL OF COMMUNICABLE DISEASES

Objectives After completing this chapter you will be able to:

1. Explain how malaria is transmitted.
2. Differentiate between vivax and falciparum malaria.
3. Describe the difference in treatment of the two types.
4. Describe the four stages of malaria.
5. Demonstrate the procedure for making blood smear slides.
6. Describe how malaria can be prevented.
7. Describe the Health Technician's role in the control of malaria.
8. Explain methods of self-protection and group protection in malaria control.
9. Describe how tuberculosis is transmitted.
10. List the symptoms of tuberculosis.
11. Describe the treatment and management of tuberculosis.
12. Explain your role with a TB patient who has an adverse reaction to the medication.
13. Describe your role in the management of leprosy.
14. List the parasitic gastrointestinal conditions and the cause and treatment of each.
15. Describe your role in the control and management of communicable diseases.

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CHAPTER 16

THE HEALTH TECHNICIAN'S ROLE IN THE CONTROL OF COMMUNICABLE DISEASES

Communicable diseases still result in unnecessary suffering and death. What is meant by unnecessary suffering and death? We now have the knowledge and tools to prevent or control most communicable diseases. Yet, we continue to hear not only about epidemics of malaria, tuberculosis, diarrhoea, measles, etc, but also deaths resulting from them. In earlier days, the cause and the cure for most communicable diseases was not known. Today, we not only know the cause and treatment, we even know preventive measures. Yet, despite these available resources there is still suffering and death from communicable diseases. Every attempt should be made to control and prevent them. Health Technicians, being the link between the community and the health care delivery system, can play a major role in controlling communicable diseases by:

- Providing information on these diseases.
- Advising people to adopt health promotive personal hygiene habits.
- Improving environmental sanitation.
- Promoting immunization.
- Referring the sick to the Medical Officer or hospital.
- Following-up on prescribed treatment.

In this chapter, malaria, tuberculosis (TB), leprosy and parasitic diseases are covered including how to identify the diseases and what people can do to control and treat them.

Some diseases, such as malaria and TB are dealt with in more detail because they are very common and a great deal is known about them. Diseases like leprosy which we know less about and affects fewer people is dealt with briefly. For other diseases, such as those caused by parasites, only the treatment is described (see chapter on Environmental Health for more information).

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16.1 *THE ROLE OF THE ANOPHELES MOSQUITO IN SPREADING MALARIA*

Malaria is a very common infectious disease caused by a parasite and transmitted by mosquitoes. There are different kinds of mosquitoes but not all of them transmit malaria. Only the anopheles mosquito can transmit malaria and this mosquito breeds in collections of clear water. Anopheles mosquitoes transmit the malarial parasite from an infected person to a non-infected person. There are two stages of parasitic development; the first stage occurs in the mosquito and the second stage in a human being.

The stage in the mosquito When a female anopheles mosquito bites a person with malaria, it sucks up blood containing malarial parasites. In the mosquito the malaria parasite develops and reaches maturity after approximately two weeks. Within this period, the parasite reaches the salivary glands of the mosquito and is called a sporozoite.

The stage in the human being When an infected mosquito bites another person, the sporozoite form of the parasite is injected into the blood stream of that person. The parasite is carried by the blood to the liver where it develops further. In two weeks the parasite matures, and thousands of young parasites break loose from the liver cells and enter the red blood cells (RBC). Development inside the RBC takes about 48 hours to complete during which time many parasites are formed from each original one.

When fully developed, the parasites cause the RBC to burst open releasing the newly formed parasites. When the parasites are being released, the patient shivers. Each parasite tries to enter another RBC to restart the cycle. This makes a patient's temperature rise and makes him feel hot. This cycle repeats itself many times, once every 48 hours. The person going through this experience becomes a carrier. If he is bitten by a female malaria mosquito, the parasite will be picked up and transmitted to another person at the end of about a two week period. This cycle is shown in Figure 16.1.

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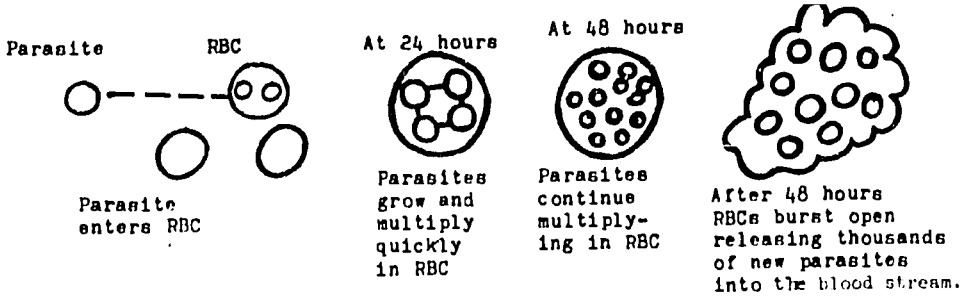

Fig. 16.1 Malaria cycle in the human blood stream.

There are four types of malaria, two of which are found in Pakistan. These are:

- Vivax malaria.
- Falciparum malaria.

Vivax malaria is generally mild and not fatal because fewer numbers of parasites are produced in each 48 hour cycle. Therefore, fewer RBCs are destroyed resulting in a milder form of malaria. Falciparum, on the other hand, is a dangerous disease and a person could die if he does not get prompt treatment. This is because falciparum parasites are capable of producing billions of new parasites within a very short time. Each parasite is capable of attacking and destroying a RBC in each 48 hour cycle.

16.2 STAGES OF A MALARIA ATTACK

Malaria occurs in definite stages. The early stage may not be different from the early stage of other diseases, when a person has general symptoms. There may be a headache, backache, loss of appetite, abdominal discomfort, mild diarrhoea and a chilly sensation followed by a typical attack

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consisting of the following four well-marked stages:

- A cold stage.
- A hot stage.
- A wet stage.
- An apyrexial stage (a stage without fever).

The cold stage The patient first experiences shaking chills during which he feels cold. Shivering may be so severe as to rattle the bed, make the teeth chatter and make the small hairs of the body stand erect. The skin becomes dry. Shivering causes the patient to use extra clothing and blankets. Even with the additional coverings, there is no feeling of relief from the cold. The pulse at this time is rapid, accompanied by complaints of headache and nausea with or without vomiting. The body temperature rises rapidly during the cold stage which lasts from half an hour to two hours.

The hot stage The shivering ceases gradually overlaping with the rising temperature. At this point, the patient feels hot so he throws off his covers and extra clothing. His face is flushed, the eyes wet, tears flow and the skin is hot and dry. The pulse is fast and the respiration rapid. He now suffers from worsened headache, dry throat, coated tongue accompanied by great thirst, nausea and sometimes vomiting. The temperature during this stage may rise to 106 degrees Fahrenheit or higher. The duration of this stage is from 1 to 8 hours.

The wet or sweating stage During this stage, the patient suddenly starts to perspire profusely all over his body, drenching clothing and sheets. He also feels a great sense of relief, the headache and vomiting subside, the pulse becomes more normal. He feels tired and sleepy and usually falls asleep at this time. The duration of this stage is from 1 to 5 hours.

The apyrexial stage (no fever) Following the sweating stage, there is an interval of normal or below normal temperature. During this period, the patient may want to get up and carry out his normal activities although he is still very weak, irritable and has a poor appetite. The duration of this fever free interval depends on the type of malaria, averaging about 12 hours in falciparum malaria and 36 hours in vivax malaria. After this apyrexial interval, a repetition of another cycle of chills, fever and sweating is experienced. Treatment with malaria drugs may limit these cycles. In untreated cases, these cycles may repeat for 10 days or longer.

During the acute attacks, the spleen and liver are frequently enlarged, soft and tender to the touch.

These symptoms are typical for people with a low degree of tolerance to malaria. In highly malarious areas where the people have a high tolerance, the symptoms will generally be much milder. Generally speaking, the most characteristic symptoms which would make you suspect a patient to be suffering from malaria are:

- Intermittent (periodic) fever.
- Severe chills.
- Headache.

16.3 COMPLICATIONS OF MALARIA

If a diagnosis is not made and appropriate treatment started immediately, the chance of developing complications increases greatly. The serious complications of malaria are known as "pernicious malaria." These complications arise in persons suffering from falciparum malaria because the parasites multiply very rapidly. Pernicious malaria is either cerebral or algid.

Cerebral malaria This results from a clogging of the blood vessels in the brain by large numbers of parasites. The patient complains of headache and drowziness and if treatment is not started immediately, he may go into coma and may even die.

Algid malaria This results from the massive and sudden destruction of RBCs leading to severe acute anaemia. The person suffering from this condition has shallow breathing, a weak and fast pulse and low blood pressure. He may even have abdominal discomfort with vomiting and diarrhoea. Loss of fluid may lead to shock. Therefore, the person may need to be treated for shock as well as malaria.

16.4 DIAGNOSIS AND TREATMENT OF MALARIA

alaria cannot be diagnosed by the above symptoms only. The iagnosis must be based on a blood test. A blood smear hould, therefore, be taken on all persons who have chills nd fever. It can be taken during any of the stages but hould be taken prior to starting any medication. The rocedure for taking a blood smear is given at the end of the hapter.

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Malaria is a very serious disease. Treatment should be started as early as possible to avoid complications and suffering. Recognizing this, the Malaria Control Programme recommends two types of treatment:

- Presumptive.
- Radical.

The treatment of malaria should conform to the same drugs and dosages used by the malaria control units. Two types of treatment are used, depending on whether treatment is started before or after the diagnosis is confirmed by a blood smear. When the treatment is given before the blood smear results are available, it is called presumptive treatment. After a positive blood smear is reported to you, the treatment you will give is called radical treatment, and will depend on the type of malaria found on the blood smear examination. All treatment dosages are determined by age group and are listed in the following two charts. It is important to look up the dosage each time you see a patient.

TABLE 16.1 PRESUMPTIVE TREATMENT FOR MALARIA

Age group	Number of Chloroquine tablets (150 mg each)
1 - 11 months	1/4 tab
12 - 24 months	1/2 tab
3 - 4 years	1 tab
5 - 6 years	2 tabs
7 - 14 years	3 tabs
15+ years	4 tabs

TABLE 16.2 RADICAL TREATMENT FOR FALCIPARUM MALARIA

	DAY OF TREATMENT					
Age group	1		2		3	
1 - 11 months	C* = 1/4		C = 1/8		C = 1/8	
12 - 24 months	C = 1/2		C = 1/4		C = 1/4	
3 - 4 years	C=1	P=3/4	C=3/4	P=3/4	C=3/4	P=3/4
5 - 6 years	C=2	P=12	C=1-1/2	P=1/2	C=1-1/2	P=1/2
7 -14 years	C=3	P=1	C=2-1/4	P=1	C=2-1/4	P=1
15+ years	C=4	P=2	C=3	P=2	C=3	P=2

C = Chloroquine 150 mg/tablet.
P = Primaquine 7.5 mg/tablet.

TABLE 16.3 RADICAL TREATMENT FOR VIVAX MALARIA

Age groups	DAY OF TREATMENT 1	2	3	4	5
1 - 11 months	C=1/4	C=1/8	C=1/8		
12 - 24 months	C=1/2	C=1/4	C=1/4		
	C=1	C=3/4	C=3/4		
3 - 4 years	P=1/4	P=1/4	P=1/4	P=1/4	P=1/4
	C=2	C=1-1/2	C=1-1/2		
5 - 6 years	P=1/2	P=1/2	P=1/2	P=1/2	P=1/2
	C=3	C=2-1/4	C=2-1/4		
7 - 14 years	P=1	P=1	P=1	P=1	P=1
	C=4	C=3	C=3		
15+	P=2	P=2	P=2	P=2	P=2

C = Chloroquine 150 mg/tablet.
P = Primaquine 7.5 mg/tablet.

Note: PRIMAQUINE must NOT be given to pregnant women nor to children below 2 years of age.

Chloroquine-resistant falciparum malaria Chloroquine is the most effective drug against falciparum malaria. However, some of the falciparum parasites have become resistant to chloroquine. It is important to identify these cases. How do you as Health Technicians recognize chloroquine-resistant parasites?

If a patient who was diagnosed as having falciparum malaria based on a blood smear and treated with chloroquine, comes to see you again with the same symptoms a few weeks later you should suspect chloroquine-resistant malaria. Still, he should first be started on presumptive treatment followed by radical treatment after a blood smear. If the blood smear result show falciparum malaria again, this person must be referred to the Malaria Control Programme for a more thorough investigation and different treatment.

16.5 THE HEALTH TECHNICIAN'S ROLE IN MALARIA CONTROL

The discussion so far has centered on the cause of malaria as well as its signs, symptoms and treatment. In this section specific activities of the Health Technician will be identified. In order to make the presentation simple and clear this part will be presented in table form.

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TABLE 16.4 THE ROLE OF THE HEALTH TECHNICIAN IN THE MANAGEMENT OF MALARIA

Presentation	*Health Technician's activities*
Suspected case of malaria	- Make a blood slide and send to the RHC. - Start on presumptive treatment according to Table 15.1.
Positive blood smear	- Give radical treatment for either falciparum or vivax - whichever was found. - A pregnant woman and a child under two years of age should be referred to the Malaria Control Programme. - Chloroquine is very bitter, therefore, for children under four years suggest Nivaquine or Basquine syrup. - Inform family that an overdose of chloroquine may lead to death. Therefore, instruct them to keep the drug out of the children's reach. - If the patient does not improve in 3 or 4 days refer him to the hospital.
For a fever above 103 F	- Sponge the body with cool water and continue fanning until the fever drops below 103 F. - Take the temperature every 10 to 15 minutes. - Give fever reducing medication such as Paracetamol.
Cerebral malaria	- Refer immediately to a hospital.

Malaria would disappear from a community if one of two conditions are met.

- If all the malaria spreading (anopheles) mosquitoes are destroyed.
- If there are no human malaria carriers.

While it may be possible to destroy the malaria mosquito in a community, particularly by the use of insecticides, their period of absence will only be temporary. Once the effect of the insecticide wears off, the same mosquito will return from outside the community and in a short time will repopulate the area again. The same problem exists in meeting condition 2. It is possible to administer malaria drugs to every community member and reduce the carrier pool to zero, but because of the frequency of travel both into and out of the community, it would only be a matter of time before the parasite is reintroduced to the community by an incoming malaria carrier. Because of these difficulties, malaria will not be eradicated from a country such as Pakistan for many years to come. Therefore, the only practical approach is to control malaria by reducing its transmission to a level where the disease no longer kills nor is able to cause excessive sickness in a community. This is the basic concept of malaria control. To achieve this degree of control, two major types of preventive measures can be used:

- *Self-protective measures:* Methods which an individual can use.
- *Group protective measures:* Those methods which are used on a community-wide basis.

As Health Technicians, you can play a very important role in the effective control of malaria.

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TABLE 16.5 HEALTH TECHNICIAN'S ROLE IN MALARIA PREVENTION

Type of preventive measures	*Health Technician's activities*
Self-protection methods	- Inform people that malaria (anopheles) mosquitoes bite only during the night. Therefore, instruct them to protect themselves by: . Covering the unprotected parts of the body such as neck, arms and legs. . Screening windows and doors to prevent mosquitoes from entering the house. . Sleep under a mosquito net. . Use repellents or burning coals or weeds outside the house to keep mosquitoes away. - Inform the people about the symptoms of malaria such as: . Fever of intermittant duration. . Severe chills. . Headache. - Encourage them to come for or send suspected cases for blood smear and early treatment.
Group protection methods need to be highly organized and require skills, supplies and equipment.	- Act as a link between the Malaria Control Programme and the community by maintaining a close contact with both. - Keep self informed on control plans and schedules and inform community of coming events. - Explain to the community why certain measures are being used.

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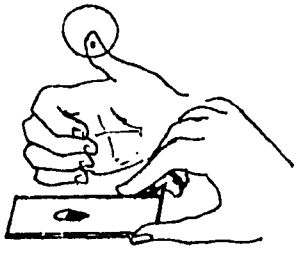
TABLE 16.5 HEALTH TECHNICIAN'S ROLE IN MALARIA PREVENTION

Type of preventive measures	*Health Technician's activities*
Elimination of breeding sites.	- Work with malaria worker to mobilize the community to eliminate small breeding sites by simply filling them with dirt.
House spraying with insecticides.	- Help arrange and organize insecticidal spraying of of houses in villages periodically.
Anti-larval measures.	- Help arrange for spraying of large areas of stagnant water. - Help community to introduce fish to the water (pooled) which eat mosquito larvae.
Reduction of malaria carriers' pool.	- Distribute malaria drugs in mass during the transmission season.



Have your blood examined for malaria

Take treatment

Fig. 16.2 Responsibility of a person with suspected malaria towards its control and treatment.

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16.6 *TUBERCULOSIS*

Tuberculosis is a communicable disease that develops over a long period of time. It is highly infectious and caused by bacteria, Mycobacterium tuberculosis. It is one of the major disease problems in Pakistan. This disease is transmitted to a healthy person from an infected one by droplets during the act of sneezing and coughing. Children under 5 and older adults are at greater risk of developing this disease, as are those with lowered resistance due to malnutrition, diabetes and cardiac diseases.

The symptoms of tuberculosis are:

- Continued low grade fever particularly during evening hours.
- Persistent cough lasting more than a month.
- Tiredness.
- Blood-streaked sputum (haemoptysis).
- Lack of appetite (anorexia).
- Increased pulse rate, more than 90 per minute.
- Night sweats.
- Chest pain.
- Continued weight loss.

The diagnosis of tuberculosis is based on:

- A person seen suffering from the above symptoms.
- A chest examination by the Medical Officer and an x-ray.
- A sputum test.

The initial infection, when organisms first enter the body, goes unnoticed because the symptoms are usually mild and the lesions usually heal. But when a person's resistance is low, the infection flares up. The initial infection may have a serious outcome in infants, adolescents, young adults and those malnourished or underweight.

Tuberculosis can affect most parts of the body including the lymph nodes, lungs, kidneys, bones, joints and intestine. However, the most common site is the lung (pulmonary tuberculosis). Infected persons in the community not under treatment are the ones who are spreading the disease. This disease is spread by droplets from coughing and sneezing droplets containing Mycobacterium tuberculosis. Therefore, close or frequent contact with an infected person will infect a healthy person.

Tuberculosis develops slowly; it takes about 4 to 12 weeks to develop a primary lesion, the first localization of the organism in the tissue. A full-blown case will develop only after a year or two of the initial infection except in the high risk group.

Since the spread of disease is through contaminated droplets from coughing and sneezing, those untreated cases of tuberculosis or those inadequately treated may be sputum positive for years. Therefore, it is very important to get diagnosed cases treated early and continuously until the treatment course is completed.

Treatment has to be of long duration, about 12 months. It takes two months of continuous and full treatment for a person to become sputum negative. When a person's sputum is negative, it means that he cannot transmit the disease but he is not completely cured. He can develop symptoms again and become sick if he does not continue his treatment. With the treatment of this condition there are also some adverse reactions (see Table 16.7) which need to be observed. If the patient shows any sign of an adverse reaction to the treatment he should be referred to the District Tuberculosis Control clinic for another form of treatment.

In addition to treating the patient, close contacts like family members should be screened for possible infection. They also need to be referred to the tuberculosis control clinic to determine their status.

16.7 THE HEALTH TECHNICIAN'S ROLE IN TUBERCULOSIS CONTROL

Health Technician's have a crucial role to play in helping the individual who is suffering from tuberculosis, his family as well as the community and control the further spread of the disease.

Health Technicians should encourage all who have a chronic cough to send their sputum to the tuberculosis control clinic or RHC to be tested. These people should be advised to obtain a small container or dish with a tight cover and clean it well with soap and water. They then cough deeply and bring up mucous from the lungs, not saliva from the mouth. Spit the mucous into the container and take it to the centre. At the centre, the lab technicians will prepare a slide and look at it under the microscope. The sputum is positive if TB bacilli are seen. If the slide is negative, it does not mean the person does not have the disease. He still needs to be sent for a chest x-ray which will show lesions on the lungs if they

are present. For those with a positive sputum test or positive chest x-ray the standard three drug treatment regime should be prescribed for 12 months. This treatment plan is given in Table 16.6

TABLE 16.6 *THE THREE DRUG TREATMENT PROGRAMME FOR TUBERCULOSIS RECOMMENDED BY THE TUBERCULOSIS CONTROL PROGRAMME*

Medication	10 - 15 Years	16 - 45 Years	>45 Years
Strepto-mycin (First 2 months only)	Intramuscular injection: Daily single dose: 1/2 g to 3/4 g. wt: normal to heavy.	Intramuscular injection: Daily single dose: 1 g.	*
Isoniazid (12 months)	By mouth: Daily single dose: 150 mg to 300 mg. wt: normal to heavy.	By mouth: Daily single dose: 300 mg.	By mouth: Daily dose: 300 mg to 450 mg. wt: normal to >40 Kg.
Thioaceta-zone (12 months)	By mouth: Daily 75 mg to 150 mg. wt: normal to heavy.	By mouth: Daily 150 mg.	By mouth: Daily 150 mg to 225 mg wt: normal to >40 Kg.
Ethambutol (12 months)	*	By mouth: See note (1) and (2). Daily single dose: 1200 mg.	By mouth: Daily sing-le dose: 1200 mg.

*Not given unless close attention and follow-up can be maintained.

(1) Substitute if intolerant to isoniazid.

(2) Add if sputum slides are 3+ or more positive per level magnification.

For children 1 to 9 years of age, an individualized treatment plan is developed at the centre.

Specific activities of the Health Technician in the management and control of TB are given in Table 16.7.

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TABLE 16.7 THE HEALTH TECHNICIAN'S ACTIVITIES IN THE MANAGEMENT AND CONTROL OF TUBERCULOSIS

Type of situation	*Health Technician's activities*
Suspected case with some of the symptoms of tuberculosis	- Refer these persons to the tuberculosis control clinic at the District level.
A diagnosed case	- Explain to the patient and his family that this is a communicable disease which requires only simple measures to control its spread: . Covering the mouth and nose with a handkerchief while sneezing and coughing. . Washing the handkerchief with soap and water and drying. . Spitting the mucous into an earthen pot and burning the contents with leaves and papers. - Explain that treatment is long (12 months) and the dangers of not taking the medications regularly. - Explain that you or one of the other Health Workers (HW) will visit periodically to assess the progress until the treatment plan is completed. - Explain the reason for visiting the tuberculosis control clinic as per the Medical Officers recommendations. - Screen family members for tuberculosis.
A person on the tuberculosis treatment plan	- Determine what drugs and dosages have been prescribed. - Make sure the patient is taking the prescribed dose daily (see Table 16.6). - Advise the patient or family to go to the tuberculosis control clinic for replenishment of drugs one week before he is finished with the medication.

TABLE 16.7 *THE HEALTH TECHNICIAN'S ACTIVITIES IN THE MANAGEMENT AND CONTROL OF TUBERCULOSIS*

Type of situation	*Health Technician's activities*
Those developing the following adverse reactions: • Weakness and numbness of the legs. • Jaundice. • Skin rash or anaemia. • Dizziness or ringing in the ears.	- Observe for possible adverse reactions to the medications. - Refer them to the TB control clinic.
Drug-resistant patients are those who have persistant symptoms despite treatment, especially continued weight loss and cough.	- Refer these cases to the tuberculosis hospital for a second line of drug therapy. (Usually Ethambutol and Rifampin are given to these cases).
Contacts are those individuals who share in the day to day living with a diagnosed case. This includes family members and those who frequently come into the family.	- Refer these people for screening to make sure that they have not been infected. - Those with symptoms may need a sputum test and x-ray.
Prevention on a community level.	- Arrange to give BCG vaccine to all children who have not been infected. BCG is recommended for all infants under one year of age. - Examine school children for BCG scars and arrange for BCG vaccination for those without the scar.

16.8 LEPROSY

Leprosy is a chronic bacterial disease caused by Mycobacterium leprae. It chiefly affects the skin, mucous membranes and certain nerves. Bacteria from an infected person enter the body of a healthy person through either the skin or the respiratory tract. Once bacteria enter the body, it takes 3 to 7 years for symptoms to develop. How this disease is transmitted is not clearly established but household and intimate contacts are important. Millions of bacilli are found in the nasal discharge of untreated persons and in the milk of lactating women who are not treated.

The disease is identified by:

- A patch or patches of either red or pigmented skin.
- A loss of normal feeling in those areas (patch).
- An inability to distinguish between sharp or dull pain or between hot or cold in the affected areas.
- A positive nasal and tissue fluid smear, taken to determine the presence of the disease causing organisms.

As long as structurally normal Mycobacterium leprae are present in the smears, one should consider infection possible. However, if continuous treatment is provided with DDS (diamino-diphenyl sulfone, dapsone) and irregularly shaped organisms are present, experience suggests that infectiousness is lost and there is no possibility of infecting others. The usual treatment is oral dapsone (DDS) 6 to 10 mg per kg body weight per week for both adults and children given in daily doses. Treatment may be required for 2 to 3 years.

The Health Technician's role in leprosy control is to refer suspected cases to the leprosy control unit. Only the specialists who have worked with leprosy patients are knowledgeable enough with their problem to work well with them. In addition to requiring correct treatment these people need a great deal of counseling. Leprosy has been feared by people because of the deformity it can cause. For many centuries individuals with leprosy were sent out of the community because people thought it was highly contagious and they wanted to protect themselves.

Even though much scientific evidence exists today to contradict this belief, people still do believe that it is a very contagious disease. Therefore, a person who suspects he has leprosy may not go for treatment for fear of being isolated. You as Health Technicians have a big job to do in counseling suspected cases to go for diagnosis and treatment

as soon as possible before complications occur.

After being treated for two months, a person is no longer infectious and cannot transmit the disease. He/she needs to mix normally with people and carry out all normal activities. You may need to encourage this and discourage any tendency toward isolation.

In brief then, the Health Technician's role in the management and control of leprosy is:

- To refer suspected cases to the leprosy control programme for diagnosis.
- To give the patient and family information about the disease.
- To confirm that the diagnosed case is following the recommended course of treatment.
- To counsel the family on the need to complete the treatment course and inform them that after two months of treatment the patient can participate fully in group activities without fearing the possibility of spreading the infection.
- To educate the community on what is known about leprosy today and the need to change their thinking about the disease.

Schedule of treatment Dapsone (diamino-diphenyl sulphate, DDS) must be started slowly to avoid reactions. The schedule to follow for each age group for different types of leprosy is given below:

	Adults	Children between 12 and 30 kg.	Children below 12 kg.
For tuberculoid:			
First 4 weeks	25 mg 2x/wk	25 mg 1x/wk	10 mg 1x/wk
Second 4 wks	50 mg 2x/wk	25 mg 2x/wk	10 mg 2x/wk
Third 4 wks	100 mg 2x/wk	50 mg 2x/wk	25 mg 2x/wk
Thereafter	200 mg 2x/wk	100 mg 2x/wk	50 mg 2x/wk
For Lepromatous and borderline: Change 4th week to:	300 mg 2x/wk	150 mg 2x/wk	75 mg 2x/wk

Adverse reactions that may sometimes be seen during treatment include:

- Fever.
- Swollen tender joints and or lymph glands.
- Jaundice.
- Skin rash.

If any of these or other unexplained signs or symptoms occur in patients starting on dapsone, stop the drug and consult a physi ian.

16.9 GASTROINTESTINAL CONDITIONS

Diseases of the digestive system are very common in Pakistan. The most frequent single reason why children are brought to the RHC or BHU is diarrhoea. All of the following common gastrointestinal conditions discussed in this chapter, except typhoid, have diarrhoea as a symptom. These diseases are:

- Typhoid.
- Cholera.
- Dysentery.
- Worms.

No matter what the cause, there is a generally accepted treatment for diarrhoea which is covered in Chapter 11. That chapter deals with problems of children, but the principle of diarrhoea treatment is also the same for adults. For this reason, you are to review that section again and relate it to adults. Basic information on how the above conditions are spread is given in the chapter on Environmental Health. This section will deal with specific diagnostic treatment plans for each condition.

Typhoid fever This is an infection caused by Salmonella typhi. A milder form is known as paratyphoid and is caused by paratyphi A, B or C. Man gets the infection by eating contaminated food or drinking contaminated water. The organism attacks the gastrointestinal system in the first week and then passes into the bloodstream. While in the intestine, it can cause ulcerations which in untreated cases may prove dangerous during the course of the disease or later.

One symptom of typhoid is a slow onset of fever during the first week. The temperature rises a little every day which is called a "step-ladder" type of fever. The patient has constipation, headache, nausea and sometimes vomiting. Later diarrhoea may occur. The pulse is comparatively slow.

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This disease can be diagnosed by the presence of typhoid bacilli in the blood, faeces and urine. A blood, urine and stool specimen needs to be sent to the hospital laboratory for examination. It takes two to three days for the culture to grow and results to be known.

The treatment of choice is chloramphenicol 500 mg every 6 hours for one week.

Cholera This is an acute diarrhoeal disease caused by Vibrio cholerae. The infection is acquired by ingestion of food or drink contaminated with by faeces containing the cholera organisms. Symptoms of cholera are:

- Sudden onset of severe and frequent diarrhoea.
- The stool quickly looses all faecal appearance and odour.
- Faeces become gray and are often called "rice water stool."
- Signs of dehydration become apparent in a very short time.

The diagnosis is made by the presence of the organism in the stool. So it is important to send the stool for examination to the hospital laboratory.

The treatment for cholera should start with the immediate replenishment of fluids and nutrients lost from the body by giving oral rehydration solution if the person is able to drink. Otherwise immediate referral to the BHU or RHC for intravenous fluid therapy is required. The rehydration therapy should continue as long as the diarrhoea is present. In addition to oral rehydration therapy, tetracycline 500 mg orally every 6 hours for 3 to 5 days should be administered.

Dysentery This disease can be caused by a number of bacterial and protozoan organisms. The most common are shigella and amoeba. The disease is usually mild but can become serious. It begins with diarrhoea mixed with blood and/or mucous. The person experiences sudden colicky pain or cramps followed by diarrhoea. This infection may be accompanied by fever, especially in children who can have a fever as high as 40 C (104 F). As the disease progresses, the patient becomes weaker, so prompt treatment is important. The diagnosis is based on the presence of blood and mucous in the stool plus the organism responsible, eg shigella bacteria or an amoeba. Some cases are acute and others may be chronic.

The treatment of choice for bacterial dysentery is tetracycline or Ampicillin 1 gm to start and 500 mg every six hours for 7 days.

The treatment of choice for amoebic dysentery is Flagyl 200 mg daily for one week.

Note: It is very important to identify the specific organism causing the dysentery because treatment will vary according to the organism.

Worms The various kinds of worms and how they infect people were discussed in the Environmental Health chapter. All worms infect children and adults equally except for pinworms which are common in younger children only. An infection of intestinal worms is a chronic rather than acute condition. People usually come to the PHC/BHU only after passing worms in the stool. Since this condition is due to infected water or food, most of the rural population not utilizing adequate personal hygiene suffer from it. In some places, treatment for worms is given routinely every six months or during the monsoon season when water sources are contaminated with soil containing worm eggs. The medications used for treating worms can have adverse effects if too much is given and some medication like that for hookwork, is very strong. So it would be better to treat only infected cases. Infected cases can be easily detected by doing a simple stool test which consists of looking at a stool smear slide under the microscope and identifying the eggs of different kinds of worms. Treatment for a variety of worms is given in the following table.

TABLE 16.8 TREATMENT FOR INTESTINAL WORMS

Type of intestinal worm	Preferred medication
Pinworm	Piparazine citrate 40 mg/kg/ day, 2 doses daily for one week.
Hookworm	Tetrachlorethylene (TCE) 0.12 ml/kg but never more than 5 ml.* 2 doses two days apart
Roundworm	Piparazine citrate 120 mg/kg, one dose only or Antepar 75 mg/kg for 2 days.
Tapeworm	Niclosamide (Yomesan) tablets. These need to be chewed well. No food two hours before or two hours after taking the medicine.

*You need to treat for roundworm before giving TCE for hookworm. TCE causes many adverse effects such as abdominal pain and headache. It should not be given to any person who is malnourished or pregnant or to children until their condition improves. Always give on an empty stomach.

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16.10 THE HEALTH TECHNICIAN'S ROLE IN THE TREATMENT AND MANAGEMENT OF GASTROINTESTINAL CONDITIONS

The main role of the Health Technician in the treatment and management of gastrointestinal conditions is to educate the family and community in maintaining adequate personal hygiene habits. You must also:

- Send suspected cases to the BHU or RHC for diagnosis.
- Give the patient information on the medication he must take.

TABLE 16.9 HEALTH TECHNICIAN'S ACTIVITIES IN THE MANAGEMENT OF GASTROINTESTINAL CONDITIONS

Area of responsibility	*Health Technician's activities*
Prospective cases: If a person in the family is diagnosed as having intestinal worms, other members are considered prospective cases because they share the same food and water which are the main sources of infection.	- Encourage all family members to send a small stool sample for examination. - Examine the stool under the microscope for the presence of eggs. - Determine which type are seen. - Inform the individual or family of results. - Encourage those with negative stool to maintain adequate personal hygiene habits. - Treat those individuals whose faeces contain worm eggs.
Infected cases: those individuals who have either passed worms in the stool or vomited a worm or have a positive stool test for eggs of one type or another. They can be infected with more than one type of worm.	- Determine the dose of medication required for the specific type of worm. - Give instructions on taking drugs. - Treat roundworms first and then others. - Discuss the importance of personal hygiene habits.
Prevention and health education: consists of informing families and the community how to protect themselves from becoming infected.	- Inform families about the disease and how harmful it is. Explain how these worms live on food which people eat. - Advise all, especially farmers, to wear shoes outside of their homes.

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TABLE 16.9 HEALTH TECHNICIAN'S ACTIVITIES IN THE MANAGEMENT OF GASTROINTESTINAL CONDITIONS

Area of responsibility	*Health Technician's activities*
	- Advise proper disposal of faeces. (See Environmental Health chapter). - Encourage families to boil drinking water. - Explain the importance of washing hands with soap and water before eating and after the toilet. - Instruct them to wash vegetables well before cooking. - Discourage the use of raw human faeces in the cultivation of vegetables. - Cut fingernails to keep them short and clean. - In case of tapeworm, inform the family on the importance of cooking beef well and not to graze cattle on grass polluted with human faeces. - For pinworms, instruct mothers to have children wear clean light clothes at night. - Give iron tablets to those who are anaemic after treating for for identified worms.

In this chapter only the most common of the communicable diseases in Pakistan were discussed. The discussion has been limited to the activities of Health Technicians in prevention and treatment. If you need or want to know more, you can consult the reference sources provided at the end of the volume.

16.11 *PROCEDURE FOR MAKING A BLOOD SMEAR*

Supplies and equipment required:

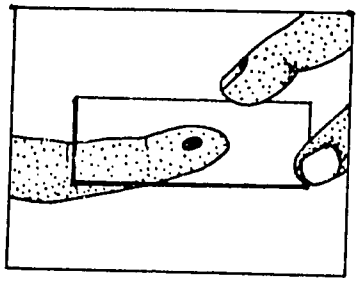
1. Clean slides. All slides must be clean because dirty or greasy slides show artifacts. Also, the blood film will not stick to the slide.
2. Alcohol (Spirit).
3. Sterile cotton wool.
4. Sterile lancet.

Steps for taking smear:

In adults prick the left middle or ring finger; in babies prick the left big toe. Proceed as follows:

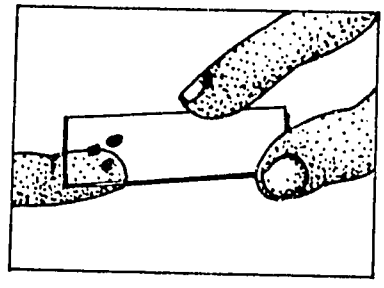
- Hold the finger to be pricked.
- Clean the tip of the finger with cotton soaked with spirit or soap and water.
- Dry with another piece of cotton wool.
- Prick the finger at the side of the tip with a sterile lancet.
- Allow the blood to flow freely.
- Discard the first drop of blood if a thick smear is needed. Use the first drop to make the thin film.
- The next blood drops should be collected for examination or for a thick film.

Thin blood film

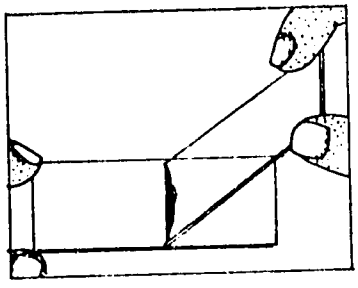


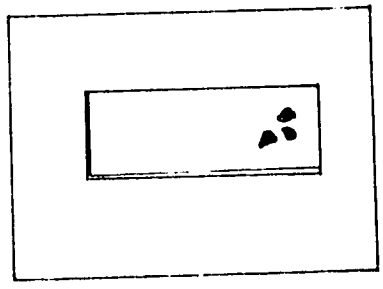
Step 1. Put a drop of fresh blood on the middle of the slide.

Thick blood film



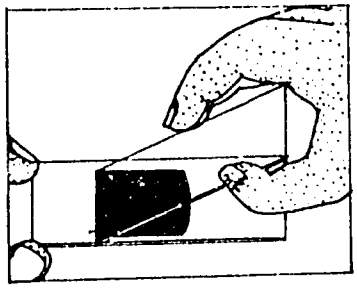
Step 1. Put three drops of fresh blood on the left end of the slide. of the slide.

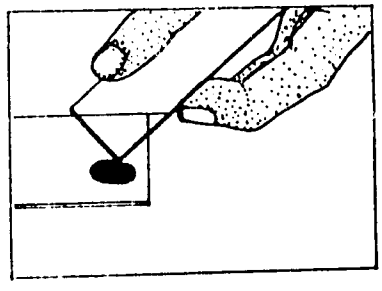


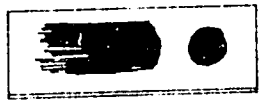


Step 2. Use the end of another slide and allow the drop of blood to spread along it.

Step 2. Turn the slide around so that the drops will be on the right end of the slide.







Step 3. Push the spreader quickly from the centre to the left side of the slide, drawing the blood behind it.

Step 3. With the corner of another slide, mix the blood and smear it in a round form of about 1 cm in diameter.

Fig. 16.3 Preparation of a thick and thin blood film.

- Leave the film to dry. Do not blow on it or shake the slide.
- When the film has dried mark the slide by writing the number given on the thin film using a lead pencil, according to the instructions given below:

Numbering the slide:

Take a lead pencil and write clearly on the thin smear when it is dry:

- Slide number (According to fever reporting case form).
- BHU # or name (or F.R. (Fever reporting) Post No.).
- Date: when the smear was made.

Reporting:

The form used in Malaria Control is EVA-M/3 (Figure 16.4) which has three parts. It is important to fill in the patient's address. The first part is to be kept at the Basic Health Unit while the other two are sent to the Rural Health Centre where specially trained technicians will examine the blood smear. The technicians will identify the particular type of malaria.

These forms along with the blood smears will be collected by the Malaria Supervisor/CDC Supervisor or any other Malaria Control employee. You should be well informed about the Rural Health Centre and request a F.R. Post No. for your unit. The smear result will be sent to you through the third part of the form.

MALARIA ERADICATION PROGRAMME

(EVA-M/3)
S.No.

FEVER CASES REPORT

Village/Hospital_____F.R. Post No. [ ]

S. No.	Name of Sick Person with Father's Name Cast & Detailed Address	Age	Date Slide Taken	No. of Tab.

Slides sent on: [ ]
[ ]
[ ]

MALARIA ERADICATION PROGRAMME

FEVER CASES REPORT (EVA-M/3) S.No.

Village ___Tehsil ___Thana ___ Distt ___

Type of Post _____ F.R. Post No. [ ]

S. No.	Name of Sick Person with Father's Name Cast & Detailed Address	Age	Date of Fever	Date of Slide Taken	No. of Tab.	Lab. Ref. No.	Results

Slides sent on: [ ]
[ ]
[ ]

NAME OF SENDER: _____

S.No.
F.R. Post No.
[ ]

Date Slide Sent... ...

S. No.	RESULT

Date: _____

Signature

Fig. 16.4 Malaria eradication programme.

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GLOSSARY

Algid malaria: A form of malaria with symptoms of collapse.

Amoeba: A protozoa found in water and capable of causing dysentery.

Anorexia: Loss of appetite.

Apyrexial: Absence of fever.

Carrier: A person who harbours a specific pathogenic organism without actually having symptoms of the disease and is capable of spreading it to others.

Cerebral malaria: A form of malaria in which the brain is affected and may lead to coma and death.

Cholera: An acute infectious disease characterized by diarrhoea and severe loss of fluids, muscle cramps and tendency to collapse.

Communicable: A disease which can be transmitted directly or indirectly from one person to another.

Dysentery: A term applied to an intestinal disorder characterized by inflammation of the mucous membranes and diarrhoea.

Haemoptysis: Coughing up blood.

Lepromatous leprosy: A more contagious and severe form of leprosy.

Malaria: An infectious disease caused by a protozoa in the red blood cells. It is characterized by periodic chills, fever and sweats.

Parasite: An organism that lives in or upon another organism known as the host.

Presumptive treatment: Treatment given before test results are available or a diagnosis is made.

Prospective case: Likely to become a case in the future.

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Protozoa: The simplest organisms which can be serious parasites of man.

Radical treatment: Treatment specific for the type of organism seen in culture.

Sporozoite: Stage of the malaria organism when it is found in the salivary glands of the mosquito and enters human tissue.

Tuberculoid leprosy: A more benign form of leprosy.

Tuberculosis: An infectious disease caused by the tubercle bacillus which can affect all body parts but typically affects the lungs.

Typhoid: An acute infectious disease caused by Salmonella bacteria and characterized by skin lesions, fever, headache and abdominal symptoms.

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Review questions:

1. Describe the life cycle of the malaria organism in the mosquito and the human being.
2. What two factors determine the transmission of malaria in a community?
3. Can all mosquitoes transmit malaria? How can you distinguish between the mosquito that does and those that do not?
4. What are the two types of malaria common in Pakistan?
5. What are the four stages of a malaria attack? Describe each stage.
6. What are the possible complications of malaria?
7. What is the procedure used to confirm a diagnosis of malaria?
8. Describe the steps in making a thin or thick smear.
9. What are the two drugs used in the treatment of malaria?
10. What is used to treat children with malaria?
11. What should you do for drug-resistant falciparum?
12. What is meant by presumptive and radical treatment?
13. Does mosquito netting help prevent malaria? How?
14. How is leprosy transmitted?
15. What is the treatment for leprosy and how long is the treatment course?
16. For how long should a leprosy patient be isolated?
17. How are intestinal conditions transmitted?
18. Describe the signs and symptoms and treatment for the following conditions:

    - Typhoid.
    - Cholera.
    - Dysentery.
    - Roundworm.
    - Hookworm.
    - Tapeworm.
    - Pinworm.

19. Describe the Health Technician's role in the control and management of gastrointestinal conditions.
20. Which of the above gastrointestinal conditions is most serious and why?

Suggested learning activities;

During your hospital rotation, ask to take care of people who have communicable diseases and keep a record such as the one below:

No.	Type of condition	Treatment prescribed	Your activity
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

EVALUATION FORM

*CHAPTER*_____

Organization of content [ ] Appropriate
[ ] Inappropriate

Method of presentation [ ] Simple to understand
[ ] Difficult to understand

Amount of content [ ] Adequate
[ ] Inadequate

Any other comments:

Write a paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 17

THE HEALTH TECHNICIAN'S ACTIVITIES IN PROVIDING FIRST AID SERVICES

Objectives After completing this chapter you will be able to:

1. Define first aid.
2. Describe the four points which you must consider in assessing the status of a person requiring first aid.
3. Describe what causes burns.
4. State how a burn is classified and managed.
5. Describe heat and cold related problems and their management.
6. Describe the two types of bleeding and their management.
7. Identify the pressure points commonly used to stop bleeding.
8. Describe shock and its management.
9. Identify common bone and joint injuries and describe their management.
10. Describe different types of wounds and how they are managed.
11. Identify common bites and describe their management.
12. Describe poisoning and its management.
13. Describe the Health Technician's activities in the management of:

    - Drowning
    - Electric shock

14. Describe the following procedures:

    - Splinting
    - Heimlich Manoeuver
    - Bandaging
    - Cardio-Pulmonary Resuscitation
    - Artificial Respiration

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CHAPTER 17

THE HEALTH TECHNICIAN'S ACTIVITIES IN PROVIDING FIRST AID SERVICES

The Red Cross defines first aid as "the immediate care given to a person who has been injured or suddenly taken ill." It includes self-help and home care if medical assistance is not available or is delayed. As Health Technicians, you will have to assess the degree of the problem, the resources available and take immediate action to save a person's life or prevent a major complication.

In assessing the status of a person requiring first aid, always consider the following four points:

1. *Air:* Does the person have an open airway and is he breathing?

2. *Bleeding:* Is the person bleeding?

3. *Cardiac:* Is the heart working? Can you feel the pulse?

4. *Shock:* Is the person in shock?

Depending on your findings, you must take immediate action to save a person's life. Any minor situation could become life-threatening if adequate care is not provided.

This chapter covers the more common trauma and emergency situations. Information is provided on how various conditions can be recognized and the activities of Health Technicians in the management of these situations.

Topics covered are burns, wounds, fractures, bleeding, shock, bites and drowning.

17.1 BURNS

Burns are damage to the tissues of the body as a result of heat, electricity or chemicals. Burns can be caused by fire, hot metal, boiling water or oil. They can be caused by electric current passing through the body or they can be caused by contact with chemicals such as acids.

The seriousness of the burn is measured by the amount or area of tissue damaged. Burns are further classified as:

- First degree: Burns affecting the outer layer of the skin causing redness and pain.
- Second degree: Burns affecting the skin and underlying tissues causing blisters and pain.
- Third degree: Deeper burns that destroy the tissues and damage nerve endings resulting in blackened skin but no pain.

Burns become more serious with an increasing area of involvement and an increasing depth of tissues affected. Thus if a large area of the body is affected, the burn should be considered serious. Burn victims should also be watched for infection.

A large area of skin is said to be burned when:

- The skin of more than one arm is affected.
- More than one leg is burned.
- More than half the back is burned.
- More than half the chest is burned.

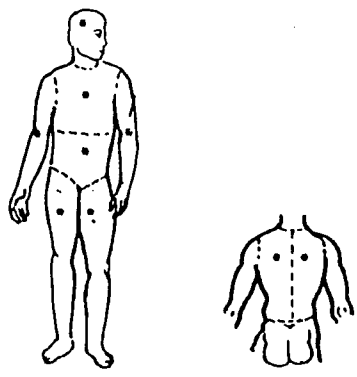


Fig. 17.1 *Determining the seriousness of burns by the area affected. Each area marked with an * is considered a large area.*

Fig. 17.2 A small skin burn.

Burn patients are frequently more seriously injured than they first appear. In burns affecting large skin areas, the patient should be closely observed for shock, often a sudden occurrence resulting from pain and/or loss of fluid.

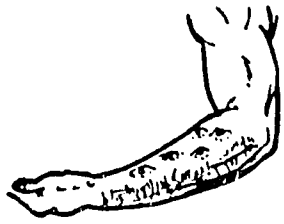
Health Technician's role If a large area of the skin is burned, the following steps should be taken:

- Lay the patient down on a clean bed.
- Treat for shock if symptoms of impending shock are observed.
- Cover the burned part with sterile gauze or a clean cloth.
- Give the patient plenty of ORS mixture plus any other fluid.
- Give two paracetamol tablets.
- Stay or have someone stay with the patient.
- The family should seek assistance from the MO at the RHC or BHU to plan for further treatment. This is a MUST.
- Advise the family to provide a diet high in proteins and vitamins.

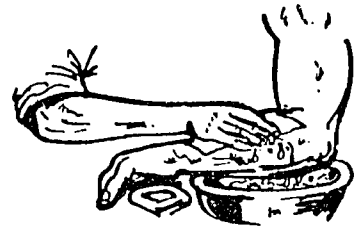
If a small area of skin is burned and the patient comes to see you less than 24 hours after the burn:

- Wash the area gently with soapy water and a clean cloth.
- Cover with iodine or preferably with gentian violet without breaking the blisters.
- Put on a loose dressing (see below).

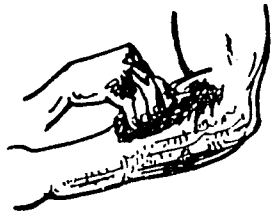
Caring for a small burn:



Burned arm is covered with blisters.



Step 1. Wash gently with soap and water.



Step 2. Cover with iodine or gentian violet.

Step 3. Put on a loose dressing.

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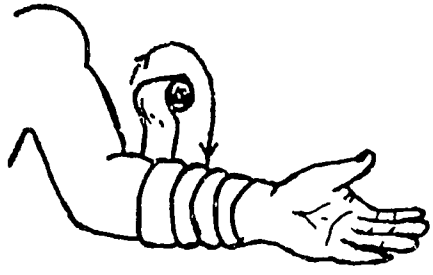
After dressing the burn:

- Tell the patient not to take the bandage off or to get it dirty.
- Repeat the cleaning and dressing procedure every two days if the skin smells bad or if there is liquid or blood coming out of it.
- If an arm or a leg is affected, place the burned part on a clean cloth soaked in salty water. Leave the skin uncovered but ask the patient to avoid letting flies settle on it.
- Give the patient an injection of penicillin every day for 5 days.
- Tell the patient to drink plenty of water and other liquids.

After one week, the following steps should be taken:

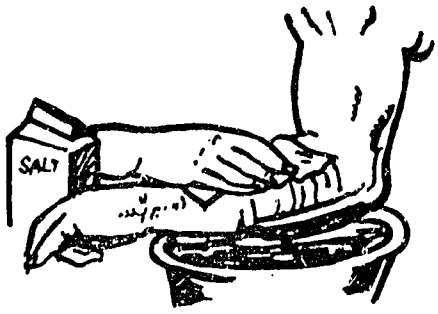
Step 1. Remove the old bandage.

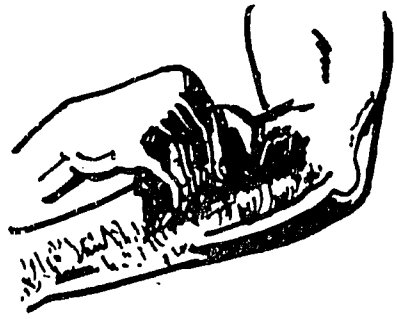


Step 2. Assess the burned area.

For bleeding For torn skin Odour of wound discharge

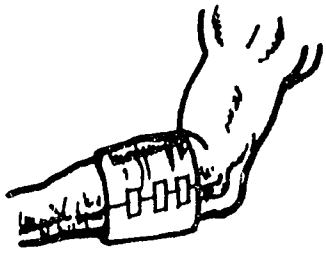
Step 3. Clean and disinfect area.





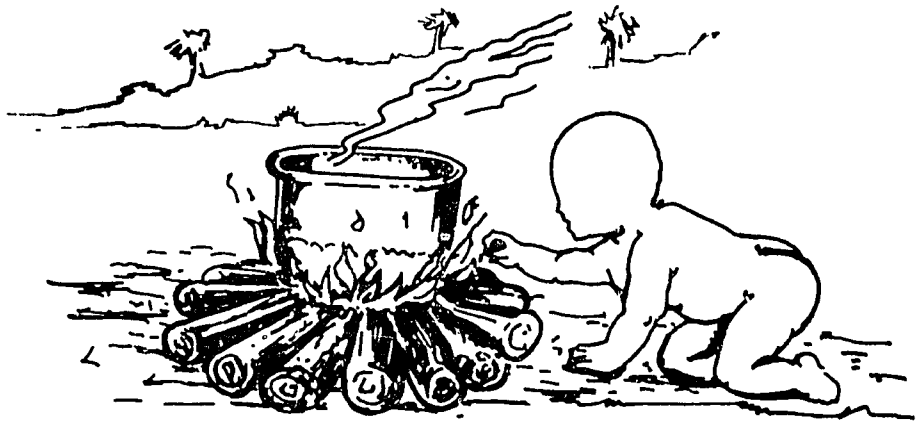
Wash with salty water. Cover with antiseptic.

Step 4. Bandage the affected area.

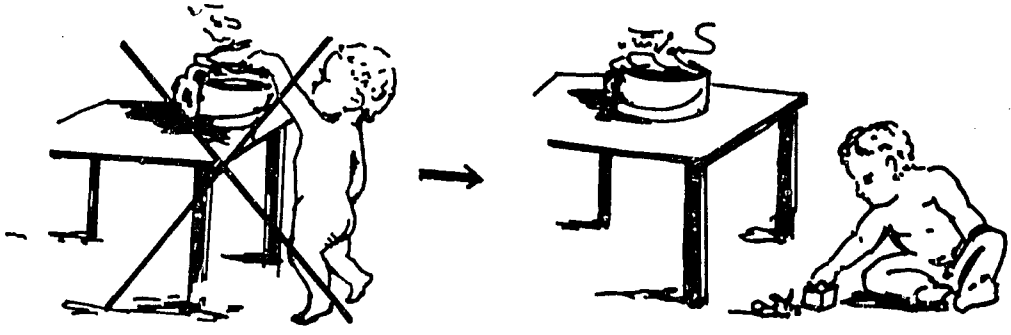


Step 5. Repeat the procedure every five days.

Step 6. Supervise the intake of nutrition and medicine.



Keep children out of the cooking area.



Place hot objects out of the reach of children.

Fig. 17.3 Teaching people to avoid burns.

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17.2 HEAT AND COLD RELATED PROBLEMS

Heatstroke, heat cramps and heat exhaustion are three conditions caused by excessive heat. Heatstroke occurs when the temperature regulating mechanism of the body fails and causes a sudden loss of the body's ability to sweat and thus give off heat. It requires immediate care to prevent convulsions, brain damage or death. This condition usually occurs in children and the elderly. It is also more common in obese people and in those not accustomed to high temperatures or hot sun. Direct exposure to the sun is not necessary for this condition to occur. Prolonged activity in a hot environment resulting in an excess loss of water and salts through prolonged heavy sweating can also result in heatstroke.

Heat cramps, severe cramps in certain muscles, are the result of the loss of body salt from profuse sweating. This is a mild condition.

Heat exhaustion is a milder form of heatstroke. Weakness is produced by a loss of fluids rather than a derangement of the heat control center.

TABLE 17.1 HEAT RELATED CONDITIONS AND FIRST AID ACTIVITIES

Condition	*How to recognize it*	*Health Technician's activities*
Heatstroke	- Person complains of feeling extremely hot. - There is no sweating. - Skin may be hot, dry and red. - Body temperature is high (may be 105°F., 41°C. or higher). - Pulse is fast and strong. - The person may be unconscious.	- Immediate care should be given to cool the body fast but to prevent over-chilling once the temperature is below 102°F. (39°C.). To cool the person down: . Move the person to a cool area. . Remove clothing. . Pour cold water over the person or sponge with cold water or alcohol. Fan until the body temperature drops to 102°F. (39°C.). Continue to take the temperature and discontinue cooling when the temperature is 100°F or 38°C.

TABLE 17.1 HEAT RELATED CONDITIONS AND FIRST AID ACTIVITIES

Condition	*How to recognize it*	*Health Technician's activities*
		- Give ORS preparation if person is conscious. - If unconscious, transport person to the hospital, continuing to cool him. - Advise future use of an umbrella and drinking plenty of salty liquids.
Heat exhaustion.	- Person complains of nausea, dizziness, headache. - Person may be confused or faint. - Skin is pale, feels cold and moist. - Body temperature is normal or slightly below normal. - Person is sweating a great deal. - Person is tired and weak. - May faint but lowering the head will help regain consciousness.	- Take person to a cool area. - Have person lie down and raise feet 8 to 12 inches higher than head. - Loosen person's clothing. - Give sips of salt water (1 teaspoon of salt per glass) at the rate of half a glass in 30 minutes for about an hour. - Apply a cool wet cloth to exposed parts of the body. - For vomiting, give only small amounts of liquid at a time (a spoonful). - If person continues to vomit and the condition gets worse, refer him to a nearby health facility with a Medical Officer. - Advise person not to return to work for 2 to 3 days after such an attack. - Encourage the taking of salty drinks when sweating heavily and resting at intervals.

TABLE 17.1 HEAT RELATED CONDITIONS AND FIRST AID ACTIVITIES

Condition	*How to recognize it*	*Health Technician's activities*
Heat cramps	- Person has cramps in various muscles beginning with the legs and abdomen.	- Gently massage affected muscle. - Give salt water for an hour.

Exposure to extreme cold and frostbite Exposure to extreme cold for a long time period can be dangerous especially when the low temperature is accompanied by high winds or high humidity. It can lead to frostbite, a condition in which body tissues are damaged or die due to freezing. Once freezing begins, it progresses rapidly unless the tissues are warmed quickly. The fingers, toes, nose, ears and cheeks are most commonly affected.

TABLE 17.2 COLD RELATED CONDITIONS AND FIRST AID ACTIVITIES

Condition	*How to recognize it*	*Health Technician's activities*
Cold exposure	- Person shivers. - Has numbness in hands, feet, face and ears. - Feels drowsy and weak. - Body temperature may be low.	- Bring person inside to a warm room or place quickly. - Remove wet or frozen clothing and put on dry warm clothes. - Wrap him in a warm blanket. - Give hot liquids to drink. - Advise the wearing of a hat to cover the ears, gloves and an extra pair of socks in the future. - Limit prolonged outside activities by periodically coming into a warm place at intervals.

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TABLE 17.2 COLD RELATED CONDITIONS AND FIRST AID ACTIVITIES

Condition	*How to recognize it*	*Health Technician's activities*
Frostbite	- First the skin of the affected area looks flushed. - Skin changes to a white, greyish/ yellow appearance. - Pain may be felt early but stops. - Affected area feels cold, tingling and numb. - When area is frozen it becomes hard. - In severe cases person feels drowsy and numb over whole body. - Blisters, ulcers and gangrene are complications likely to develop later.	- Place body part in luke warm water. - Do NOT rub affected area or expose it to fire or direct heat or use hot water bottle. - Cover the affected area. - Give a warm drink. - As soon as affected area is thawed have person exercise that area. - Refer person to Medical Officer if large area is involved. - Advise preventive measures of wearing adequate clothing and avoid being outdoors for long periods.

17.3 BLEEDING PROBLEMS

Bleeding or haemorrhaging, excessive loss of blood, occurs frequently in trauma cases. One should be prepared to stop the bleeding in a systematic manner while maintaining circulation.

There are two types of bleeding:

- Internal bleeding occurs inside the body as a result of trauma or medical problems such as a ruptured ectopic pregnancy. It is not immediately obvious since the bleeding is inside the body. Internal bleeding should be suspected in all trauma cases.
- External bleeding refers to bleeding outside the body. Because the site and amount of bleeding can be observed, external bleeding can be divided into minor bleeding or severe bleeding. Minor bleeding can be controlled by elevating the bleeding part and by applying a pressure bandage. A common type of minor bleed is a nose bleed due to ruptured blood vessels in

the nostrils. Severe bleeding cannot be stopped and requires complex care. This person must be referred to the hospital immediately. Control of bleeding should be attempted on route.

Intracranial bleeding is a serious form of internal bleeding. The bleeding occurs inside the skull and will cause permanent disability or death if proper medical care is not provided immediately. In all head injuries, the possibility of intracranial bleeding should be considered and signs and symptoms observed for. If intracranial bleeding is suspected, immediately transport the patient to the hospital.

Any bleeding that does not stop immediately or cannot be seen should be considered a life-threatening situation and referred to the hospital.

TABLE 17.3 TYPES OF BLEEDING AND THE HEALTH TECHNICIAN'S ACTIVITIES

Type of bleeding	*How to recognize it*	*Health Technician's activities*
Internal bleeding	- Feeling of faintness. - Cold clammy skin. - Sudden thirst. - Rapid shallow pulse. - Lowering BP. - Increasing abdominal pain or distension. - Increasing difficulty in breathing. - Person becoming increasingly anxious or nervous.	- Have person lie down. - Take BP, pulse, respiration. - Raise feet to higher level than head. - Keep person warm. - Refer person to hospital immediately when internal bleeding is suspected.

TABLE 17.3 *TYPES OF BLEEDING AND THE HEALTH TECHNICIAN'S ACTIVITIES*

Type of bleeding	*How to recognize it*	*Health Technician's activities*
Intracranial bleeding	- Severe headache. - Increasing nausea and vomiting. - Increased drowziness. - Little or no pupil response to light. - Shock.	- Advise family to immediately take patient to hospital. - Keep patient flat. - Keep patient warm. - Do not give any medicine. - If there is bleeding from ears or nose, do not try to stop this.
External bleeding: Nose bleeds	- One notices fresh bleeding from the nose usually without pain.	- Apply cold water or ice to the nostrils. - Hold nose and press as illustrated. - If pressure on nose does not stop the bleeding, make a roll of sterile gauze or clean cloth and plug nostrils. This usually stops the bleeding. - If bleeding cannot be stopped with gauze plug, seek medical help.
Other external bleeding	- Bleeding from one or more areas of the body.	- Elevate affected area. - Apply pressure bandage. - Apply tourniquet if necessary.

Fig. 17.4 *Caring for a nose bleed.*

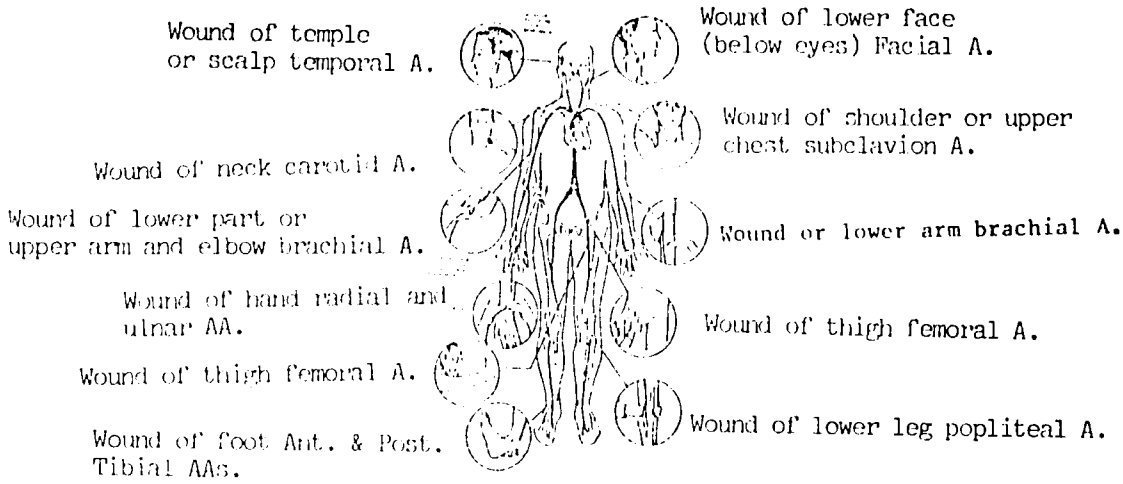

Fig. 17.5 ***Pressure points for temporary control of bleeding.***

17.4 SHOCK

Shock is a serious condition in which there is a diminished functioning of many vital organs. Shock occurs during injuries and illness. One of the most important contributing factors to shock is an inadequate supply of blood to the vital organs such as the brain, heart, kidney and liver.

There are various types of shock caused by:

- Injury.
- Haemorrhage.
- Fluid loss (as in vomiting of long duration, dysentery and burns).
- Electricity (electrical shock).
- Drug-related such as insulin shock.
- Infection.
- Exposure to extreme heat or cold.
- Pain.
- Delay in treatment.

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Whatever the underlying cause, the goal in the management of shock is to improve circulation to the vital organs and to maintain normal body temperature as quickly as possible. Time is a very important factor and prompt and appropriate action will result in quick recovery. Delayed management will not only delay recovery but will result in complications and even death. Act promptly and appropriately.

TABLE 17.4 THE HEALTH TECHNICIAN'S ACTIVITIES IN THE MANAGEMENT OF SHOCK

How to recognize shock	*Health Technician's activities*
- Skin is pale and cold. - Skin may be moist if sweating has occurred. - Person feels weak. - Pulse is rapid (over 100/min) and may be difficult to feel and count at the wrist, carotid and femoral areas. - Breathing rate is increased. - Blood pressure is low. - If haemorrhaging, the person may be restless and anxious. - There may be nausea and vomiting. - Person may be mentally confused or lose consciousness at a later stage.	- Keep the person lying down with feet elevated higher than head. - Cover the person to keep him warm. - If conscious, give warm drinks at the rate of half a glass every 15 minutes for adults, 2 oz for children 1-12 and 1 oz for infants. - Take blood pressure, pulse and respiration frequently to determine status. - Tell person about his condition and what is being done to help him. - If person is unconscious, put him on his/her side; do not give anything by mouth. - If person regains consciousness and improves, continue fluid treatment, take vital signs at increased intervals and have person rest. - If person does not regain consciousness and condition is getting worse, make plans for transport to the hospital. - Encourage one member of the family to stay with the patient.

Note: The positioning of a person in shock varies according to the type of injury. The following rules should be adhered to:

- If an injury to the neck or lower back is suspected, do not move the patient until transportation to the hospital is arranged.

- If head injury is suspected, the person should lie flat or in a sitting position. The head should not be lower than the feet.
- If a person with raised feet has increased pain or difficulty breathing, lower the feet again.

17.5 WOUNDS

A wound occurs when the skin is scraped, cut or torn. A wound can be small (up to 5 cm), large (more than 5 cm), superficial or deep. When a person comes to a Health Technician with a wound, its size and seriousness must first be assessed. The Health Technician must also be aware that with every wound there is some chance of infection. Therefore, you must take actions to prevent infection, such as washing your hands before and after handling a wound. The ways of determining the characteristics of a wound and the Health Technician's activities are given below.

TABLE 17.5 THE HEALTH TECHNICIAN'S ACTIVITIES IN THE MANAGEMENT OF WOUNDS

Type	*Characteristics*	*Health Technician's activities*
Small and/or superficial: cuts or skin abrasions.	- Less than 5 cm. - On the skin surface with minimal tissue damage. - Blood loss is minimal. - Injured person is alert.	- Wash your hands. - Remove any dirt around wound. - Clean it with soap and water. - Apply iodine or gentian voilet or any other antiseptic to the affected area. - If the wound is small and superficial a dressing is not required. - If a dressing is required, use a clean, soft cloth like malmal and wrap it gently as shown in Fig. 17.6. - Change the bandage every 2 to 3 days. - Give tetanus toxoid. - Instruct the person or a family member to observe for signs of infection and report to you or the Medical Officer.

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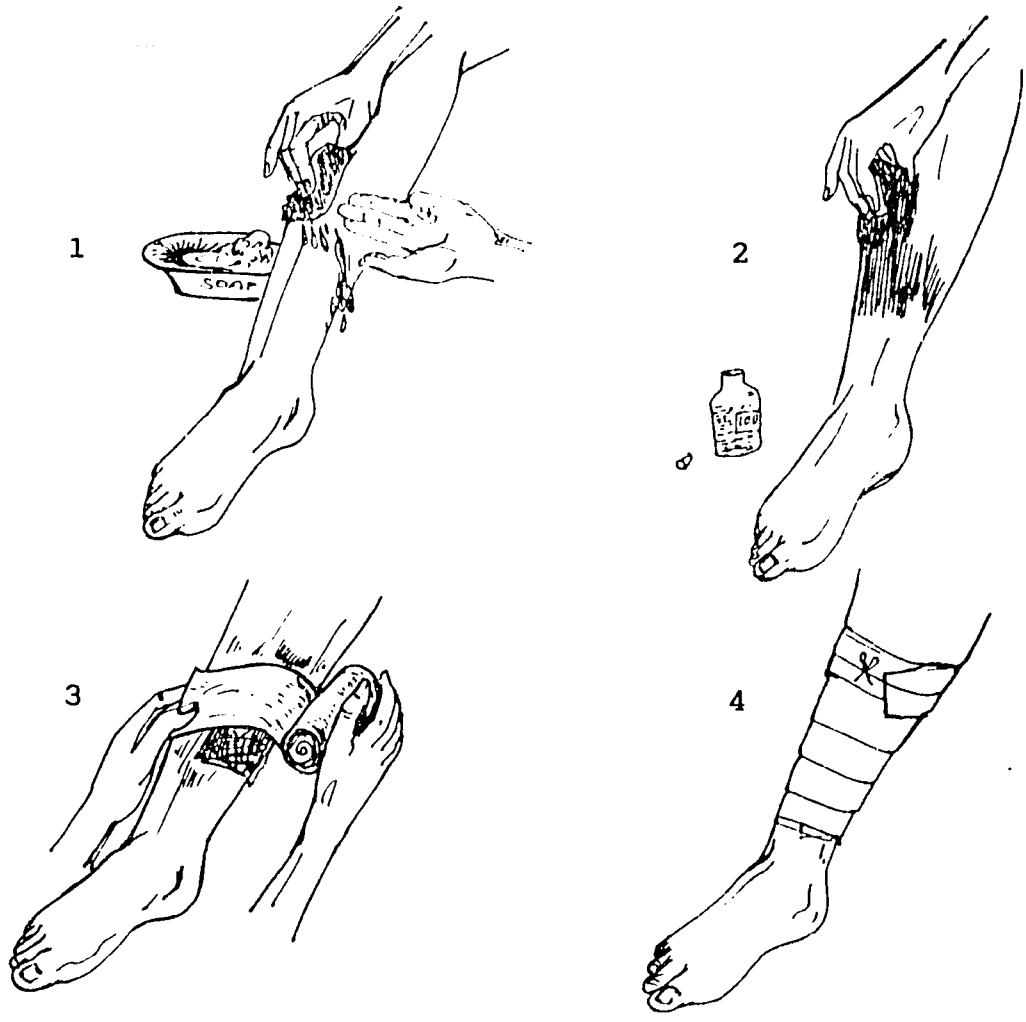

lways wrap towards the heart so as to facilitate blood circulation.

ig. 17.6 *How to clean, apply antiseptic and dress a small and superficial wound.*

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TABLE 17.5 THE HEALTH TECHNICIAN'S ACTIVITIES IN THE MANAGEMENT OF WOUNDS

Type	*Characteristics*	*Health Technician's activities*
Large and/or deep:		
Less than 12 hours old, uncontaminated	- More than 5 cm. - Some tissue is damaged. - Bleeding is present. - Having straight edges. - Edges come together.	- Wash your own hands. - Control bleeding. - Wash wound and area with soap and water. - Apply antiseptic solution. - Apply dressing and change every 2 to 3 days. - Give tetanus toxoid.
More than one day old Heavily contaminated with soil and foreign material	- Lots of damaged tissues. - Infected. - Irregular edges. - Edges wide apart.	- Clean wound. - Apply butterfly plaster to close open edges (refer to procedure). - Apply dressing. - Give tetanus toxoid. - Refer to MO for antibiotic treatment or start it yourself.

17.6 BONE AND JOINT INJURIES

Bone and joint injuries are common in all types of major accidents and their management includes not only immediate care but long-term care to protect the person from further injury by immobilizing the injured area. The first step is to assess the type and site of injury and determine the most appropriate way to handle the injured part. If the injured person is conscious, he will be able to give you information on how the injury occurred and what body parts are affected.

A fracture is a break or crack in the bone. The most common cause of fractures are motor vehicle accidents, falls and sports activities.

A closed fracture is one in which the bone is cracked or broken but is not exposed to the outside of the body.

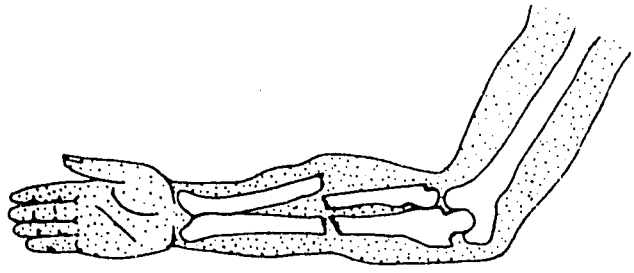


Fig. 17.7 Closed fracture.

An open fracture is one where there is an open wound from the skin right down to the broken bone.

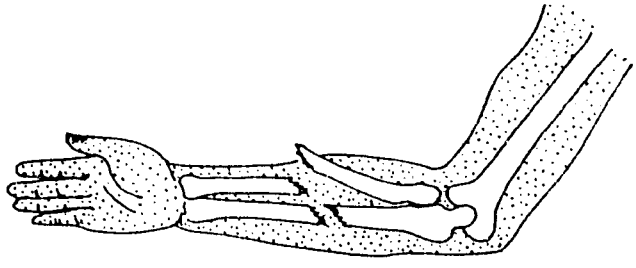


Fig. 17.8 Open fracture.

When dealing with a fracture you must remember the following three points:

- All fracture cases should be given first aid treatment and sent to the hospital.
- Do only what is absolutely necessary to prepare the patient for referral to the hospital.
- Immobilize the affected part before transporting the patient to the hospital.

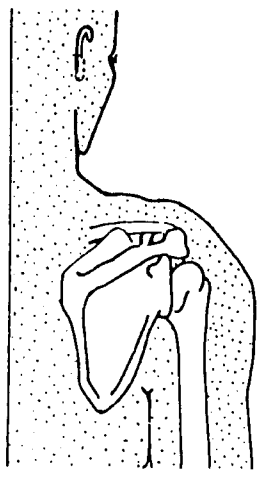
Sprains and dislocations A sprain is an injury to the soft tissues surrounding the joints, usually from forcing a limb beyond its normal range of motion. A dislocation is a joint out of its normal position. Sprains and dislocations occur when a joint is twisted by tripping, falling or by a sudden wrench. Joints commonly dislocated are:

- Shoulder
- Elbow
- Finger
- Hip
- Knee
- Jaw

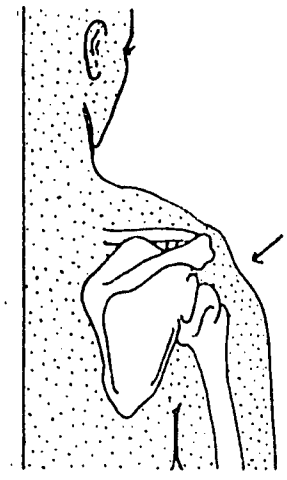
In sprains the muscles, tendons and ligaments are stretched or torn. The areas usually sprained are:

- Ankles
- Fingers
- Wrists
- Knees

How to recognize various types of bone injuries and the Health Technician's related activities are given in Table 17.6.



Shoulder joint in normal position.



Dislocated shoulder joint.

Fig. 17.9 *Normal position of the shoulder joint and dislocation of the shoulder joint.*

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TABLE 17.6 THE HEALTH TECHNICIAN'S ACTIVITIES IN THE MANAGEMENT OF FRACTURES, SPRAINS AND DISLOCATIONS

Type of Injury	*How to recognize it*	*Health Technician's activities*
Fractures	- History of a fall or hit. - Pain at the site or near the site of fracture. - Inability to move the affected part. - Deformity of the limb may be noticed. - Swelling at the site of fracture. - Fracture may be felt on touching. - Movement at a place where there should be no movement. - Broken end of bone may protude under the skin.	- Place the patient in a comfortable position with the injured part well supported. - Do not remove clothing. - Immobilize the affected part by using a splint and bandages. - Always immobilize the joint above and below the fracture site. - Treat for shock, if required. Give small amounts of fluid, since patient may require anaesthesia for setting the fracture on arrival at the hospital. - Give something for pain. - Refer the patient to hospital. - If the fracture is an open one, carry out the following in addition to the above. . Cut away and remove the clothing over the wound and cover it with a clean dry dressing. . Stop any bleeding by applying a pad and bandage. If bleeding is severe, apply a tourniquet.

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TABLE 17.6 THE HEALTH TECHNICIAN'S ACTIVITIES IN THE MANAGEMENT OF FRACTURES, SPRAINS AND DISLOCATIONS

Type of injury	*How to recognize it*	*Health Technician's activities*
Sprains and dislocations	- Severe pain in the joint at the time of injury. - Swelling of the joint. - Bruising of the joint. - Reduced movement of the joint. - Deformity of the joint (only in dislocation). - Signs of shock may be present. - In simple sprain, the history is that of mild trauma. The pain is not severe, swelling is minimal and there is no deformity of the involved joint.	If there is a sprain: - Rest and support the injured joint in the most comfortable position. - Apply a cold compress and bandage the joint firmly. - Give something for pain. If there is a dislocation: - Rest and support the injured joint in the most comfortable position. - Treat for shock if present. - Transfer the patient to the hospital. - Give something for pain.

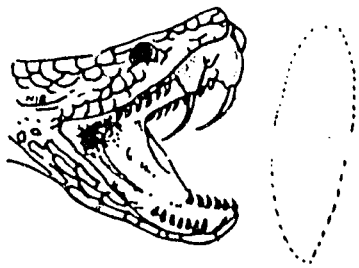
17.7 ANIMAL AND HUMAN BITES

Animal and human bites produce injuries similar to wounds. Therefore, all bites should be treated as open wounds and consideration given to the possibility of infection.

Animal bites can be from pets or wild animals. Pets like dogs and cats and wild animals like bats and rats carry a variety of bacteria in their mouth. Their bites could cause rabies, tetanus and other infections.

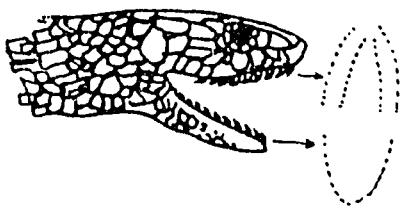
The bites of insects such as bees, wasps and scorpions have a poisonous effect.

Snake bites There are two types of snakes, poisonous and non-poisonous. Fortunately, the bite marks are different for each and it is easy to distinguish between the two. Poisonous snakes possess 2 to 4 fangs, non-poisonous snakes have no fangs and leave only serrated marks.



Fang marks.

The bite of a poisonous snake leaves fang marks and rarely other teeth marks.



The bite a non-poisonous snake leaves two rows of teeth marks.

Fig. 17.10 Snake bites.

In the following table a variety of common bites are discussed as well as the Health Technician's activities in treating them.

TABLE 17.7 THE HEALTH TECHNICIAN'S ACTIVITIES IN THE MANAGEMENT OF BITES

Type of bite	*Health Technician's activities*
Human bites that break the skin.	- Clean the wound thoroughly. - Apply clean dressing. - If the wound is deep or large and there is a chance of infection, refer for medical attention.
Animal bites on the face or neck.	- Refer immediately for medical care after cleaning and dressing the wound.

TABLE 17.7 THE HEALTH TECHNICIAN'S ACTIVITIES IN THE MANAGEMENT OF BITES

Type of bite	*Health Technician's activities*
Animal bites on other parts of the body. Even a lick on an open wound from a rabid dog can cause rabies in a person. Signs of rabies in a dog appear within ten days: - Dog no longer eats. - His bark becomes different than usual and can be uncontrollable. - He may tremble and shows signs of being wild/savage. - He may have saliva running out of the mouth.	- Wash wound with soap and water. - Apply clean dressing. - Give tetanus toxoid. - Observe the animal for the development of symptoms of rabies. - Do not kill the animal. If the animal has to be killed, have the body examined for rabies. - If the suspected rabid animal cannot be found and observed, seek immediate care. Rabies vaccine may have to be administered.
Scorpion sting: The person stung by a scorpion, often a child, complains of severe pain at the site of the sting and shows signs of shock. A scorpion sting is poisonous, and if the child is small and physically weak the sting may produce serious results. - The patient will tell you that he has been stung by something. - The wound is red and there may be bleeding. - Signs of shock are present particularly in small children.	- Apply a cold compress to the site of the sting. - Treat for shock. - Give paracetamol. - Refer to the hospital if signs are severe.

TABLE 17.7 THE HEALTH TECHNICIAN'S ACTIVITIES IN THE MANAGEMENT OF BITES

Type of bite	*Health Technician's activities*
Insect stings:	
Bee, wasp and hornet stings occur frequently in rural areas, especially if the nests of these insects are disturbed. - There is a history of being stung by an insect. - The site of the sting looks red, swollen and is painful.	- Apply cold compresses to the site. - Give paracetamol. - If the pain and swelling are severe or if there are signs of allergy, give adrenaline.
Snake bites:	
Non-poisonous	- Look for fang marks to determine whether snake was poisonous. - Wash area with soap and water.
Poisonous	- Do not move the part that has been bitten because movement will make the poison spread more rapidly through the body. - Carry the person on a stretcher.
If the bite is less than 30 minutes old	- Tie a cloth around the limb just above the bite. Sterilize a knife in a flame. - Use the knife to make 1 cm long and 1/2 cm deep cut into each fang mark. - Then suck the poison and spit it out. - Repeat sucking and spitting out poison for 15 minutes.

Fig. 17.11 Treating a poisonous snake bite.

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TABLE 17.7 THE HEALTH TECHNICIAN'S ACTIVITIES IN THE MANAGEMENT OF BITES

Type of bite	*Health Technician's activities*
If the bite is more than 30 minutes old	- Transport the person to the hospital where snake bite anti-venom is available. - If you have been trained and authorized to give antivenom treatment, start it. Guidelines on determining the amount of antivenom are given at the end of the chapter.

Poisonous snake bites are dangerous. Seek medical help after following the above steps.

17.8 POISONING

A poison is any substance which causes illness (even death) when taken into the body. Poisons may be ingested accidently, as is the case with young children, or on purpose for suicide. Poisons enter the body by:

- The mouth.
- Breathing poisonous gas.
- Through infectious agents.
- Absorption through the skin.

The clinical picture varies depending upon the kind and amount of poison received. The symptoms and signs of common poisons found in Pakistan are given below:

Symptoms/Signs	*Common poisons*
Vomiting, diarrhoea abdominal pain	Dhatura, jamal ghota, infected or rotten food, strong acids or alkalis, iron tablets.
Drowziness, coma	Barbiturates, opiates, chloral hydrate, diazepam (Valium), malathion, sui gas, snake bite, aspirin.
Burns around the mouth	Strong alkalis such as lye, bleach, lysol.
Convulsions	Strychnine, camphor, kerosene oil, aspirin.
Cyanosis	Kerosene oil, cyanide, nitrites.

Symptoms/Signs	*Common poisons*
Constricted (pinpoint) pupils	Opiates (including morphine and heroin).
Dilated pupils	Ephedrine, atropine, antihistamines.
Increased respiratory rate and/or dyspnea	Aspirin.
Irregular and/or rapid pulse	Digitalis (Digoxin, Lanoxin).
Bizarre muscle spasms	Chlorpromazine (Largoctil, Thorazine), promethezine (Phenergan), prochlorperazine (Compazine).
Characteristic odor	Kerosene oil, alcohol, phosphorous, liquid paraffin.

Health Technician's activities:

If the patient is conscious:

- Find out what happened, what poison was taken.
- If there are no burns in or around the mouth and no history of acids, alkalis or hydrocarbons (kerosene oil, petrol, liquid paraffin), then induce vomiting by giving 2 to 3 glasses of warm salt water and putting your fingers in the back of the throat. If syrup of ipecac is available give 15 ml to children and 20 ml to adults instead to induce vomiting. Ipecac may be repeated in 20 minutes if vomiting has not occurred. Make a note of how much and when syrup of ipecac was given.

If the patient is unconscious:

- Do not induce vomiting; do not give anything by mouth.
- Get information from family or friends.
- Keep the head tilted to the side to prevent choking in case patient vomits.
- Watch closely for difficult breathing and convulsions.
- Refer to hospital as soon as possible.
- If respirations stop, begin mouth to mouth artificial respiration immediately.

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When sending the patient to hospital:

- Include a note with the history, your findings, any medications given (syrup of ipecac, diazepam) and any other information (suicide note).
- Any remaining poison or container.
- Any vomited matter.

For insecticides (malathion, etc), fertilizers and other poisons absorbed through the skin:

- Remove all clothing and bathe patient to prevent further absorption.
- Keep at rest in fresh air (fan if necessary).
- Sponge head and neck with cool water.
- Give as much liquid as patient can take.

Prevention:

- Advise parents to keep all medications out of the reach of small children.
- Do not put kerosene, liquid paraffin, petrol or other poisons in soda bottles. Small children may take a drink, thinking it is soda.
- Caution parents not to give large doses of aspirin to children.

17.9 CONVULSIONS

A convulsion is an attack of unconsciousness accompanied by the following:

- The person falls to the ground.
- The body becomes stiff and jerky movements of the arms and legs follow lasting a few seconds or minutes.
- Foaming around the mouth may occur.
- There may be loss of bowel and bladder control.
- The face may become pale or bluish.
- Person regains consciousness within minutes and does not remember anything.

Health Technician's activities:

- Stay calm.
- Prevent a person from hurting himself by removing nearby sharp objects.
- Loosen tight clothing.
- Do not put anything in his mouth.

- Allow a person to regain consciousness on his own. This should occur in 1 to 3 minutes.
- Tell the person what happened and advise rest.
- Suggest he seek medical attention to determine the cause of the convulsion.

17.10 DROWNING

Drowning occurs when a person has inhaled water into the lungs. The lungs become filled with water instead of air.

Health Technician's activities:

- Turn the patient face down with the head turned to one side and the arms stretched out. If a slope exists, the head must be placed downwards.
- Place your hand around the patient's abdomen and raise the body to encourage the water to run out of the lungs.
- Clear the mouth of weeds or any other material obstructing air entry and remove false teeth, if any.
- Loosen the clothing around the neck and waist.
- Apply artificial respiration. Do not stop until the breathing has been re-established. Try for at least a quarter of an hour.
- After recovery do not let the patient sit up. Transfer him/her lying on a stretcher to the nearest Primary Health Centre as soon as possible.

17.11 ELECTRIC SHOCK

An electric shock is caused by a person touching a live wire. The signs of electric shock are:

- The patient is unconscious.
- The patient is or has been in contact with a source of electricity.

Health Technician's activities:

- Wherever possible shut off the current.
- Free the person from the source of electricity by using a piece of wood, paper or rubber to push or pull him away.
- Make sure you are dry and no part of your body is wet.
- Give mouth to mouth respiration immediately.

After the patient has recovered, examine the skin for the presence of any burns and refer to the hospital for further treatment.

Educate the community on how to avoid electric shock by talking on the following points:

- Advise that all electric points be safe and that there are no exposed live wires.
- Prevent children from playing with electric switches and sockets.
- Prevent children from climbing up electric poles.

17.12 THE PROCEDURE FOR DEALING WITH FRACTURES

Splints A splint is a rigid appliance, usually made of wood or metal, which is tied to a fractured limb to support it and prevent movement from taking place at the site of fracture. Splints can be improvised by using anything which is rigid enough and sufficiently long enough for support. Rolled newspapers, magazines, a branch of a tree, etc, can be used for splinting in an emergency.

The body itself can be used for splinting purposes. A fractured arm can be strapped to the side of the chest to immobilize it, or a fractured leg can be tied to the other leg.

If a splint is not used properly, it may cause damage. Therefore, the following points should be remembered when using a splint:

1. Make sure the fractured area is properly supported while placing it on a splint.

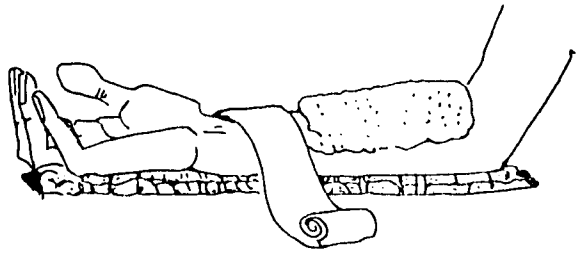

Fig. 17.12 Supporting the fracture.

2. Make sure the splint is well padded with cloth.
3. Make sure the splint is long enough to immobilize the joint above and below the fracture.
4. Make sure the bandage used to secure the splint has a knot tied on the splint and not on the flesh.

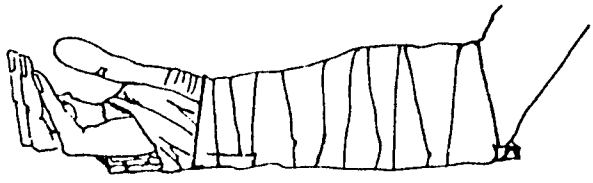

Fig. 17.13 Securing the splint.

Bandages A triangular bandage if very useful in a number of ways. It is usually used as follows:

1. In first aid for retaining a dressing, as a tourniquet, to tie on a splint, to hold the lower limbs together or as a pad.
2. As a sling, when the upper limb is to be rested because of an injury or an infection.

You must always be sure that the knot used in tying a bandage is secure and that here is no danger of it slipping. The knot used is the 'Reef Knot' because the more it is tightened, the more secure it becomes. Also, it can easily be undone without damaging the bandage.

A roller bandage is the most commonly used bandage. It consists of long and narrow strips rolled into a compact roll (cylinder). It can be made by cutting or tearing any suitable material, such as cotton, if a ready made roll is not available. The width and length of the bandage will depend upon the part of the body it will be used for. The width ranges from 3/4 inch (for fingers) to 3 to 6 inches for the body. The length varies from 1 yard/metre to 10 yards/metres.

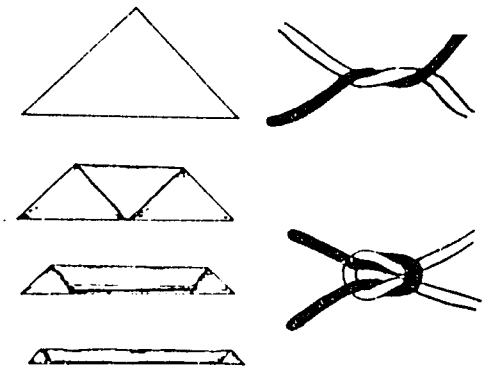

Fig. 17.14 *Ways of folding a triangular bandage and making a Reef Knot.*

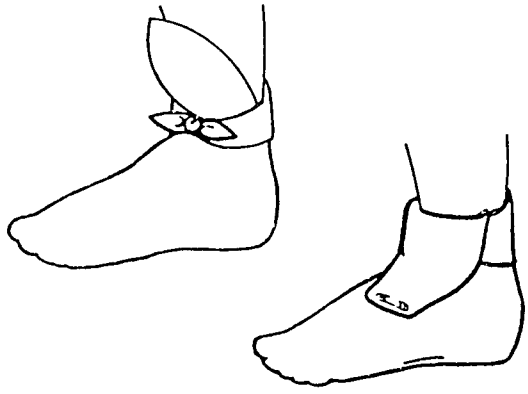

Fig. 17.15 *Using a triangular bandage on the foot.*

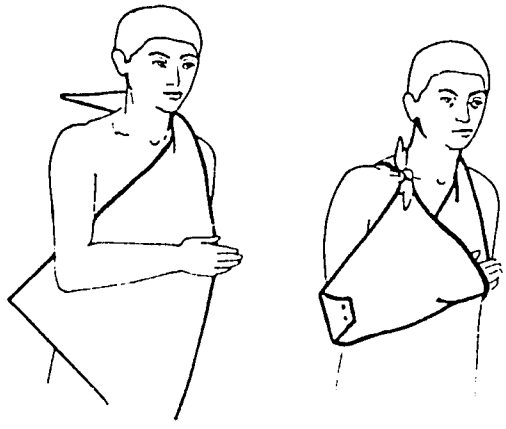

Fig. 17.16 *Using a triangular bandage for an arm sling.*

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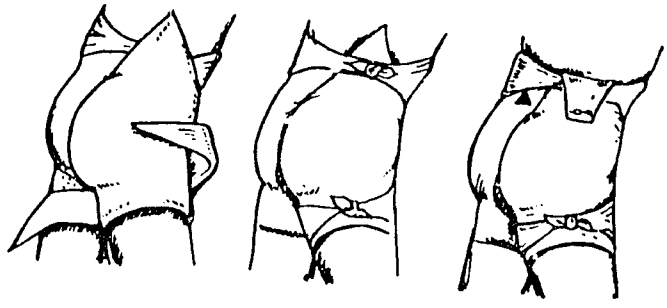

Fig. 17.17 Using a triangular bandage on the hip.

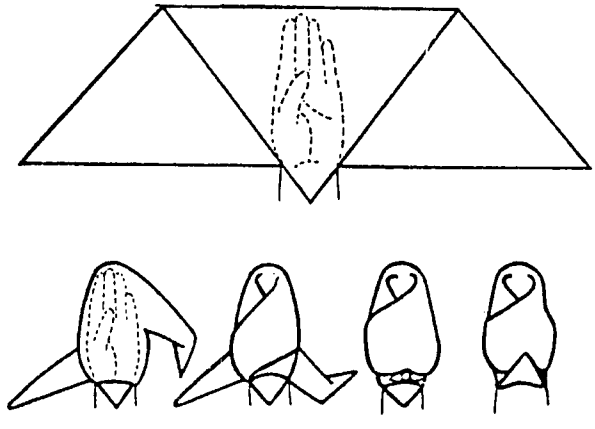

Fig. 17.18 Using a triangular bandage on the hand.

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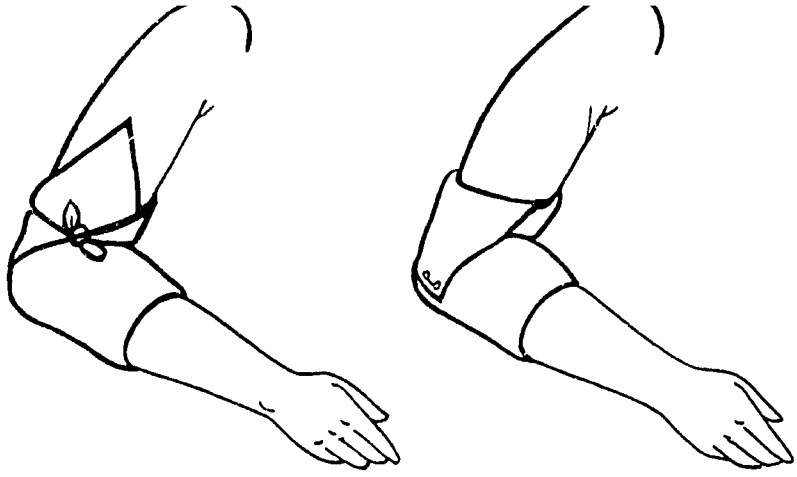

Fig. 17.19 Using a triangular bandage on the elbow.

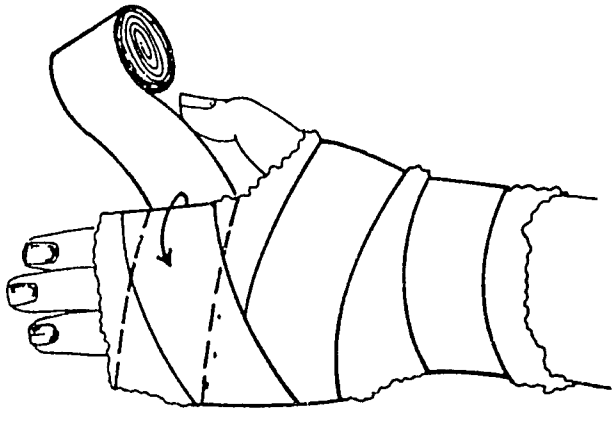

Fig. 17.20 Using a roller bandage on the hand.

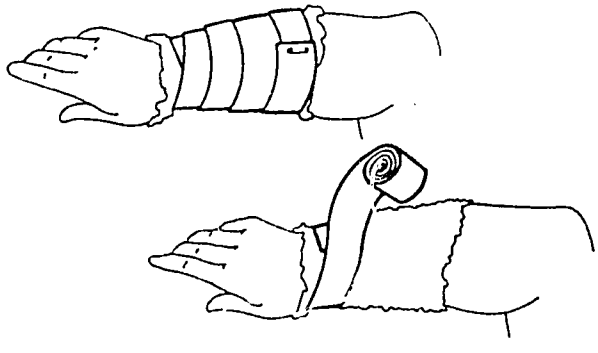

Fig. 17.21 Using a roller bandage on the wrist and lower arm.

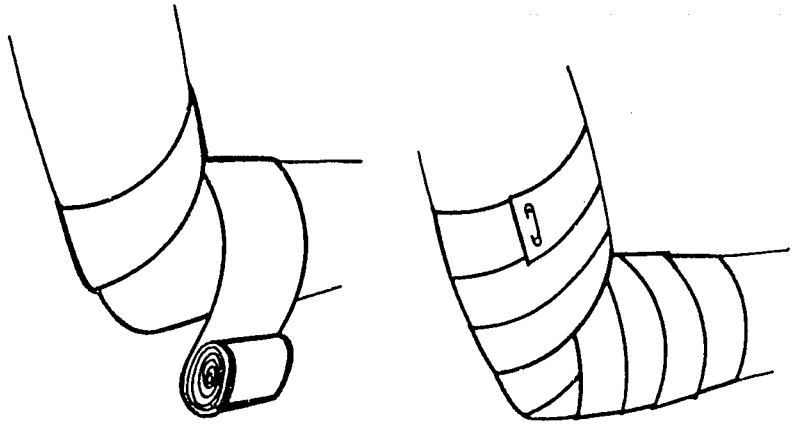

Fig. 17.22 Using a roller bandage on the elbow.

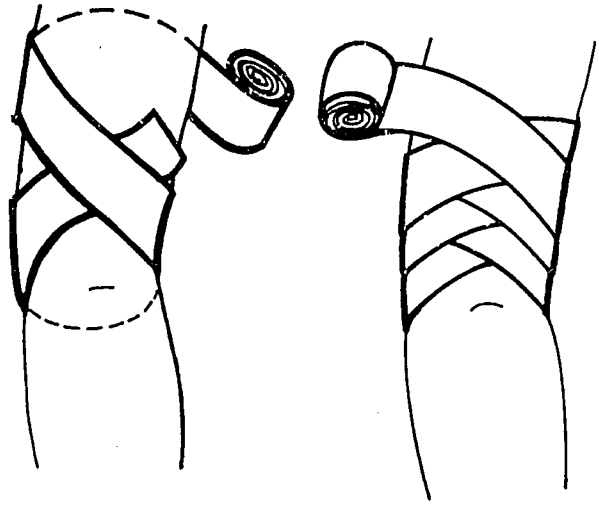

Fig. 17.23 Using a roller bandage on the upper arm.

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17.13 *THE PROCEDURE FOR ARTIFICIAL RESPIRATION (Pulmonary Resuscitation)*

Pulmonary resuscitation is a means of supplying oxygen artificially until the patient can breathe by himself. It should be started as soon as the following is observed:

- Air exchange from the mouth or nose cannot be heard or felt.
- There is no chest movement.
- The person has bluish skin, lips, tongue or nail beds.

The person may or may not be unconscious.

Procedure:

- Turn the patient's head to one side and clean out the mouth with your finger. Remove false teeth, food, mucous, vomit or other material from the mouth.

- Tilt the patient's head back to open the airway.

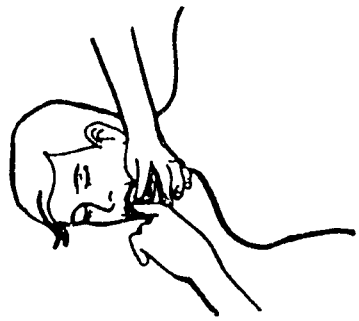

Fig. 17.24 Clean out the mouth.

Fig. 17.25 Clear airway by tilting the head back.

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If the person is not breathing use the chin lift or jaw lift. With the patient's head tilted back, place your fingers under the patient's jaw. Lift the jaw forward to open the airway.

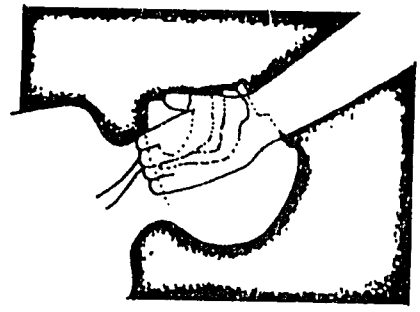

Fig. 17.26 Lifting the jaw.

With the patient's head tilted back, place your thumb on the inside of the patient's lower teeth and hook your fingers under the patient's chin. Lift the chin.

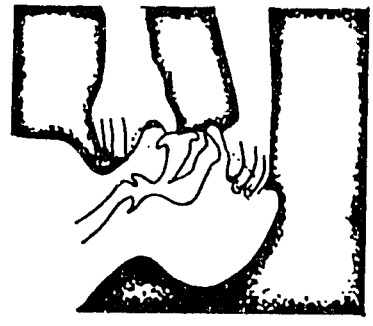

Fig. 17.27 Lifting the chin.

- Start mouth to mouth resuscitation. For older children and adults:

  . Pinch off the nostrils.
  . Make an airtight seal between your mouth and the patient's mouth.
  . Blow into the patient's mouth and watch for the rise of the chest. If the chest rises, remove your mouth so air can be expelled, then continue with ventilations at a rate of 12 to 15 full breaths a minute.

If the chest does not rise with the first breath of air, or stops rising later on, the airway is obstructed. This obstruction can almost always be relieved by lifting the jaw or chin.

- Younger children and infants:

  . Make an airtight seal over the patient's nose and mouth with your mouth.
  . Ventilate the patient with 30 "gentle puffs" of air a minute (just enough air to make the chest rise).
  . Observe the chest for a rising movement with each "gentle puff" of air.

If the chest does not rise with the first puff of air, or stops rising later on, the airway is obstructed. Carry out the jaw lift or chin lift manoeuver.

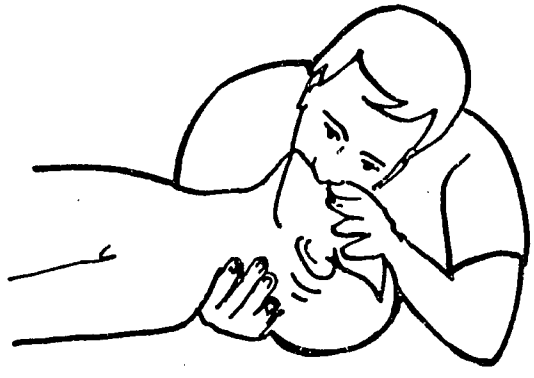

Fig. 17.28 Mouth to mouth resuscitation.

Continue pulmonary resuscitation until the patient is breathing on his own. If the patient cannot be seen by a physician and you feel a pulse, continue resuscitation. If the patient does not have a pulse, resuscitation can be discontinued after one hour if there is no possibility that a physician can be reached anytime soon and there are no signs of recovery.

Summary of pulmonary resuscitation procedures:

In summary, the general rules for resuscitating the patient who has stopped breathing are as follows:

- *Clear the airway*	Clean out the mouth, tilt the head back, lift the jaw or chin.
- *Airtight seal*	Around the mouth, the mouth and nose, the nose or an artificial airway.
- *Ventilation*	15 to 20 breaths per minute for older children and adults, 30 "puffs" per minute for younger children and infants.
- *Watch chest movements*	If the chest does not move up with each breath, the airway is blocked. Do the jaw lift or chin lift manoeuver.
- *Check carotid pulse*	If the pulse is absent, the heart is not beating and oxygen is not circulating. Start cardio-pulmonary resuscitation.

The signs of effective pulmonary resuscitation are as follows:

- Cyanosis (bluishness) of patient's skin, lips, tongue and nail beds decreases.
- Patient starts gasping on his own.

Signs of patient recovery are as follows:

- Presence of breath sounds.
- Normal respiration returns.

When to stop artificial respiration:

- When the patient has recovered and is breathing well on his own.
- After one hour if there is no pulse and no respiration and no sign of improvement.

Complications Pulmonary resuscitation can result in air filling the stomach. If the patient's stomach starts to bulge, press a hand on the stomach area to force the air out. You should hear a belch.

If the patient vomits during resuscitation, turn the patient's head to one side and clean out the mouth. If you suspect that the patient has aspirated vomitus, examine the patient for the next three days for signs of pneumonia and refer to the Medical Officer if necessary.

Permanent brain damage may occur if pulmonary resuscitation is started six minutes or longer after the patient goes into pulmonary arrest.

17.14 THE PROCEDURE FOR THE HEIMLICH MANOEUVER

The Heimlich manoeuver is performed on persons who are choking on food, are nearly drowned or who might have aspirated vomitus. Food or other objects become caught in the trachea as the patient is breathing in. The Heimlich manoeuver forces the object out with a sudden force of air expelled from the lungs.

Step 1. Stand behind the patient with your arms around him at the level of the epigastric area. Grasp your hands together with the fingers locked and thumb against the abdomen.

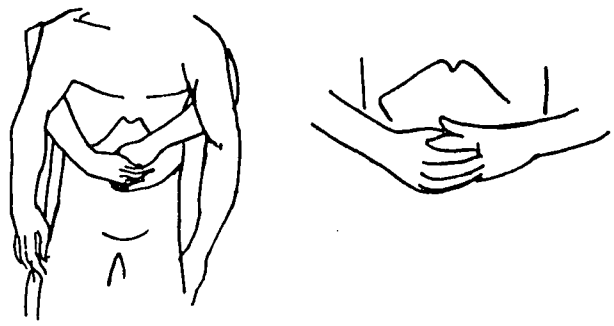

Fig. 17.29 . Usual position for the Heimlich manoeuver.

Step 2. Make a forceful upward and inward thrust. Repeat if necessary (don't waste too much time with drowning victims).

The procedure can also be done with the patient lying on his back.

Fig. 17.30 Heimlich manoeuver with the patient lying down.

17.15 THE PROCEDURE FOR CARDIOPULMONARY RESUSCITATION

Cardiopulmonary resuscitation (CPR) requires one to provide artificial respiration (mouth to mouth) and external cardiac massage at the same time. The first step in CPR is to determine whether it is required. CPR should be started only when all of the following conditions are present:

- No breathing.
- No pulse is felt.
- Breathing has been absent for less than 5 minutes.
- There is a reasonable chance for resuscitation. That is, the patient is not so ill or severely injured that there is no reasonable chance he could recover.

Once it is decided to attempt resuscitation, proceed as follows with one or two persons as available.

One person CPR:

Step 1. Place the patient on his back on a firm surface (ground or table), positioning yourself to one side.

Step 2. Clear the airway and position the patient's head for artificial respiration.

Step 3. Ventilate the lungs three times quickly (do not wait for the lungs to completely empty; check chest movement).

Step 4. Deliver one "chest thump" over the pressure point.

Step 5. If the heart does not start beating, compress the heart over the pressure point 15 times (two hands for an adult, one hand for a child under age 10, two fingers for a young child or infant).

Step 6. Ventilate the lungs two times quickly.

Step 7. Return to the chest and compress the heart 15 times.

Steps 1 to 4 should take no longer than 15 to 30 seconds to complete. Continue to repeat steps 6 and 7 quickly, compressing the chest 50 times a minute with 2 breaths between every 15 compressions. The carotid pulse can be checked during ventilation to see if the heart has started beating. Look for improvement in skin colour of the face during cardiac compressions.

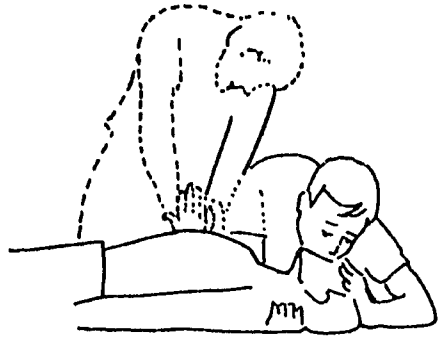

Fig. 17.31 CPR with one person only.

CPR with two people:

Step 1. Place the patient on his back on a firm surface (ground or table). Person 1 is positioned at the patient's head and person 2 in the cardiac compression (massage) position at the patient's side.

Step 2. Person 1 clears the airway and positions the head for artificial respiration.

Step 3. Person 1 ventilates the lungs 3 times quickly.

Step 4. Person 2 delivers one chest thump over the pressure point. If the heart does not start beating immediately, person 2 starts uninterrupted cardiac compressions at 60 times a minute.

Step 5. Person 1 ventilates the lungs one time between every 5 compressions.

Step 6. When not ventilating the patient, person 1 checks the pupils, the carotid pulse, the skin colour, and the chest movement.

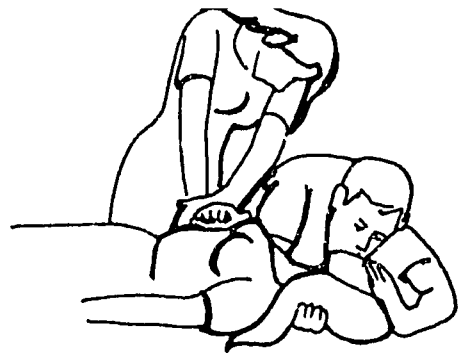

Fig. 17.32 CPR with two people.

Signs of effective heart and lung function are as follows:

Cardiac massage	*Artificial respiration*
- Heart compression results in pulses of the carotid and femoral arteries.	- Cyanosis (bluishness) of the patient's skin, lips, tongue and nail beds decreases. - Dilated pupils constrict.

No signs of recovery If the patient is showing no signs of effective cardiopulmonary resuscitation, resuscitation can be discontinued if:

- Within an hour's time the patient has shown no sign of improvement, and a physician cannot see the patient within the first hour or anytime soon thereafter.
- The patient had been in cardiorespiratory arrest for 10 or more minutes by the time you saw him.

If the chest stops moving while one person is carrying out resuscitation, stop the cardiac compressions (massage) and clear the airway. Then continue resuscitation. If two persons are carrying out resuscitation, it is the responsibility of person 1 to observe the chest movement while ventilating the patient. If the chest stops moving during ventilation, person 1 clears the airway while person 2 continues cardiac compressions.

Summary of the cardiopulmonary resuscitation procedure:

Two procedures for cardiopulmonary resuscitation of the unconscious patient have been discussed. In summary, the general rules for resuscitation of the patient whose heart has stopped beating and who is not breathing are as follows:

One person only	*Two persons*
- Lie the patient on a firm surface.	- Person 1 and 2, position patient.
- Clear the airway.	- Person 1 clears airway.
- Ventilate the lungs 3 times quickly. Note chest movements.	- Person 1 ventilates.
- Chest thump once over the pressure point, gently with a child or infant.	- Chest thump: person 2.
- Pressure point positioning if the chest thump fails; position hands, finger tips in the centre of the bottom half of the sternum.	- Pressure point positioning: person 2.
- Cardiac compressions (15).	- Person 2 does un interrupted compressions at 60-80 times a minute.
- Ventilate lungs 2 times quickly.	- Person 1 ventilates lungs one time between every 5 compressions.
- Cardiac compressions (15).	
- Repeat 2 ventilations then 15 cardiac compressions.	

17.16 *DETERMINING THE SEVERITY OF ENVENOMIZATION AND THE AMOUNT OF ANTIVENOM REQUIRED*

The amount of antivenom used to treat a poisonous snake bite (envenomization) is determined by the severity of the bite.

TABLE 17.8 DETERMINING SNAKE BITE SEVERITY AND ANTIVENOM REQUIRED

Severity of envenomization	*Signs and symptoms*	*Amount of antivenom required*
No venom	Fang marks with surrounding oedema (wheal) of 1 inch or less within first 12 hours and no systemic signs.	None.
Minimal	Fang marks with surrounding oedema of 1-5 inches within first 12 hours, discolouration (erythema), no systemic involvement.	10 ml (1 vial)
Moderate	Fang marks with surrounding oedema of 5-10 inches within first 12 hours, discolouration (erythema) ecchymosis (subcutaneous haemorrhage), systemic involvement (weakness, nausea, vomiting).	20 ml (2 vials)
Severe	Fang marks with surrounding oedema of more than 10 inches within first 12 hours, the above mentioned symptoms and signs and shock.	30 - 40 ml (3 - 4 vials)
Very severe	Fang marks with rapid progressive swelling which may reach the trunk in a few hours, ecchymosis, bleb formation (large vesicles), systemic involvement within 15-30 minutes of bite with weakness, nausea, early signs of shock.	40 - 50 ml (4 - 5 vials)

Should antivenom be started at a BHU or RHC or should the patient be referred to the hospital? This depends upon the severity of the envenomization and the time required to transport the patient to the hospital. For example, if the signs and symptoms are progressing rapidly and the hospital is several hours away, then you must start antivenom treatment immediately. On the other hand, if the signs and symptoms are progressing slowly over several hours and the hospital is less than one hour away, then you should refer the patient for antivenom treatment.

For cases in between, you must simply use your best judgement.

Other considerations:

- Apply a loose tourniquet just above the bite. It should be tight enough to slow venous return, but it should not be so tight as to stop arterial blood flow. The pulse should still be felt below the tourniquet.
- Apply ice or ice-water to the site of the bite until antivenom is given.
- Give bed rest with the limb immobilized.
- Clean and debride the wound. Apply an antiseptic and sterile bandage. *Do not suture.*
- Novalgin or pethedine should be given for pain depending upon severity.
- Start administration of ampicillin or tetracycline.
- Give tetanus toxoid.
- Measure, mark and record oedema every 30 to 60 minutes.
- Refer all patients with oedema of more than 1 inch to the hospital for evaluation as soon as possible.

GUIDELINES FOR ANTIVENOM TREATMENT

Supplies:

- Syringe filled with 1:1000 epinephrine for treatment of an anaphylactic reaction.
- 500 cc of 0.9% saline solution (normal saline or Ringer's solution).
- An IV infusion set.
- An extra syringe and needle.
- Antivenom.
- Skin antiseptic.
- Adhesive tape.
- An IV stand.
- Blood pressure cuff.

Procedure:

1. Test for antivenom sensitivity:

   - Make a 1:100 dilution of antivenom and a 0.9% saline solution (1 part antivenom to 100 parts 0.9% saline).
   - Inject 0.01 cc of 1:100 solution intradermally.
   - Examine in 10 to 15 minutes for a positive reaction to the antivenom (a wheal or swelling around the injection site with redness).
   - An ophthalmic test can also be done. Place 1 drop of 1:100 solution in one eye. A positive reaction is inflammation of the eye.

2. If there is a reaction, desensitize the patient:

   - Stop the IV infusion of antivenom if started.
   - Make a dilution of 1:100 antivenom to 0.9% saline solution.
   - Monitor for respiratory distress or a drop in blood pressure.*
   - Inject the following amounts subcutaneously as indicated:

     . 0.05 cc 1:100 immediately.
     . 0.1 cc 1:100 at ten minutes.
     . 0.2 cc 1:100 at twenty minutes.
     . 0.5 cc 1:100 at thirty minutes.

   - Make a new solution of 1:10 antivenom to 0.9% saline solution.
   - Inject the following amounts subcutaneously as indicated:

     . 0.1 cc 1:10 at forty minutes.
     . 0.2 cc 1:10 at one hour.
     . 0.5 cc 1:10 at one hour and ten minutes.
     . 1.0 cc 1:10 at one hour and twenty minutes.

*Note: If respiratory distress or a drop in blood pressure occurs give 0.5 cc of 1:1000 ephinephrine subcutaneously every twenty minutes. Continue to desensitize patient.

3. If there was no reaction, start antivenom treatment:

   - Dilute 10 cc of antivenom into 500 cc of 0.9% saline solution.
   - Start an IV infusion.
   - Monitor respiration and blood pressure.

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If there is no reaction to the antivenom (respiratory distress or drop in blood pressure) in the first five minutes, the total dose of antivenom is added to the bottle of 0.9% saline solution. Increase the flow of the IV infusion so that the total dosage has been infused within one to two hours.

4. *Release the tourniquet.*

5. If there is a further reaction stop the antivenom and proceed with step 2.

17.17 HOW TO APPLY A TOURNIQUET

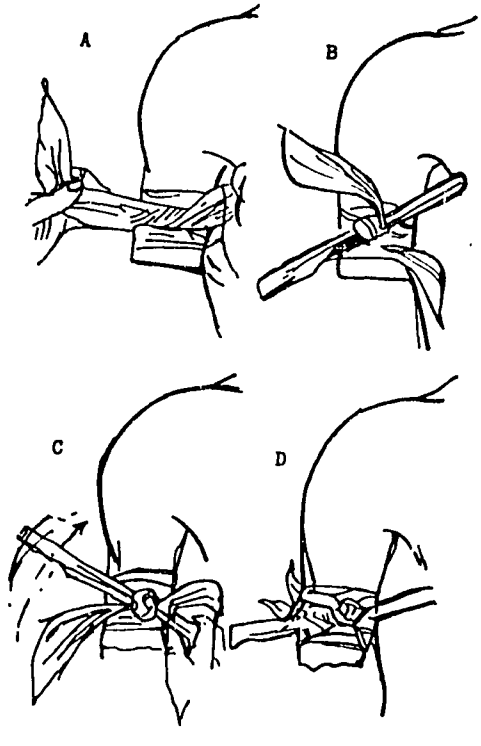

Fig. 17.33 Application of a tourniquet. A) Wrap twice around arm, tie a half-knot. B) Place "windlass" over half-knot. C) Finish knot and turn windlass to tighten. D) Secure windlass with tails of tourniquet.

17.18 PROCEDURE FOR CUTTING AND APPLYING BUTTERFLY PLASTERS

Required items:

- Clean scissors.
- Adhesive tape (plaster).

Step 1. Cut pieces of plaster as shown by dotted lines.

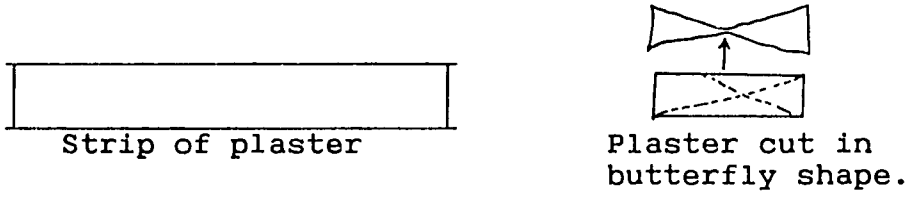

Fig. 17.34 Cutting butterfly plasters.

Step 2. Apply butterfly plasters using one hand to bring the edges of the wound together and the other to apply precut butterflies.

Step 3. Leave plaster in place for one week on the face or trunk and two weeks on the lower leg or hand.

Step 4. Remove by pulling each end towards the middle. This keeps the wound from being pulled open.

GLOSSARY

Abrasion: A scraping away of a portion of skin or mucous membrane due to an injury.

Coma: An abnormal deep stupor occurring in illness or injury where the person cannot be aroused.

Constricted: A narrowing; decrease in size.

Convulsion: Involuntary muscle contractions and relaxations, often with a loss of consciousness.

Cyanosis: Slightly bluish discolouration of the skin due to decreased amounts of haemoglobin.

Desensitize: To lessen the allergic sensitivity to a substance by administering it in low doses.

Dilated: Expansion or widening.

Dislocation: A joint or bone displaced from its usual position.

Envenomization: A poisoning caused by a bite or sting.

First aid: Emergency care or treatment given to an ill or injured person before medical help can be obtained.

Fracture: A break in a bone.

Frostbite: Freezing of a part of the body, especially affecting the nose, fingers and toes.

Haemorrhage: Abnormal discharge of blood either internally or externally.

Heat cramps: Severe intermittant cramping of the muscles of the abdomen and extremities due to heat.

Heat exhaustion: A state of weakness produced by the loss of normal fluids and salts from the body due to the exposure to heat.

Heatstroke: Derangement of the heat control centres of the body due to the sun or high temperatures.

Resuscitation: Act of bringing a person back to full consciousness.

Shock: A state of collapse resulting from acute peripheral circulatory failure.

Splint: An appliance made of any strong material (wood, bone, metal) for the immobilization of an injured body part.

Sprain: Trauma to a joint which causes pain and disability.

Tourniquet: Any constrictor used on an extremity to cause pressure over an artery and to control bleeding.

Wheal: A round elevation of the skin accompanied by itching. Seen in insect bites and allergic reactions.

Wound: An injury to the body that involves the laceration or breaking of a membrane such as the skin.

Suggested learning activities:

While you are in the hospital or Rural Health Centre, inform the MO that you would like to gain some experience in providing first aid services to manage all the types of first aid covered in this chapter.

Review questions:

1. What is meant by first aid?
2. What four points are critical when assisting a person requiring first aid? List them in order to importance.
3. What is meant by a burn? What causes burns?
4. How are burns measured and classified?
5. List in order of importance the Health Technician's activities in managing a burn case?
6. The management of burns of less than 24 hours and more than 24 hours duration are different. Describe how and why.
7. How are heatstroke, heat cramps and heat exhaustion different and how are they similar? Give specific management activities for each.
8. How do cold exposure and frost bite differ? What are the activities of the Health Technicians in their management?
9. What are the two types of bleeding? Describe your activities in controlling each type of bleeding.
10. What is shock? How do you recognize shock and what do you do to treat it?
11. When would you not lower the head of a person in shock and why?
12. What is a wound? Describe the various types of wounds and what you would do for each.
13. What three points must you always keep in mind when managing a fracture case?
14. What areas are commonly affected by sprains and dislocations?
15. How would you recognize the various types of bone injuries and what would you do to manage each?
16. How do you recognize the various types of bites (human, animal and insect) and what is your responsibility in management of each?
17. How do you recognize a person who has ingested a poison and what would you, as a Health Technician, do?
18. How do you recognize a convulsion? How would you handle a person who has just had a convulsion?
19. What would you do for a person who is drowning?
20. List the Health Technician's activities, in order of priority, in managing a case of electric shock.

LEARNING ACTIVITIES RECORD

Name of student____________________________________

Type of accident or injury requiring first aid treatment	Teacher or supervisor

EVALUATION FORM

*CHAPTER*_____

Organization of content [ ] Appropriate
[ ] Inappropriate

Method of presentation [ ] Simple to understand
[ ] Difficult to understand

Amount of content [ ] Adequate
[ ] Inadequate

Any other comments:

Write a paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 18

THE ROLE OF HEALTH TECHNICIANS IN THE UTILIZATION OF DRUGS

Objectives After completing this chapter you will be able to:

1. Identify the two major responsibilities of Health Technicians when using drugs.
2. Discuss general rules about giving medicine.
3. Describe how you would make sure that the teaspoon used for measuring medicine is exactly 5 ml.
4. State two factors that determine the dosage of medicine.
5. List five commonly used routes of administration.
6. State why injections should be restricted to a minimum.
7. Describe various ways to minimize the risk of infection and allergic reactions when giving injections.
8. Describe the signs of an allergic reaction.
9. Describe the site and method for giving injections in:

    - Subcutaneous tissue.
    - Intradermal tissue.
    - Muscles.

10. Give meanings for the abbreviations used when writing prescriptions.
11. State the two systems of weights and measures commonly used for drugs.
12. Convert some weights and volumes from one system to another.
13. Recognize undesirable effects of various medicines from the presenting symptoms.

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CHAPTER 18

THE ROLE OF HEALTH TECHNICIANS IN THE UTILIZATION OF DRUGS

Generally, the diagnosing of diseases and the prescribing of medications are limited to physicians only. However, Health Technicians, as a link between the community and the health facility, are authorized to recommend certain drugs for common or minor conditions for which people would not ordinarily go to the Medical Officer, RHC or BHU for treatment. Neglecting minor or common conditions can lead to complications and unnecessary suffering. Therefore, in order to prevent these conditions from becoming major or complicated, you are authorized under Standard Operating Procedures to recommend certain drugs.

This chapter will deal with those drugs used in the management of common and minor conditions as well as other commonly prescribed medications. You need to become familiar with each drug that is frequently prescribed by Medical Officers so that you can supervise and follow-up those individuals taking them. In other words, you have two major responsibilities in the utilization of drugs. These are:

- Recommending certain medications for common, minor and emergency conditions.
- Following-up those individuals who are taking medications for disease treatment.

In order for you to be able to recommend certain drugs and to follow-up those persons taking other medication you need to know:

1. The Health Technician's role in the administration of drugs.
2. Certain abbreviations, weights and measures as well as conversion methods commonly used in the administration of drugs.
3. Side effects, undesirable reactions and contra-indications to medicines and what to do about them.

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4. Specific information about each drug including:
   - Category or classification.
   - Name(s).
   - Condition it is used for.
   - Dosage and method of administration.
   - Health Technician's activities specific to the drug.

18.1 THE ROLE OF HEALTH TECHNICIANS IN THE ADMINISTRATION OF MEDICATION

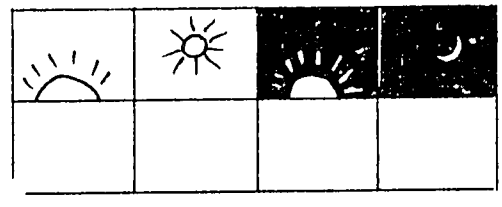
Giving drugs and supervising individuals who are taking them are two of the most serious duties of Health Technicians. Health Technicians must learn about many drugs which physicians prescribe. For the drug to be effective, it should be taken exactly as the physician prescribes in relation to route, time of administration, preparation and dosage. You must also know enough to recognize and report undesirable reactions which would require stopping or changing the drug. As Health Technicians, you need to know certain general rules about giving drugs:

- For medication to be effective, the right medicine has to be given at the right time, which is the time prescribed by the physician.
- In order to make sure that the medicine is taken appropriately, you need to make sure directions for administration are written on the container. If they are not, then you should to write them down according to the physician's instructions on the prescription:

  - Have the person taking the medicine repeat how and when to take it.
  - For those unable to read, you can draw a picture similar to the one shown below.

To remind people who cannot read when to take their medicine, you can give them a note like this.---------->

In the blanks at the bottom draw the amount of medicine they should take and carefully explain what it means.-------->



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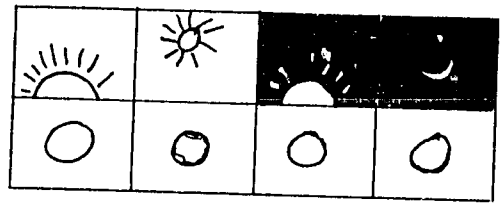
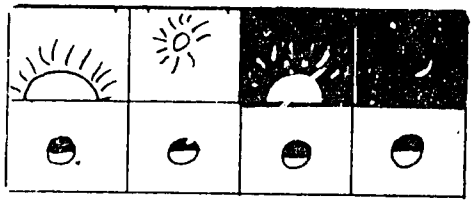
For example:

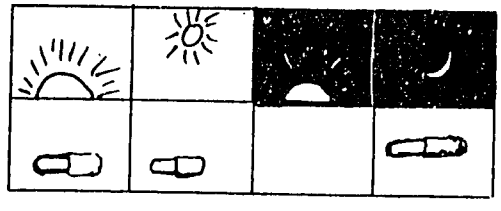
This means 1 tablet 4 times a day, 1 at sunrise, 1 at noon, 1 at sunset, 1 in the middle of the night.---------->



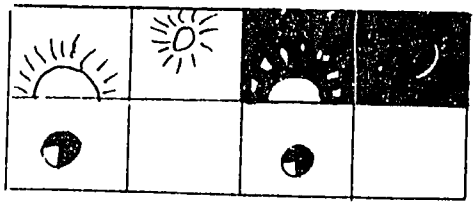
This means 1/2 tablet 4 times a day.



This means 1 capsule 3 times a day.



This means 1/4 tablet twice a day.



This means 2 teaspoons twice a day.

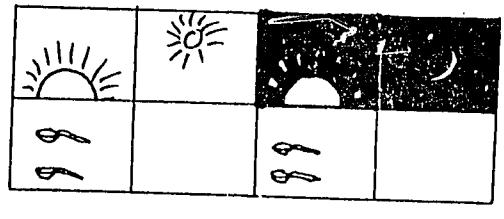


Fig. 18.1 Helping those who cannot read remember to take their medicine at the prescribed time. (Taken from D. Werner's book *Where There Is No Doctor.*)

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Remember, for medicine to be effective, the right dose has to be given, so make sure the dosage is written on the bottle and that the person taking the medicine knows how to measure or take the medicine. David Werner's book illustrates this very clearly, and this has been reproduced below for you.

1/2 tablet=half of one tablet

1 1/2 tablets=one and one half tablets

1/4 tablet=one quarter
or
one-fourth
of a tablet

1/8 tablet=one eighth of a tablet (dividing it into 8 equal pieces and taking 1 piece)

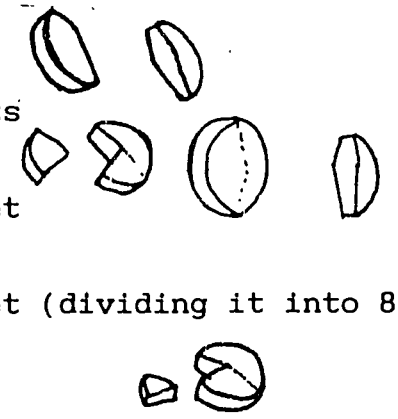

Fig. 18.2 Common ways of measuring medicine.

Medicine is usually weighed in grams (g) and milligrams (mg).

1000 mg = 1 g (one thousand milligrams make one gram)

1 mg = .001 g (one milligram is one one-thousandth part of a gram)

Examples:

One adult Resochin tablet contains 200 milligrams of of Resochin.	0.2 g or 200 mg	=	Different ways of saying 200 milligrams.

It is important to know how many grams or milligrams are in a medicine. For example, if you want to give a small piece of an adult medicine to a child but you do not know how much to give, then read the small print on the label to see how many grams are in each tablet. For example, each tablet may contain .3 g or 300 mg. If you want to give .075 g or 75 mg to the child, then you have to give 1/4 tablet.

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75 mg

75 mg

4 baby doses

75 mg

If you cut the adult tablet into 4 equal pieces, each quarter equals one baby dose.

75 mg

add up to

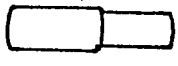
300 mg

1 regular adult dose

Many medicines, especially the antibiotics, come in different weights and sizes. For example, tetracycline may come in 3 sizes of capsules:

250 mg

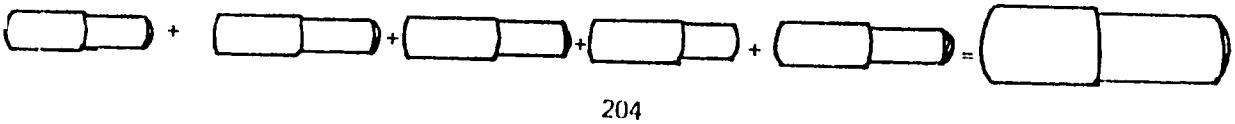
100 mg

50 mg 

Be careful to only give medicine in the recommended amounts. It is very important to check how many grams or milligrams the medicine contains.

For example if the prescription says "Take tetracycline, 1 capsule or 250 mg 4 times a day," and you have only 50 mg capsules, you have to take five 50 mg capsules 4 times a day (20 a day).

50 mg + 50 mg + 50 mg + 50 mg + 50 mg = 250 mg



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Measuring penicillin Penicillin is often measured in Units.

U = Unit 1,600,000 U = 1 g or 1,000 mg

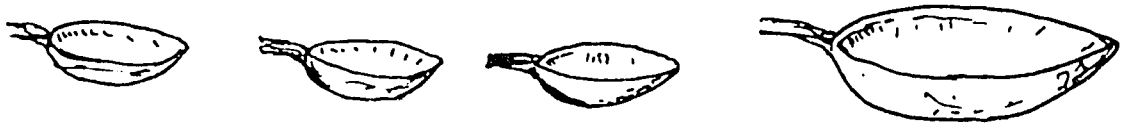
Many forms of penicillin (pills and injections) come in doses of 400,000 U. 400,000 U = 250 mg

Measuring liquids:

ml = milliliter 1 liter = 1000 ml

Liquid medicines are often prescribed by the tablespoon or teaspoon:

1 teaspoon (tsp) = 5 ml 1 tablespoon (tbs) = 15 ml



3 teaspoons = 1 tablespoon

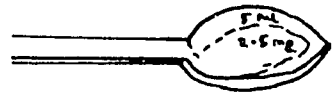
Fig. 18.3 Measuring liquid medicine.

When instructions for a medicine say "Take 1 tsp," this means take 5 ml. Many of the "teaspoons" people use hold as much as 8 ml or little as 3 ml.

When using a teaspoon to give medicine, it is important that it measure 5 ml - no more, no less.

To make sure that the teaspoon used for medicine measures 5 ml:

1. Buy a 5 ml measuring spoon.



or

2. Buy a medicine that comes with a plastic spoon. This measures 5 ml when it is full and may also have a line that shows when it is half full (2.5 ml). Save this spoon and use it to measure other medicines etc.

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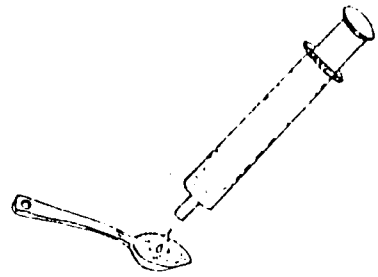
or

3. Fill any small spoon that you have at home with 5 ml of water, using a syringe or something else to measure. Make a mark on the spoon at the level of the liquid.



Storage of medicine Medicine should be stored where children cannot reach it, preferably a high place with a lock. Some medicine, like antibiotic solutions, should be kept in a cool place. Bottles and containers should be tightly closed and stored away from sunlight.

Factors modifying dosage The dosage usually depends upon the age and weight of the patient. This is especially true for children. Since it is impossible to memorize doses for all ages and weights that vary from the normal adult, it is necessary to read the printed information given by the pharmaceutical company on the medicine and follow it carefully. If you are not given this information, it is still possible to figure out the dosage by using the age and weight of the child. Use the guidelines provided in Figure 18.4.

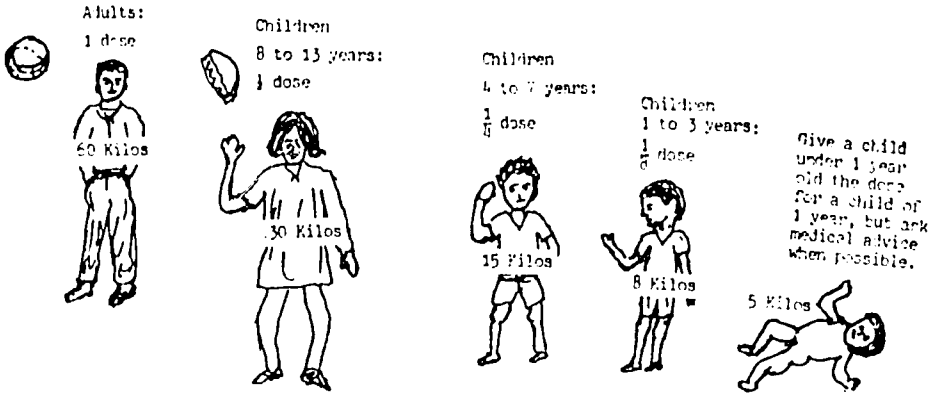


Figure 18.4 *Estimating the dosage of medicine for children when only an adult dose is given.*

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Routes of administration Medicine can be given by any of the following routes:

- By mouth (orally).
- By inhalation.
- Through the mucous membranes of the rectum, vagina, eyes, ears, nose, throat.
- By injection: intramuscular, subcutaneous, intradermal and intravenous.
- By local application.

By mouth Liquids, tablets, powders, capsules and lozenges are given by mouth. You should know why the medication is prescribed in order to decide whether it should be diluted or given in a concentrated form. For example, if a systemic effect is desired, then the drug should be well diluted to help with absorption. Water is the best solvent for most liquid or solid medication. Some preparations such as cough syrup, prescribed for its local soothing and sedative effects, are usually given undiluted.

Cold water is usually used to dilute mixtures or to help swallow tablets and capsules. But for certain drugs such as peppermint, given for its carminative effect, hot water should be used because heat promotes the expulsion of gas.

Inhalation Inhaled drugs can produce a systemic or local effect. Ammonia gas (from ammonia water or smelling salts) is used systemically as an emergency heart and respiratory stimulant for fainting or mild collapse. Some gases are inhaled for anaesthetic purposes during surgery. Oxygen is inhaled to relieve respiratory distress.

Moist air or steam inhalation is used for relieving inflammation of the mucous membranes in colds and sinusitis. This softens the thick and sticky mucous so that it can be expectorated more easily.

Through the mucous membranes Drugs that are to be absorbed through the mucous membranes usually have a local effect. These drugs are usually inserted into various body cavities (rectum, vagina) in the form of suppositories.

There are a few drugs which are given for a systemic effect. Nitroglycerin is an example. It is absorbed more effectively when placed under the tongue than when taken orally.

Local administration There are certain drugs which are applied to the skin in the form of creams, ointments or paints. These are used for their local effects.

Injections Injecting medicine into the skin, muscles or veins should be kept to a minimum. Taking medicine by mouth is more natural and better for a person since it carries less risks. Therefore injectable medicine should be used only when it is absolutely necessary. These occasions are:

- When the prescribed medicine does not come in a form that can be taken by mouth.
- When a person is vomiting constantly, cannot swallow or is unconscious.
- In certain emergency situations where it is important to give medicine without delay.

There are two major reasons for giving injections only when absolutely necessary: the risk of infection resulting from germs entering the body with the needle and the risk of an allergic or poisonous reaction caused by the medicine.

There are ways to minimize these risks. As Health Technicians, you should follow the precautionary measures outlined below.

Ways Health Technicians can prevent an infection from injection:

1. Boil all syringes and needles for 20 minutes before giving the injection and keep them completely clean.
2. Be sure that the medicine is in good condition and not spoiled.
3. Check the expiration date of the medicine.
4. Clean the injection site with alcohol or soap and water.
5. Carefully follow instructions for injecting the medicine (see chapter on immunization).
6. When using disposable syringes, make sure they are destroyed properly.

An allergic reaction should be suspected if any of the following signs appear:

- Hives or rash with itching.
- Swelling anywhere.
- Breathing difficulty.
- Signs of shock.
- Nausea, vomiting or dizzy spells.
- Vision problems.
- Ringing in the ear.
- Difficulty urinating.

The following medicines are known to cause allergic reactions within a short time after injection:

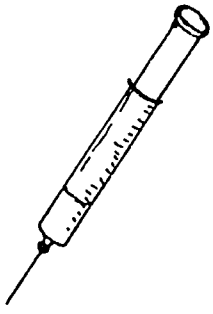
- Penicillin
- Antitoxin made from horse serum such as snake antivenom or tetanus antitoxin.

To avoid serious reactions from an injection, follow the five points listed below.

1. For mild to moderate infections:

give penicillin pills

instead of injections.



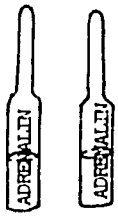
2. Before injecting ask the person:

"Have you ever had hives, itching, swelling or trouble breathing after getting an injection of penicillin?"

If the answer is yes, do not use penicillin or ampicillin. Use another antibiotic like erythromycin.

3. Before injecting:

always have ampoules of adrenaline ready.



4. After injecting:

stay with the person for at least 30 minutes.

5. If the person becomes very pale, his heart beats very fast, he has difficulty breathing or he starts to faint, immediately inject into a muscle half an ampoule of adrenaline (a quarter of an ampoule in small children) and repeat in 10 minutes if necessary.

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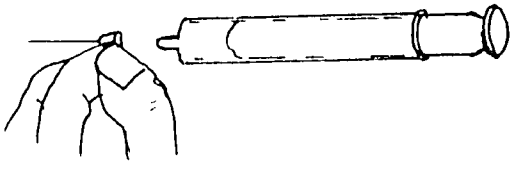
Although the sterilization and preparation of syringes and needles for injection has been covered in Chapter 13, a brief description is provided below for a quick review.

Preparing a syringe for injection:

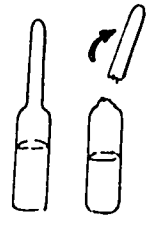
1. Take the syringe apart and boil it and the needle for 20 minutes.

2. Pour out the boiled water without touching the syringe or the needle.

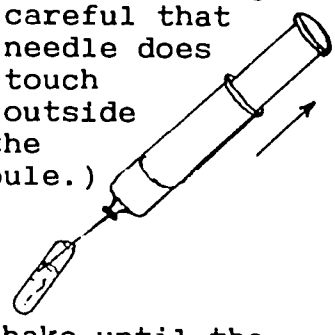
3. Put the needle and the syringe together, touching only the base of the needle and the bottom of the plunger.



4. Clean the ampoule of distilled water (or diluent) well, then break off the top.

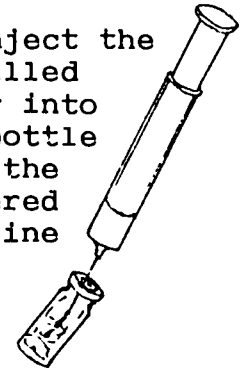


5. Fill the syringe. (Be careful that the needle does not touch the outside of the ampoule.)

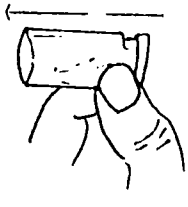


6. Rub the rubber top of the penicillin (or other medicine) bottle with a clean cloth wet with alcohol or boiled water.

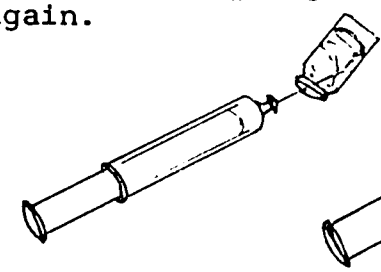
7. Inject the distilled water into the bottle with the powdered medicine



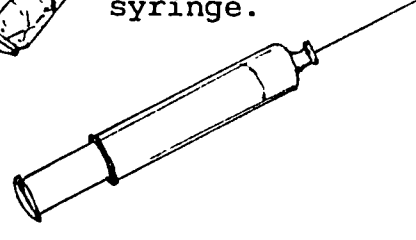
8. Shake until the medicine dissolves.



9. Fill the syringe again.



10. Remove all the air from the syringe.



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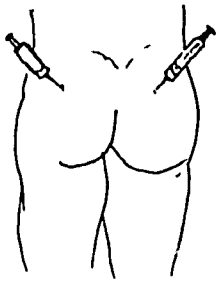
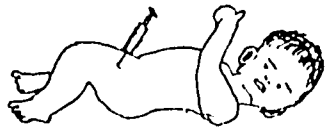
Be very careful not to touch the needle with anything, not even the cotton with alcohol. If by chance the needle touches your finger or something else, boil it again.

Where to give an injection:

For muscular injections, it is preferable to use the upper outer quadrant of the buttocks.

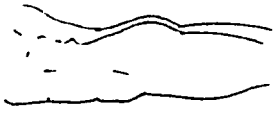


Never inject children under 2 years of age in the buttocks. Inject them in the upper outer part of the thigh.



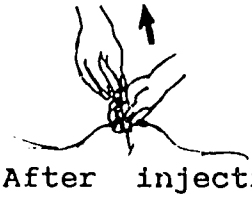
How to give an injection:

1. Clean the skin with soap and water or alcohol. To prevent pain, be sure the alcohol is dry before injecting.

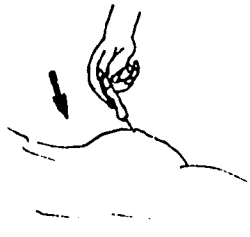


2. Put the needle straight in all the way. (If it is done with one quick movement, it hurts less.)

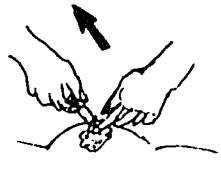
3. Before injecting, pull back on the plunger. If blood enters the syringe, take the needle out and put it in again somewhere else.



4. If no blood enters, inject the medicine slowly.



5. Remove the needle and clean the skin again.



6. After injecting, rinse the syringe and needle at once. Squirt water through the needle and then take the syringe apart and wash it. Boil before using again.

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18.2 *UNDERSTANDING ABBREVIATIONS, WEIGHTS AND MEASURES AND METHODS OF CONVERSION*

The most commonly used abbreviations for prescribing drugs throughout the world are listed below.

Abbreviation	Meaning
bd	twice a day.
bds	
bid	
cap	capsule
g	gram
gr	grain
IM	intramuscularly
IV	intravenously
kg	kilogram
L	litre
liq	liquid
mg	milligram
ml	millilitre
oz	ounce
PO	by mouth
PR	per rectum
q	every (example: q 6 hr= every 6 hours)
qd	daily
qh	every hour

Abbreviation	Meaning
qds qid	4 times a day
SC	subcutaneously
sol	solution
tab	tablet
tds tid	3 times a day
wt	weight

The systems for weighing and measuring drugs There are two systems of weights and measures commonly used for drugs, the apothecary and metric systems. The apothecary system is used only for compounding and dispensing drugs.

The metric system is a decimal system of weights and measures universally used in science. This system goes from a microgram (1/1000 mg), the smallest unit, to a kilogram (1000 g), the largest unit for measuring solids. Liquids are measured from a millilitre (1/1000 litre) to a litre (1000 ml).

Listed below are various weights and volumes of the metric and apothecary systems and their abreviations and equivalents.

APOTHECARY WEIGHT	*SYMBOL*	*EQUIVALENT*
Grain	gr	60 milligrams
Dram	z	60 minims or grains
Ounce	z or oz	480 minims or grains or 8 drachms
Pound	lb	7000 grains or 16 ounces

APOTHECARY VOLUMES	*SYMBOL*	*EQUIVALENT*
Minim	m	60 minims
Fluid Dram	fz	60 minims
Fluid Ounce	foz	480 minims or 8 fluid drams
Pint	O	20 fluid ounces

METRIC WEIGHTS	*SYMBOL*	*EQUIVALENT*
Microgram	mcg	1/1000 milligram
Milligram	mg	1/1000 gram
Gram	g	1000 milligrams
Kilogram	kg	1000 grams

METRIC VOLUMES		
Millilitre	ml	1/1000 litre
Litre	L	1000 ml

Some weights and volumes need to be converted from one system to another. You need to know:

- The conversion of grains to grams and vice versa.
- The conversion of ounces to grams.

Since 1 gram (g) = 15 grains (gr), to find out how many grains are in 2 grams you multiply 2 x 15 = 30, which gives you 30 grains.

To convert grains to grams, divide grains by 15. To find out how may grams are in 60 grains, you divide 60 by 15 (60/15). This gives 4 grams.

To convert ounces to grams you need to know that 1 ounce (oz) = 30 grams. Therefore, to convert ounces to grams you need to multiply by 30. To get grams from ounces, you divide by 30.

Fahrenheit and centigrade In the hospital setting, both the apothecary and metric system are used. Thermometers have two systems as well, and you will have access to both centigrade and fahrenheit thermometers. Therefore, you need to know how to convert from one to the other.

The following two formulas are used for converting from centigrade to fahrenheit and from fahrenheit to centigrade.

F = 9/5 (C + 32)	C = F - 32 x 5/9
For example: 40 C = ? F	102 F = ? C
F = (9 x 40)/5 + 32	C = 102 - 32 x 5/9
F = 360/5 + 32	C = 70 x 5/9
F = 72 + 32 = 104	C = 350/9 = 38.3

For your information, certain fahrenheit temperatures are given below with their equivalent in centigrade, starting from the freezing point to the boiling point.

TABLE 18.1 TEMPERATURE EQUIVALENTS IN FAHRENHEIT AND CENTIGRADE

Fahrenheit (F)	*Centigrade (C)*
32° F (Water freezes)	0.0° C
96° F	35.6° C
97° F	36.1° C
100° F	37.8° C
101° F	38.4° C
102° F	38.9° C
104° F	40.0° C
212° F (Water boils)	100.0° C

Preparation of percentage solutions When preparing percentage solutions use the metric system, because it is much easier. A 1% solution means that there is 1g for every 100 ml.

How many grams of gentian violet would you use to make:

1. A 1% solution in 200 ml of water?
2. A 2% solution in 100 ml of water?
3. A 2% solution in 400 ml of water?

Answers: 1) 2g 2) 2g 3) 8g

Since you will be working in the community setting, it is important to know what domestic measures are available for your use. The most common ones are a teaspoon and a tablespoon.

A teaspoon is approximately 5 ml and a tablespoon is approximately 15 ml.

You can also use cups and glasses for measuring but first you need to determine the capacity of each by comparing it with a standard measure. You must always carry a standard measure with you to determine the capacity of the household container.

18.3 SIDE EFFECTS OF DRUGS

Many people take far more medication than is necessary. Physicians and health workers also prescribe far more drugs than are necessary. This use of too many medicines can cause needless suffering and even death.

No medicine is completely safe Every medicine, no matter how common, carries with its use the possibility of complications. For example, aspirin is one of the mildest drugs available. However, it may be very dangerous to those who are sensitive to it. Recently, it was discovered that when given to children, aspirin could cause Reye's syndrome. Therefore, medicine should be used only when necessary. As Health Technicians, you should be aware of situations in which medicine should not be given. In addition, you should know what the side effects of various drugs are, so that if these symptoms appear you can stop the drug and refer the person to the physician for a substitute.

There are certain situations when it is best for you not to use any drugs. These situations are:

- During pregnancy and lactation, women should not take any medicine except vitamins and iron. This is because every medicine may cause complications to the developing baby. Only if the mother's general health and welfare are in danger should medicine be given.
- Newborn children have a certain immunity and do not require any medicine. There will be emergency cases when medication is necessary. In these cases the newborn should be cared for by experienced and well-trained people.
- A person who has experienced an allergic reaction to any drug should *NEVER* use that medicine again during his/her life.
- Medicines that are excreted by the liver, such as antibiotics, should not be given to a person with hepatitis because it will further damage the already affected liver.

As was stated earlier, every medicine carries with it the possibility of some danger for some people. What is good medicine for one person may be poison to another. Therefore, as Health Technicians, you should be alert in observing those signs and symptoms which indicate that the medicine is causing a problem for the individual. Not all individuals react the same way to a drug and each drug has a different effect on different individuals. It is difficult, if not impossible, to memorize the side effects of each drug. You may use the following points to determine the harmful effects of a drug and refer the person to the physician to change or stop treatment:

- Any new symptom a person experiences for longer than 24 hours.
- Any symptom of a serious nature or severe in type.
- Any one or group of symptoms that is disturbing to the person.

The following are possible symptoms due to an undesirable rather than therapeutic effect of the medicine. Prolonged duration or severity of any one of these symptoms or a combination of them should alert you to possible dangers of the drug. Stop the medicine and refer the person to the physician.

These undesirable symptoms include:

- Weakness, dizziness.
- Fever.
- Tender nerves, joint pains.
- Visual disturbances.

- Gastrointestinal disturbances: Nausea, vomiting, cramps, diarrhoea, loss of appetite, constipation.
- Headache.
- Drowsiness.
- Hearing disturbance, ringing in the ear.
- Dryness of mouth.
- Irritability.
- Burning sensation.
- Intoxication/confusion, temporary diminishing of physical and mental control of activities.
- Flushing.
- Change in blood pressure, decreased or increased.
- Palpitations.
- Increased heart rate/decreased heart rate.
- Loss of sleep at night, sleepy during the day, repeated bad dreams.
- Convulsions.
- Anaphylactic shock.
- Addiction from prolonged use.
- Depression.
- Loss of libido.
- Rash and hives.
- Swelling.
- Loss of taste.
- Jaundice.
- Change in the colour of urine.
- Difficulty breathing.
- Chills.

18.4 SPECIFIC INFORMATION ON EACH MEDICINE

Thus far, the information given on the role of Health Technicians in utilizing medicines has been general. This unit will give you specific information on commonly used drugs including the category of drug, the name of the drug, the dosage and the method of administration as well as the Health Technician's activities specific to its use.

For easy reading and quick reference the information is presented in table form, with a different table given for each category of medicine. The following is a list of the drug classifications used in this chapter in order of presentation.

- Antibiotics
- Antituberculosis drugs
- Antileprosy drugs
- Antimalarials
- Antiamoebics
- Antitrichomonas drugs

- Antihelminthics
- Antifungal drugs
- Antiseptics
- Antiinflammatory drugs
- Antibacterials
- Antiscabies
- ENT/Dental preparations
- Antihypertensive/Diuretics
- Heart stimulants
- Bronchodilators
- Antispasmodics
- Antacids
- Laxatives (Purgatives)
- Drugs that induce vomiting
- Analgesics/Antipyretics
- Anticonvulsants
- Respiratory stimulants
- Rehydration fluids
- Vitamins and minerals
- Antidiabetic drugs
- Local anaesthetics
- Steroids/hormones
- Drugs used in obstetrics

TABLE 18.2 ANTIBIOTICS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
1. Penicillin Crystalline (short-acting) Other names Penicillin G Benzyl Penicillin	Bacterial infections: pneumonia, sepsis, meningitis, infections of the ears, nose, throat, chest and skin.	Newborns 125,000 IU (1.25 lac) 12 hourly for 5 days. Children 250,000 IU (2.5 lacs) to 500,000 IU (5 lacs) depending on severity of infection and size of child, every 6 hours until improving. Then change to Procaine Penicillin IM. Adults 500,000 IU (5 lacs) to 1,000,000 IU (10 lacs) IM, every 6 hours until improved.	Intramuscular injection.	- Store in refrigerator. - Give a test dose prior to injection. - Dissolve in distilled water before injection. - Keep 1:1000 adrenaline ready and inject 0.5 cc if there is an adverse reaction. - Use under instruction of MO. - Check expiration date before use.
2. Penicillin Procaine (intermediate acting)	Bronchitis, pneumonia, ear, nose and throat infections, meningitis, septicaemia and puerperal sepsis. Also used in venereal infections.	Children 200,000 U (2 lacs) to 400,000 U (4 lacs) daily. Dose depends on size of child and severity of infection. Adults 400,000 U (4 lacs) to 1,200,000 U (12 lacs) daily. Dose depends on severity of infection.	Intramuscular injection.	- As for crystalline penicillin. - Do not use for newborn.

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TABLE 18.2 ANTIBIOTICS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
3. Benzathine Penicillin (long-acting)	Prevention of rheumatic fever, skin infections, infections resistant to other forms of penicillin, syphilis.	Adults 1,200,000 IU given once a month. Children: 8-12 yrs. 600,000 IU. Children: 3-7 yrs. 300,000 IU. Children under 3 150,000 IU.	Intramuscular injection.	- Store in refrigerator. - Do not use if there is a history of allergy to penicillin. - Keep 1:1000 adrenaline ready for use if there is allergic reaction. - Give a test dose. - Use only under order of MO. - Effect lasts for 2-4 weeks.
4. Ampicillin (broad spectrum/wide-range penicillin)	Throat infections, pneumonia, genito-urinary infections, respiratory infections, ear infections.	Adults Capsules of 250 mg and 500 mg. 1 capsule every 6 hrs, dose depending on severity of infection. Syrup 125 mg per teaspoon (5 ml) in 4 doses a day at 6 hour intervals. Children: 8-12 yrs. 1 capsule or 2 teaspoon 6 hourly. Children: 3-7 yrs. 1/2 capsule or 1 teaspoon 6 hourly. Children under 3 1/4 capsule with honey or 1/2 teaspoon 6 hourly. Newborns Same as for under 3 yrs.	By mouth.	- Warn patient to stop taking the drug and return to the health facility if there is a skin rash or itching. - Use syrup/suspension for babies. - Do not give it to patients who have a history of allergy to penicillin. - Use drug when prescribed by MO. - Alert patient about possible allergic reactions. - Store drug in a cool place.

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TABLE 18.2 ANTIBIOTICS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
5. Erythromycin	Same types of infection as for penicillin, especially for respiratory and throat infections.	Adults 500 mg tablets 6 hourly (or capsules). Syrup 4 teaspoons 6 hourly. Children: 8-12 yrs. 250 mg tablets or 2 teaspoons of syrup 6 hourly. Children: 3-7 yrs. 150 mg (half tablet) or 1 teaspoon syrup 6 hourly.	By mouth.	- Store in a cool place or airtight container. - Advise patient to keep out of reach of children. - Advise use of drug for 10 days. - Advise using drug 30 to 60 minutes before eating. - Use under advice of MO. - Advise patient not to use for more than 2 weeks.
6. Tetracycline (wide range antibiotic) Other names Tetracycline HCL, Oxytetracycline	Infections penicillin is ineffective against. These include urinary infections, prostatitis, chronic bronchitis, typhus, gastroenteritis and trachoma.	Adults 250 mg capsule given every 6 hrs. Suspension 125 mg/5 ml, give 2 teaspoons) 6 hourly. Injection 100-250 mg vials given as advised by the physician. Ointments are of two types: a) for eyes. b) for skin conditions.	Caps and syrup by mouth. Injection by intramuscular route. Eye ointment locally applied. Skin ointment locally applied.	- Use under advice of physician. - Do not use the drug for small children (under 8 years). - Store in airtight containers. - Advise patient not to take iron preparations, antacids or soda bicarb while taking tetracycline. - Do not use after expiration date.
7. Chloramphenicol (Chloromycetin)	Typhoid fever, typhus fever, septic arthritis, gastroenteritis.	Adults Available in 250 mg capsules. Suspension 125 mg in 5 ml (syrup). Injections 1 g vials. Ointment for eyes and also eye drops.	By mouth, intramuscular, locally.	- Do not use for infants under 2 months of age or for pregnant or lactating women. - Use suspension for children. - Use drug under advice of MO. - Do not use after expiration date.

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TABLE 18.2 ANTIBIOTICS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
8. Streptomycin	Tuberculosis along with INH, septic abortion, severe infections of throat and respiratory tract in combination with penicillin procaine.	Adults 1 g daily for 6-8 weeks as determined by physician. Older children 30 mg per kg of body weight in 24 hours.	Intramuscular injection after dissolving in distilled water.	- Do not give during pregnancy. - Store in a cool place. - Warn patient to report to MO or health facility if ringing in ears occurs during use. - Use injections at different sites. - Do not use after expiration date.

TABLE 18.3 ANTITUBERCULOSIS DRUGS (Other than Streptomycin)

1. INH (Isoniazid)	Chemoprophylaxis of tuberculosis. Treatment of tuberculosis in combination with other drugs.	Adults 100 mg tablets given 3 times a day. Children 3 mg per kg of body weight given in a single or divided dose daily for six months to 1 year, as advised by physician.	By mouth.	- Do not give without advice of physician. - Warn patient not to stop drug without medical advice even though patient may feel well. - Do not use while patient takes cortisone. - Do not use if patient has urinary problems. - Check blood Hb every month or two.
2. Thiacetazone	Treatment of tuberculosis as a chemotherapeutic regimen in combination with other drugs.	Adults 50 mg tablets three times a day in combination with INH. Children 4 mg per kg of body weight per day in a single or divided dose in combination with INH.	By mouth.	- Caution patient about possible side effects which include loss of appetite, nausea, vomiting, anaemia, skin rash and jaundice. - Warn patient to report to MO if side effects occur. - The drug is not given alone.
3. Ethambutol Other name Myambutol	Treatment of tuberculosis in combination with other drugs.	Adult 400 mg once a day.	By mouth.	- Do not use the drug alone. It is used in combination with other drugs. - Do not use if patient has vision defects. - It is not used in children under 13 years of age.

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TABLE 18.4 ANTILEPROSY DRUGS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
Dapsone (DDS)	Treatment of leprosy.	Adults 50 mg twice a week for 2 years. Drug is available in tablets of 10 or 50 mg. Children: 5-10 yrs. 25 mg twice weekly (1/2 of a 50 mg) for 2 years. Children under 5 10 mg tablet twice weekly for 2 years.	By mouth.	- Stop drug if skin rash occurs or if there is nausea and vomiting, loss of appetite, headache and sleeplessness and ask patient to report to MO. - Store drug at room temperature. - Protect from light. - Caution patient that duration of use is 2 years.

TABLE 18.5 ANTIMALARIALS

1. Chloroquine phosphate Other names Resochin Aralen phosphate	Treatment and prophylaxis of malaria. Treatment of amoebic infections.	For presumptive malaria treatment Number of chloroquine tabs (each) containing 150 mg base) given as single dose. Age group / Number of tabs 1-11 mos. / 1/4 tab. 12-24 mos. / 1/2 tab. 3- 4 yrs. / 1 tab. 5- 6 yrs. / 2 tab. 7-14 yrs. / 3 tab. 15 + yrs. / 4 tab.	By mouth.	- Take blood smear before treatment. - Administer presumptive treatment until confirmed. - Consult MO for radical treatment. - For amoebiasis consult MO before use regarding dosage. - Caution patient that drug may cause itching.

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TABLE 18.5 ANTIMALARIALS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
		For amoebiasis (Hepatic) 1 g daily (600 mg base) in 2 divided doses for 2 days followed by 500 mg (300 mg base) daily for 2-3 weeks. Treatment is usually combined with an effective intestinal amoebicide. Syrup: 50 mg in 5 ml (one teaspoon) is used for children		
2. Pyrimethamine Other name Daraprim	Malaria prophylaxis	Adults 1-2 tablets weekly during malaria transmission season.	By mouth.	- Use only for preventive treatment. - Consult MO for use in pregnant women. - Caution user to report if vomiting occurs.
3. Primaquine	Malignant tertian malaria carriers.	As prescribed by MO.	By mouth.	- Do not use during pregnancy except under advice of MO. - Do not give to children. - Use for malaria propylaxis where the disease is prevalent. - Do not use this drug for treatment of malaria.

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TABLE 18.6 ANTIAMOEBIC/GIARDIA DRUGS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
Metronidazole Other Name Flagyl	Amoebiasis, trichomonas infections, giardiasis.	Amoebiasis and giardiasis Adults 800 mg tds for 5 days. Children: 1-2 yrs. 200 mg (1 tab) tds for 5 days. Children: 3-6 yrs. 200 mg (1 tab) qid for 5 days. Children: 7-10 yrs.: 400 mg (2 tabs) tds for 5 days. Children: Over 10 yrs. 600 mg (3 tabs) tds for 5 days. Trichomonas vaginalis Adults 200 mg (1 tab) tds for 7 days.	By mouth.	- Advise patient to stop using the drug if side effects occur. These are GI disturbances, dizziness and skin rash. - Caution patient to report to health facility if reactions occur. - Do not give the drug if there is a history of allergic reaction to its previous use.

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TABLE 18.7 ANTITRICHOMONAS DRUGS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
Gentian violet Other names: Methyl rosaniline Gentiajel	Trichomonas vaginal infections. Mild abrasions or injuries.	Adults 2% solution in distilled water for application to skin and vagina.	Local application.	- Do not give if there is known allergy to its previous use. - Do not paint deep skin abrasions or infections with this drug.

TABLE 8.8 ANTIHELMINTHIC DRUGS (for worms)

1. Piperazine Other name Antepar	Threadworms or roundworms.	Threadworms Body wt / Syrup (tsp) / Tablet Up to 7 kg: 1/2 / - 7 to 14 kg: 1 / 1 14 to 27 kg: 2 / 2 Over 27 kg: 4 / 4 Roundworms Up to 14 kg: 2 / - 14 to 23 kg: 4 / 4 23 to 45 kg: 6 / 6 Over 45 kg: 7 / 7	By mouth.	- Advise patient that no laxative is required after its use. - Advise patient fasting is not necessary. - Follow-up results after use. - Repeat treatment if worms are still present.

TABLE 18.8 ANTIHELMINTHC DRUGS (for worms)

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
		Each tablet contains Piperazine citrate 200 mg. Elixer is available.		
2. Bephenium hydroxynaphthoate Other name Alcopar		Adults 5 g packet dissolved in water, given in one dose. Children above 2 yrs. of age 2 to 2.5 g in one dose. Available in pellets 1.25 g each in 5 g tube. Powder: Envelopes of 2 foil packets of 5 g granules.	By mouth.	- Give the drug on an empty stomach. - Advise patient or mother to withhold food for one hour after use. - Advise patient that laxative is not required after its use. - Do not give the drug if there is a known allergy to its previous use. - Caution patient that vomiting/diarrhoea may sometimes occur following its use.
3. Niclosamide Other name Tapeworm tablets.	All worms but preferred for tapeworms	Adults 2 g (4 tablets) in a single dose. Children Same dose as for adults.	By mouth.	- Advise patient to take the drug in the morning on an empty stomach. - Give laxative 2 hours after its use.

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TABLE 18.9 ANTIFUNGAL DRUGS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
1. Nystatin Other name Mycostatin	Fungus infections of mouth, gastro-intestinal tract, vagina or skin.	Adults One tablet 3-4 times a day. Ointment Apply locally to fungus infection of skin 1-2 times a day. Pessaries and suppositories are inserted once or twice a day. Children 1/2 - 2 tablets 2-3 times a day.	Tablets by mouth. Ointment locally.	- Do not give if there is a known allergy to the drug. - Refer to MO to confirm fungus infection before use of drug.
2. Griseofulvin	Fungus infections of skin, nails and hair which do not clear with Whitefield's ointment.	Children: 6-12 yrs. 250 mg once a day. Children: under 6 yrs. 125 mg once a day. Adults 500 mg once a day. The drug must be taken for 3 weeks for infections of the skin only. If nails or hair are infected then 3-6 months are required.	By mouth.	- Warn patient about possible side effects like rash, fever, GI disturbances (nausea and vomiting). - Ask patient to report to MO if these occur. - Advise patient to use drug for 3 weeks for skin infections. If nails or hair are affected advise drug use for 3 months.

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TABLE 18.10 SKIN PREPARATIONS:ANTISEPTICS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
1. Spirit acriflavin lotion Other name Flavine lotion	For dressing wounds.	Adults and children: Dressing of wounds 1-2 times a day.	Local application.	- Wash wound with cotton swab dipped in water. - Read instructions on bottle before use.
2. Dettol	Cleaning sores and wounds, dressing for surgical purposes, vaginal douche.	Adults Small quantity of the lotion is added to water which makes a milky coloured lotion. Vaginal solution: 1-2% is prepared in water.	Local application.	- Clean the wound or sore. - Dip cotton swab and apply to wound. - Instruct patient on the self use of vaginal douche.
3. Potassium permanganate	Antiseptic use. Mouth wash after food. Disinfect snake bite and dog bite.	Kondey's solution is 1% and is used for disinfection and mouth wash. For dog and snake bites, put a few crystals over the wound and then dress.	Local application. Gargle.	- Prepare solution by adding a few crystals to water in a glass until it becomes pink. - Do not use if colour becomes deep pink as strong solution may burn the mucous membranes.

TABLE 18.11 SKIN PREPARATIONS:ANTI-INFLAMMATORY AGENTS

1. Calamine lotion Other name Zinc carbonate pinked with ferrous oxide	Moderately severe skin irritations or sores.	Apply enough to cover the lesions and surrounding skin well. May be reapplied 3-4 times a day as needed.	Local application.	- Advise the patient to apply 3-4 times a day. - Caution patient that its use is for symptomatic relief and not for treatment.

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TABLE 18.11 SKIN PREPARATIONS:ANTI-INFLAMMATORY AGENTS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
2. Hydrocortisone skin ointment	Eczema, pruritis ani, pruritis vulva.	Apply ointment of 1% - 2.5% in 5-10 g tubes. Skin lotion 1% 1-2 times a day.	Local application.	- Apply thin film of ointment locally. - Do not apply on large wounds or malignant ulcers.

TABLE 18.12 SKIN PREPARATION:ANTIBACTERIALS

1. Sulphur ointment Other name Sublimate sulphur	Dermatitis, scabies.	Apply locally twice daily.	Local application.	- Do not give if there is a known allergy to drug. - Advise patient to apply twice daily. - Stop use if patient complains of of irritation.
2. Tetracycline skin ointment Other name Dermatitis ointment, Achromycin	Dermatitis, scabies.	Apply locally once or twice daily.	Local application.	- Do not use if there is a known allergy. - Check expiration date. - Do not use this for eyes.

TABLE 18.13 SKIN PREPARATIONS:ANTIFUNGAL AGENTS

1. Whitfield's ointment Other names Benzoic and Salicylic acids	Fungal infections	Apply locally 2 or 3 times a day.	Local application.	- Do not use in known allergy. - Instruct patient not to use for eyes.
2. Methyl salicylate ointment Other name Iodex	Muscular pains. Joint pains. Fungal infections.	Apply directly over aching area or fungal skin area.	Local application.	Advise local application at affected site followed by hot compresses.

TABLE 18.14 SKIN PREPARATIONS:ANTI-SCABIES/LICE

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
Benzyl benzoate emulsion/lotion 25% Other name Scabiol	Scabies.	Adults and children Take bath with soap and water and apply emulsion or lotion to body.	Local application.	- Advise patient to keep bottle away from children. - Advise disinfection of clothing. - Treat all those affected in a family at the same time.

TABLE 18.15 EENT PREPARATIONS:THE EYES

1. Sulphacetamide sodium Other name Supracid eye drops	Infections of the eyes.	Adults 5 drops of 10%, 20%, 30% solution 3-4 times a day. Children 1 drop of 10% sol. 3 - 4 times a day.	Apply to eye with dropper.	- Use ointment under MO's advice only. - Advise patient to use 3-4 times a day.
2. Chloramphenicol drops/ ointment Other name Chloromycetin drops/ointment	Conjunctivitis. After eye operations.	Adults Drops: 2-3 drops every 6 hours. Ointment: 1 or 2 times a day. Children As advised by physician.	Drops in eye. Ointment for local application.	- Check expiration date on tube. - Instruct patient on method of use/ application. - Do not use if there is known allergy.
3. Tetracycline ointment	Infections of eyes. Corneal ulcer.	Apply thin film of the ointment in eye three to four times a day or as needed.	Local application.	- Check expiration date. - Instruct method of applying ointment directly from the tube. - Do not use in known allergy.
4. Bacitracin-polymycin-neomycin Other name Triple antibiotic ointment (Polyfax)	Inflammation of eyes.	Put in eyes 1-2 times a day.	Apply to eyes.	- Check expiration date. - Advise patients regarding method of use. - Instruct patients that it is for eyes only, not skin. - Advise use 2-3 times a day.

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TABLE 18.15 EENT PREPARATIONS: THE EYES

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
5. Novesine eye drops	Pain and irritation of eyes.	3 to 4 times a day or as needed to relieve the pain.	Drops in eye.	- Do not use for eye infections. - Do not give if there is a known allergy.
6. Silver nitrate Other name Caustic lotion	Prevention of ophthalmia neonatorum. Granular eye infection.	Turn eyelid and touch the surface with silver nitrate solution. Wash with water. Put in sterile liquid paraffin drops.	Drops in eye.	- Keep prepation in a dark coloured bottle. - Make sure that bottle is properly labelled. - Use in both eyes of newborn soon after birth.
7. Atropine sulphate Other name Atropine eye drops.	Eye injury. Corneal ulcer.	1-2 drops or more until pupil is dilated.	Drops in eye.	- Use only under advice of MO. - Advise keeping out of reach of children. - Inform patient that vision remains blurred for some time after use.
8. Acetazolamide. Other name Diamox tablets.	Glaucoma. Eye surgery.	Adults 1-2 tablets given once a day for acute glaucoma and then the patient is to be referred to eye hospital. Not used in children	By mouth. By injection if if available.	- Give the tablets 1-2 times a day and refer patient to eye hospital. - Do not use in known allergy.

TABLE 18.16 EENT PREPARATIONS: EARS AND THROAT

Soda glycerine ear drops	Softening ear wax and fungal deposits.	Put 2-3 drops in ear 2-3 times a day then syringe out wax and fungus with warm sterilized water or solution. Dry the meatus with cotton swab and add antiseptic drops. If	Drops in ears.	- Put 2-3 drops 2-3 times a day for 2 days and refer the case to ENT department of hospital. - Advise patient not to use probe or matchstick for removing wax or fungus deposit.

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TABLE 18.16 EENT PREPARATIONS:EARS AND THROAT

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
		fungus or wax is not removed repeat the process.		
Saline expectorant	Chest condition where expectoration is required.	Adult 1 oz 3 to 4 times daily. Children 1/2 - 1 oz 2 -3 times daily.	By mouth.	- Add syrup tolu or aurantii to sweeten mixture and avoid nausea and vomiting. - Do not give to children.

TABLE 18.17 ANTIALLERGENIC AND DENTAL PREPARATIONS

Chlorpheniramine maleate Other name Piriton	Itchy rash or swelling of skin from insect bites. Urticaria. Allergic conditions of throat or nose.	Adults 4 to 16 mg daily in divided doses. Injection: 10 mg IM or IV. Children 1/2 - 1 teaspoon three times a day.	By mouth if tab or syrup. IM or IV for injection.	- Inform patient that there may be some drowsiness after its use. - Use syrup for children.
Eugenol and zinc oxide, clove oil Other name sugenol compound	Toothache. Dental caries.	Clean the tooth cavity and fill it with Eugenol compound or put a small cotton swab of clove oil in the dental cavity.	Apply to dental cavity.	- Avoid touching soft tissues (gums) with clove oil. - Tell patient to consult dentist.

ABLE 18.18 CARDIOVASCULAR DRUGS:ANTIHYPERTENSIVES AND DIURETICS

1. Methyl dopa Other name Aldomet	Hypertension (high blood pressure)	Adults 1-6 tablets daily depending on severity. Minimum	By mouth.	- Do not commence treatment without consulting MO. - Monitor BP frequently during treatment.

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TABLE 18.18 CARDIOVASCULAR DRUGS: ANTIHYPERTENSIVES AND DIURETICS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
		dose 250 mg tds.		- Do not use this drug if there is liver disease. - Stop use if there is headache or dizziness and consult MO.
2. Hydrochlorothiazide Other name Hydrodiuril, Esidrex	Hypertension where there is oedema.	Adults 25 mg every other day to 50 mg bid.	By mouth.	- Advise fresh fruits daily especially oranges, bananas. - Advise patient to report if there is a feeling of weakness during use. - Watch for oedema of legs and feet.
3. Furosemide Other name Lasix	Oedema. For diuresis.	Adult 10-120 mg daily or according to severity of oedema.	By mouth if tab or by injection.	- Advise patient to report if there is retention of urine. - Instruct patient to take drug after breakfast so as not to disturb the sleep by needing to urinate.

TABLE 18.19 CARDIOVASCULAR DRUGS: HEART STIMULANTS AND ANTIANGINAL DRUGS

1. Digoxin Other name Lanoxin	Heart failure.	Adult 0.25 mg after digitalization which can be further reduced or maintained according to the pulse rate. Usually one tablet daily.	By mouth.	- Monitor side effects which are anorexia, vomiting, diarrhoea, drowsiness. - Report to MO if there are side effects. - Record improvement by noting reduction in breathlessness.
2. Glycerol trinitrate Other name Nitroglycerin (Angisid)	Angina pectoris.	0.5 mg or more as needed under the tongue.	Sublingual.	- Instruct patient to dissolve tablet under his tongue. - Advise patient to report side effects such as nausea, vomiting and collapse. - Discontinue use if anginal symptoms are not relieved and report to MO.

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TABLE 18.20 BRONCHODILATORS (ANTIASTHMATICS)

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
				- Preferably used in an IV glucose saline drip.
1. Aminophylline	Bronchial asthma, status asthmaticus, cardiac asthma.	Adults Tablets: 1-2 tablets 3-4 times a day or as needed.	By mouth.	- Watch for side reactions which include nausea, headache, dizziness and palpations. - Stop using if side effects are noticed.
		Injections: 1 ampoule or 10 ml IV slowly when needed. Use 2 cc ampoule (250 mg) if IM is desired.	Intravenously or Intramuscularly	
2. Ventolin	Bronchial asthma, bronchitis, respiratory distress.	Adults Tablets: 1 tablet in the morning and 1 before retiring (2 mg). Dose depends on severity of disease.	By mouth.	- Advise patient to report if no relief occurs after use. - Use syrup for children.
3. Ventolin pump		To be used for bronchospasm. (Instructions for use available with the pump and should be carefully followed).	Inhalation.	- Instruct patient regarding method of using pump. - Instruct patient not to use pump more than 3-4 times a day.

TABLE 18.21 GASTROINTESTINAL DRUGS:ANTISPASMOTICS

1. Belladonna tablets/ tincture Other name Tincture of belladonna	Nausea and vomiting: Peptic ulcer. Abdominal cramps. Bladder infection. Gallbladder pain. Spasms, cramps in intestines/stomach.	Adult Tincture: 5-30 minims tds. One tab tds. Children: Up to 5 Yrs. 2 minims tds.	By mouth.	- Stop using if blurred vision, flushing of face or increased heart rate occurs. - Do not give to persons with visual defects. - Stop use if dryness of mouth/ throat is reported.

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TABLE 18.21 GASTROINTESTINAL DRUGS:ANTISPASMOTICS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
2. Buscopan Hyoscine Preparation	Colicky pain of stomach, intestine, gallbladder, kidney or uterus.	Adult 1-2 tablets tds. Injection: 5 ml IV Start slowly. Children Not applicable.	By mouth. Intravenous.	- Consult MO before using. - Stop using drug if colicky pain is not relieved. - Consult MO regarding alternatives.

TABLE 18.22 GASTROINTESTINAL DRUGS:ANTACIDS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
1. Sodium bicarbonate Other name Soda bicarb	Hyperacidity of stomach. As a constituant of ORS.	1-2 g as needed.	By mouth.	- Advise using tablets with water. - If powder is used, mix it with lemon juice.
2 Carminative mixture	Indigestion. Nausea or vomiting. Gastric discomfort after heavy meal.	Adults One oz 3-4 times a day after meals. Children 1/4 - 1/2 oz 3-4 times a day after meals and feeds.	By mouth.	- Advise using 3-4 times daily after meals.
3. Gelusil Other name Magnesium trisilicate, aluminum hydroxide	Hyperacidity. Peptic ulcer.	Adults One to two tablets to be chewed three to four times a day.	By mouth, chewing or sucking.	- Advise patient not to swallow tablets but to suck them by keeping tablets in the mouth. - Instruct patient to use drug 1/2 hour after meal.

TABLE 18.23 LAXATIVES (PURGATIVES)

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
1. Glycerine	Constipation. Mandles throat paint for sore	Adults Put suppository in rectum, bowel	Insert in rectum.	- Use suppository for constipation. - If not relieved, use glycerine enema to relieve constipation.

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TABLE 18.23 LAXATIVES (PURGATIVES)

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
Other name Glycerine pure	throat. Boraglycerine for dental disease.	movement should occur within half hour. Children Child supository, enema can be also given.		
2. Liquid paraffin Other names Liquid paraffin plain Liquid paraffin emulsion	Constipation.	Adults One oz at bedtime mixed in sweet milk. 30 ml of emulsion is given at bedtime. Children 4-8 ml emulsion given at bedtime.	By mouth.	- Advise taking at bedtime. - If given plain it may be added to milk.
3. Castor oil	Constipation.	Adults 1/2 1 oz early in morning. Child 2 teaspoons stat.	By mouth.	- Do not use if nausea is present. - Caution patient that griping pain may occur after use.
4. Milk of Magnesia	Constipation.	Adults 30 to 50 ml. Children Under 1 yr: 1/2 tsp (2 ml) 1-2 yrs: 1 tsp (5ml) 3-10 yrs: 2-3 tsp (10ml)	By mouth.	- Advise to use at bedtime.
5. Magnesium sulphate	Obstinate constipation. Wounds.	Constipation Take 1 oz early in the morning. Wounds Make paste and dress the septic wound 1-2 times a day.	By mouth. Local application.	- Give it with warm water early in the morning for constipation. - For wounds, make paste or pack powder.

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TABLE 18.24 EMETICS (To induce vomiting)

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
Sodium chloride Other name Strong salt solution (to cause vomiting)	To induce vomiting if undesirable substance has been swallowed.	Give sufficent quantity until vomiting occurs.	By mouth.	- Repeat use until vomiting occurs.

TABLE 18.25 ANALGESICS/ANTIPYRETICS

1. Acetylsalicylic acid. Other name Aspirin	To lower body temperature from fever. For pain relief (headache, joint or muscle pain etc).	Adults 1 to 2 tablets (5-10 gr) every 4 hours if necessary, not to exceed 12 tablets a day. NOT GIVEN TO CHILDREN BELOW 12 YEARS OF AGE.	By mouth.	- Do not give if person has a peptic ulcer. - Do not give to children below 12 years of age. - Advise family to keep away from children. - Do not give during pregnancy without consulting MO.
2. Paracetamol Other name Panadol	To lower temperature. To relieve pain or dysmenorrhoea.	Adults 500 to 1000 mg 3 times a day. Children 120 mg tid when needed.	By mouth.	- Do not give in known allergy. - Avoid prolonged use in children.
3. Pethidine hydrochloride Other name Dolargan	Pain in cardiovascular disease. Gallbladder colic. Renal colic. Postoperative pain.	Adults 25-100 mg every 4-6 hours as needed Children Up to 1 yr: 2 mg/kg body weight. 2-5 yrs: 12.5 to 25 mg/kg 6-12 yrs: 25 - 50 mg/kg	By injection.	- Do not give unless ordered by MO. - Do not give in respiratory distress. - Do not give in head injury.

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TABLE 18.26 ANTICONVULSANTS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
1. Phenobarbitone Other names Phenobarbitol, Luminal	Epilepsy. Insomnia. When sedation is required.	Adults 30 mg (1 tablet) 2-3 times a day. Injection: 200 mg IM. Children 4 mg per kg per 24 hours.	By mouth. Intramuscular.	- Use carefully if jaundice is present. - Stop use if nausea, skin rash or swelling of face is reported. - It is habit forming and should be kept under lock and key.
2. Diphenylhydantoin Other name Dilantin	Epilepsy.	Adults 30 to 100 mg, but this dosage has to be regulated according to the response of the individual patient.	By mouth.	- Drug is given after the diagnosis of epilepsy is made. - Advise patient to report any side effects such as tremors, blurring of vision, insomnia, ulcers of gum, nausea and vomiting. - Consult MO regarding continuing drug if side effects occur.
3. Diazepam Other name Valium	Minor epilepsy. Anxiety states. Insomnia.	Adults 2 or 5 mg tds as needed. Children 1 to 2 mg daily or more as needed in divided doses.	By mouth. Injection.	- Do not give to alcoholics. - Advise user not to drive vehicle after taking the drug.
4. Chlorpromazine HCL Other name Largactil, Thorazine	Anxiety states. Severe nervousness. Vomiting. Convulsions.	Adults 25 to 100 mg 3 times a day. 25 to 50 mg intramuscularly every 4 to 6 hours if needed. Children 1-2 mg per kg weight in divided doses.	By mouth. Intramuscular.	- Make patient rest for at least 30 minutes. - Monitor pulse twice a day. - Do not inject if solution is coloured. - Consult MO regarding use. - Watch for jaundice. - Do not give to patients with liver and gallbladder disease.

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TABLE 18.27 RESPIRATORY STIMULANTS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
Nikethamide Other name Coramine	Respiratory depression. Circulatory failure. Post-anaesthesia depressed respiration.	Adults 2-4 ml IM or IV. Children 1/2 - 1 ml or more IM.	By injection.	- Check ampoule for expiration date. - Reject use if coloured.

TABLE 18.28 INTRAVENOUS SOLUTIONS

Parenteral replacement solutions: 5% dextrose in normal saline, 5% dextrose in water, normal saline 0.9%, glucose 50% solution.	Patients who are unable to take sufficient fluids by mouth. Post-operative cases. Severe dehydration.	Adults Give calculated dose of fluids as needed by patients. Children Be careful while giving IV infusions to small children. Overdose can cause oedema and heart failure.	Intravenous injection.	- Check solution for particles. - Reject if not found clear. - Do not use glucose solution if patient is diabetic. Use normal saline. - Watch for swelling during infusion. - Watch for chills. If they occur consult MO before continuing. - Do not give if patient has oedema.

TABLE 18.29 REPLACEMENT FLUIDS:ORAL SOLUTIONS

1. Salt-sugar solution Other name Diarrhoea solution	Diarrhoea in children. Dehydration prevention.	Children Give the child as much as he/she wants at frequent intervals. Continue breast-feeding.	By mouth.	- Give this if ORS is not available. - Teach mother how to prepare it.
2.Oral rehydration solution(ORS) Other name Oralyte	Diarrhoea. Dehydration.	Infants and children To calculate amount: Body weight in kg	By mouth.	- Watch for oedema and drowsiness. - Do not give for severe dehydration. - Use boiled water for preparing solution. Do not boil ORS powder.

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TABLE 18.29 REPLACEMENT FLUIDS:ORAL SOLUTIONS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
		multiplied by 20 ml or body weight in lbs multiplied by 10 ml. Eg, 12 kg x 20 = 240 ml oralyte solution. Give within 1/2 to 1 hr by mouth. Give the same amount of oralyte solution by mouth every 3 hours between feeds. Continue until child is rehydrated.		

TABLE 18.30 VITAMINS AND MINERALS

1. Multi-vitamins	Manifestations of vitamin deficiency.	<u>Adults</u> 1-2 tablets daily as supplement or more for curative purposes. <u>Children</u> As above. <u>Infants</u> 4-8 drops or as needed.	By mouth.	- If vitamin deficiency disease is not clear, consult MO. - Advise family about foods containing vitamins.
2. Multi-vitamins with minerals <u>Other names</u> Filibon Vitera Otran-B	During pregnancy. During lactation. Vitamin deficiency.	<u>Adults</u> One tablet or capsule daily or as directed by the the physician. <u>Children</u> One tsp once a day.	By mouth.	- Advise family about foods containing vitamins and minerals.

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TABLE 18.30 VITAMINS AND MINERALS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
3. Vitamin A and D Other name Ad. Mine	Xerophthalmia. Keratomalacia. Rickets. Supportive during TB treatment.	Adults One capsule tid. Children Small child: one teaspoon tid. Older children: one to two teaspoons 2-3 times a day.	By mouth.	- Consult MO regarding identification of deficiency. - Advise family to eat foods containing these vitamins.
4. Vitamin B complex Other name Surbex	Anaemia. Beriberi. Neuritis. Angular stomatitis. Bleeding from gums.	Adults 1-2 tablets or more after meals. 1 ml IM or IV daily. Children 1/2 - 1 teaspoon daily.	By mouth, IM or IV	- Consult MO for identification of deficiency where appropriate. - Advise family to eat leafy vegetables and fruits.
5. Ferrous sulphate(iron) Other names Per-in-sol, Feosol	Anaemia. Pregnancy. Prevention of anaemia. Iron supplement in diet.	Adults One tablet 3-4 times daily after meals and bedtime. One tablet daily for pregnant and lactating women. Children Elixir: 1 teaspoon daily (above 2 years) 2 teaspoons daily (above 3-5 years). Drops: 15 drops daily for infants.	By mouth.	- Watch for abdominal discomfort, nausea and vomiting or constipation. - Encourage eating green leafy vegetables.

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TABLE 18.31 ANTIDIABETIC DRUGS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
Insulin Other name Soluble insulin	Treatment of diabetes. Diabetic coma.	The calculated dose (according to need) may be given SC or IM. The dose will be as directed by a physician.	Subcutaneous or intramuscular.	- Watch for sugar in urine and blood. - Warn patient about symptoms of hypoglycaemia and ask him/her to keep some glucose ready. - Instruct patient to take food soon after injection.

TABLE 18.32 MISCELLANEOUS DRUGS:LOCAL ANAESTHETICS

Lignocaine HCL Solution Other name Xylocaine	Local anaesthesia for minor surgery.	Adults As required or desired. Can be given superficially and deep. Children As desired.	By injection.	- Do not use in patients with hypertension. - Do not use intravenously. - Use only for local infiltration.

TABLE 18.33 MISCELLANEOUS DRUGS:STEROIDS (HORMONES)

Dexamethasone Other name Decadron	Shock. Severe allergy. Asthma. Head injury.	Adults 1-2 ml as needed in a single dose. 1-2 tablets 2-3 times a day or as needed.	Injection. By mouth.	- Consult MO before use. - Restrict use in asthma and use it in severe cases only. - It should be used only in emergency cases and not as a routine. - Do not use in hypertensive patients.

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TABLE 18.34 DRUGS USED IN OBSTETRICS

NAME OF DRUG	DISEASE/CONDITION PRESCRIBED FOR	DOSAGE	METHOD OF ADMINISTRATION	HEALTH TECHNICIAN'S ACTIVITIES SPECIFIC TO THE DRUG
1. Ergometrine maleate Other name Methergine	Prevention and control of haemorrhage after childbirth or miscarrige. Promote uterine contractions for expulsion of placenta.	Adults 0.5 to 1.5 g in 1 ml ampoules, IM or IV after expulsion of placenta.	By injection. Tablets by mouth.	- Do not give before childbirth or delivery of placenta. - Watch for side effects such as rapid pulse, weakness, nausea and vomiting. - Check with MO before use.
2. Oxytocin Other name Syntocinon (Pitocin)	Promoting uterine contractions during 2nd stage of labour. Stopping bleeding during 3rd stage.	2-5 IU given IM.	By injection.	- Never use in first stage of labour. - Always give in infusion mixed with 5% dextrose or saline. - Do not use when there is mechanical obstruction of labour.

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GLOSSARY

Adrenaline: Trade name for epinephrine, a medicine used to relax bronchioles during spasm.

Anaesthetic: An agent that produces insensibility to pain.

Anaphylactic: An allergic reaction of the body to a substance that results in difficulty breathing, convulsions and even death.

Apothecary system: An older system of weights and measures using a grain instead of the decimal system.

Capsule: A special container made of gelatin that keeps the patient from tasting the drug.

Carminative: An agent that removes gases from the gastrointestinal tract.

Chemoprophylaxis: Preventing disease through the use of medicines.

Contraindication: A symptom or condition that makes a particular kind of treatment unadvisable.

Conversion: Changing numbers from one system to another.

Diuresis: Increased excretion of urine.

Dosage: The strength or measured amount of a substance.

Emetic: Substance that causes vomiting.

Libido: Sexual drive or desire.

Local: Limited to one place or part.

Metric: System of measurement based on the metre as the unit of weight and the litre as the unit of volume.

Orally: To take by mouth.

Palpitations: Rapid, violent or throbbing sensation of the heart.

Prescribe: Order, usually written, for the dispensing of drugs.

Puerperal sepsis: Infection occurring in the postpartum period.

Septicaemia: Infection in the bloodstream accompanied by fever and chills.

Sublingual: Administered under the tongue.

Systemic: Affecting the whole body; given through the bloodstream.

Tablet: A small disk of medicine.

Venereal: Resulting from sexual contact.

Suggested learning activities:

1. Measure your own teaspoon, cup and tablespoon and determine their capacity.
2. Find a cup, teaspoon and tablespoon in your own home that are the same as the standard ones in your kit.
3. Boil syringes and needles in preparation for giving injections 10 times under supervision.
4. Give 10 injections:
   - Intradermally
   - Subcutaneously
   - Intramuscularly
5. Whenever a case comes requiring the administration of medicine by a route other than the mouth or injection, request that you administer it under supervision until the techniques are mastered.

Review questions:

1. Since the beginning of your training, you have been told that diagnosing a disease and prescribing medicine is the Medical Officer's responsibility. Why then is a chapter on drugs included in your curriculum?
2. What are your two major responsibilities in the utilization of medicine?
3. What rules must you know about giving drugs?
4. How can you make sure that a person is taking the right medicine appropriately?
5. If it is not possible to get a fever-reducing medicine for a child in a rural area but the parents have adult tablets, is it possible to administer these tablets to children? If so, how?
6. How can you make sure that the teaspoon used for giving medicine measures 5 ml?
7. What two factors determine the dose of medicine in children?
8. What are the common routes for administering medication?
9. What is steam inhalation used for?
10. What are the three major reasons for giving injections?
11. What two major risks are involved when giving injections and what can you do to minimize these risks?
12. How can you tell if a person is allergic to penicillin or other drugs?
13. How much adrenaline would you administer and by what route if a person has an allergic reaction to penicillin?

14. State what the following abbreviations mean?

g =
gr =
ml =
bd =
bds =
PO =
PR =
qds =
qid =
tds =

15. How do you convert 5 grains into grams?
16. How do you convert grams to grains?
17. How do you convert ounces to grams?
18. How do you convert fahrenheit temperature to centigrade temperature?
19. How do you prepare 1%, 5% and 9% solutions?
20. In what circumstances is medicine contraindicated?
21. If you find that a person taking medicine for malaria, tuberculosis or any other condition is not improving or is developing undesirable side effects, what would you do?
22. What information do you need to know about each medicine before you give it to a person?
23. Why would you stop the medicine of a person who has been taking it? What would you do after stopping the medicine?
24. What medicine can a pregnant woman take safely?
25. What site would you use for giving intramuscular injections in infants?

LEARNING ACTIVITIES RECORD

Name of student _____

	Date injection equipment boiled	*Name of person and injection site*		
		Intradermal	*Subcutanous*	*Intramuscular*
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

EVALUATION FORM

*CHAPTER*_____

Organization of content [ ] Appropriate
[ ] Inappropriate

Method of presentation [ ] Simple to understand
[ ] Difficult to understand

Amount of content [ ] Adequate
[ ] Inadequate

Any other comments:

Write a paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTER 19

HEALTH DATA AND STATISTICS

Objectives After completing this chapter you will be able to:

1. Explain how numbers help in assessing health status.
2. Describe how numbers (or data) can be collected, organized, summarized and presented.
3. Discuss how data can provide a solution or create a problem.
4. Discuss what is meant by high, low, acceptable or unacceptable rates.
5. Explain the difference between data and information.
6. Explain the difference between and the purpose of records, registers and reports.
7. Discuss the recording procedures and their purpose for several major records and registers at the RHC or BHU.

CHAPTER 19

HEALTH DATA AND STATISTICS

The major objective of a health care system is to improve the health status of the public. To do this, the Health Technician must have information regarding the initial health status of the people she or he is to serve and then measure the changes in their health status over a period of time.

When one has to measure something it is done more easily with numbers. Facts about the health status of people are most easily examined when put into number form. For example, when the actual height and weight of a child at a certain age are compared with the expected height and weight of a normal child of that age, it is possible to say that the child is growing as expected if the figures are about the same. If, however, the the child's height and weight are below what is expected then the child may need special attention. The numbers become indicators of the child's health status. If you only looked at the child and tried to make the same judgement, you might not see as clearly what is different or wrong and you could not as easily compare this child to others. So, measuring in numbers and comparing these numbers with a standard can help you to assess health status more accurately. As Health Technicians, you need to become familiar with using numbers as health indicators and understand how they can demonstrate many facts about the health status of that person or community. Your understanding of numbers, and your work with numbers, therefore, will be a very important part of your job.

The effectiveness of a health centre in dealing with health problems in nearby communities can be greatly enhanced by the numerical information about the public that a Health Technician is able to provide. In addition, the ability to supply honest and accurate numbers is quite important. If, as in our earlier example, the child's height and weight were not carefully measured, it might not have been obvious that he or she was in difficulty and the need to care for him or her might have been overlooked. Carelessness or made up numbers results in an inaccurate picture of the problem and people may suffer for this unnecessarily. Accuracy is very important when working with numbers.

In summary; data about the health of people can help you decide what you must do. Collecting such data in the form of numbers helps you to see the problem clearly (objectively) and makes it easier to compare changes over time and among people or communities. Honest and accurate numbers can give a real picture of various needs. Dishonest or inaccurate numbers can confuse or mislead you into doing the wrong things for people.

The following are numbers that can be used as indicators of health status:

- Pulse rate.
- Number of diarrhoeal episodes.
- Blood pressure.
- Number of TB cases in the village.
- Height.
- Weight.
- Temperature.
- Dates of visits or number of visits to a clinic.

In addition to collecting patient or community information in the form of numbers, Health Technicians will be expected to regularly record data in various registers (such as an out-patient register or an in-patient register) and in forms and reports. Sometimes this data will need to be summarized.

In order to understand how data can be summarized and presented in different ways, let us use the activity of measuring the height and weight of 20 eight-year-old boys as an example and follow the procedures for the collection, organization, summarization and presentation of the data.

19.1 COLLECTION OF HEALTH DATA

There are many ways to collect this data. You could ask the parents to weigh and measure the children who come to the centre or you could do it yourself either at the centre, school or village. Whatever method is decided upon, the data should be collected on a form, put into a register or listed in a report.

19.2 *ORGANIZATION OF HEALTH DATA*

You have now measured and recorded the height and weight of 20 boys as shown below:

NAMES	*WEIGHT (POUNDS)*	*HEIGHT (INCHES)*
RASHID	51	48
QAMAR	55	51
ASIF	48	47
ZAFAR	51	55
AZHAR	48	50
TARIQ	46	50
NASEEM	51	52
YOUNAS	44	47
WAQAR	44	46
MATLOOB	51	54
BABAR	39	45
ABBAS	62	58
TIPPU	51	49
HAMID	42	44
NAZEER	48	45
ARSHAD	53	51
MAJEED	57	52
RIAZ	53	50
UMMAR	39	43
ZAHEER	43	45

How do we make this data more useful? The first thing to do is give a number to each boy and list his height and weight as shown:

CHILD	*WEIGHT (POUNDS)*	*HEIGHT (INCHES)*
1	51	48
2	55	51
3	48	47
4	51	55
5	48	50
6	46	50
7	51	51
8	44	47
9	44	46
10	51	54
11	39	45
12	62	58
13	51	49
14	42	44
15	48	45
16	53	51
17	57	52
18	53	50
19	39	43
20	43	45

At this point, the list does not provide any more information than it did before. A name and a number can represent the same thing. To know if making this list was a useful step, we must know what the purpose of the data is. That is, do we want to know something about each person individually or everyone in general.

Let us say that information is needed on the lowest and highest measurements in each category without regard to which child it is. Now we can drop any reference to name. We need only look at the list of measurements. The spread between high and low numbers is called the range. Looking at the data, the range in height of the twenty boys is from 43 inches to 58 inches and the range of weight is from 39 lbs to 62 lbs (note that a range is generally stated as "from X to Y")

This information can also be stated as the difference between the high and low values (such as 15 inches for height or 23 pounds for weight). When saying it this way, more information is added to better understand the number (such as "the range in height is 15 inches, from 43 to 58 inches").

If we now want to see how the heights and weights are distributed among the 20 boys, it will be necessary to organize the data into a frequency table. Frequency refers to how often certain things occur (in this case how many of the boys have the same height or weight). A table is the presentation of the data in some grouped or combined form for a more specific purpose than just listing of the data. Using the example, we can organize the data into a table to help assess the frequency.

WEIGHT (in pounds)	*HEIGHT (in inches)*
39	43
39	44
42	45
43	45
44	45
44	46
47	47
48	47
48	48
48	49
51	50
51	50
51	50
51	51
53	51
53	52
53	52
57	53
59	54
62	58

FREQUENCY DISTRIBUTION OF WEIGHTS OF 20 BOYS

Weight (in pounds)	*No. of boys*
39	2
42	1
43	1
44	2
46	1
48	3
51	4
53	3
57	1
59	1
62	1
	20

FREQUENCY DISTRIBUTION OF HEIGHTS OF 20 BOYS

Height (in inches)	*No. of boys*
43	1
44	1
45	2
46	1
47	2
48	1
49	1
50	3
51	2
52	2
53	1
54	1
55	1
58	1
	20

Organizing the numbers in this form allows us to get more information from the data. From these two tables, the following statements can now be made concerning the weights and heights of the 20 children:

- The highest weight is 62 pounds.
- The lowest weight is 39 pounds.
- The range of weights is from 39 to 62 pounds or 23 pounds.

- The tallest boy is 58 inches.
- The shortest boy is 43 inches.
- The range of heights is from 43 to 58 inches or 15 inches.

These statements could all have been made from the original list but the information needed for these statements is easier to obtain or calculate from the frequency table. We have made the data more interesting and useful by organizing it in this way.

We can now add another observation by calculating the difference between the highest and lowest values that we have for each category. This is called the interval of the data.

The interval is the span from the lowest number up to and including the highest number. For our 20 boys, the intervals of the heights and weights would be:

Height	*Weight*
43 to and including 58 = 16 inches	39 to and including 62 = 24 pounds

(Note that is not the same as the difference between the highest and lowest value since we include both in the calculations.) Try it yourself; count how many inches there are in height. Remember, we must include the numbers of 43 and 58 in our total. Taking only the difference would tell us the distance from 43 to 58 inches (the range) but we would be one number short. We must calculate up to and including 58 inches to get the interval.

- The range of heights is from 43 through 58 inches, which is an interval of 16 inches.
- The range of weights is from 39 through 62 pounds, which is an interval of 24 pounds.

If we now want to organize the data even further, we can do it by putting the boys into groups of equal weight and height intervals. Each group must be equal in interval length and each boy put in only one group. In order to group these boys correctly, we must decide how many groups we want and divide that into the interval. This will tell us the data interval per group. For example, if we want to put the boys into 4 groups, the data will be organized in the following way:

For Weight

- The total data interval is 24 pounds.
- Dividing the total interval (24) by the number of groups desired (4) would give us an average interval (6). A table based on this information would look like this:

For Height

- The total data interval is 16 inches.
- Dividing the total interval (16) by the number of groups desired (4) would give us an average interval (4) and the table would look like this:

Weight in lbs	*No. of boys*	*Height in inches*	*No. of boys*
39 ----- 44	6	43 ----- 46	6
45 ----- 50	4	47 ----- 50	7
51 ----- 56	7	51 ----- 54	6
57 ----- 62	3	55 ----- 58	1
39 ----- 62	20	43 ----- 58	20

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We have further simplified our data with these steps and have grouped it in such a way that we can see trends that were not obvious before. What trends can you see?

19.3 SUMMARIZATION OF HEALTH DATA

So far we have arranged or grouped our data into a form called a frequency table. This is one basic way to organize and present numbers.

Data can also be managed in another way. It can be summarized through math manipulation. Some examples of this are:

- An average.
- A ratio.
- A proportion.
- A percentage.
- A rate.

Average An average is the most commonly used statistic for summarizing a list of numbers. It is obtained by adding all the numbers in a group and dividing by the total number in the group. In other words:

$$\text{Average} = \frac{\text{Sum of all the numbers in the group}}{\text{Total number in the group}}$$

Using our height data as an example:

$$A = \frac{43+44+45+45+46+47+47+48+49+50+50+50+51+51+52+52+53+54+58}{20}$$

$$\text{Average} = \frac{980}{20} = 49 \text{ inches}$$

Expressing this result in words, we would say that the average height of the 20 boys measured is 49 inches and that half of the boys are above it and half under it.

Compute the average weight for the 20 boys measured. How would you express the result?

Computing an average and using it to describe a situation is particularly helpful when you have a long list of numbers, you are looking at the group as a whole, or comparing it to another group, and are interested in a easy and general estimate of a situation.

Ratio A ratio compares any two numbers. For example, the ratio of the number of eyes to the head is 2 to 1. A ratio can be expressed in these ways:

$$2 \text{ to } 1 \text{ or } 2:1 \text{ or } \frac{2}{1}$$

It is generally expressed in its lowest numerical form.

Proportion Using the above example, there are two eyes for one head, four eyes for two heads and six eyes for three heads. To put it into number form it would be like this:

$$\frac{2}{1} = \frac{4}{2} = \frac{6}{3}$$

(Note that even though the numbers increase the ratio stays the same, 2:1). We would express this in words as: two eyes are to one head as four eyes are to two heads, etc.

Such an equation showing two or more ratios that are equal is called a proportion.

Percentage Percentage means a part of a "hundredth." You can think of a percent as being a kind of ratio, one that always has a denominator of 100. For example 5/100 is read as 5% or expressed as "five percent." In writing a percent with numbers, a symbol (%) is used and this is known as a percentage sign. Percentages are used frequently in making comparisons because the common denominator of 100 forces all the ratio data into the same form.

For example, you are told that 1/3 of a group of children seen in the under-five clinic A are less than 6 months old while 6/25 children are less than 6 months of age in clinic B. Now you are asked to state which of the two clinics saw the greater ratio of children under 6 months of age. Putting these ratios into two percentages will make it easier to compare.

Follow these steps:

Step 1. Percentage of $\frac{1}{3} = \frac{1}{3} \times \frac{100}{1} = \frac{100}{3}$

OR

```
      33.3%
3 ) 100
     90
     10
      9
      1
```

Step 2. Percentage of $\frac{6}{25} = \frac{6}{25} \times \frac{100}{1} = \frac{600}{25}$

OR

```
      24%
25 ) 600
      50
     100
```

Now you can see the answer. Since 33.3% is greater than 24% the greater ratio of children under six months were seen in clinic A.

If you are given a percentage you can also determine the number that it represents. For example, if you are told that 25% of the people living in a village with a population of 2000 have malaria and are asked to determine how many malaria cases there are, you would then multiply the total population by the percentage with malaria and have the answer of 500. Follow these steps:

Step 1. $25\% \times 2000 = \frac{25}{100} \times \frac{2000}{1}$

Step 2. $\frac{50,000}{100}$

Step 3.

```
       500
100 ) 50,000
       500
```

Answer 500 people in the village have malaria.

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Rates A rate is a ratio with a commonly agreed upon or specified denominator. A percentage is a rate. Other examples are:

1. The school vehicle travels at a rate of 40 km/per hour on rural roads.
2. The school vehicle travels at a rate of 20 km/per one gallon of diesel.
3. The rate of persons coming to the BHU is 300/per month.

The denominator can be any small or large number. When we talk, for example, about rates of birth, marriage, disease or death in the population, we usually deal with large numbers. When these rates are expressed, the denominator used is usually 1000, 10,000 or 100,000. We do this to better understand what the numbers mean. Let us use as an example a birth rate of .08 per person. This number is too small to relate to and understand, so we can express it as .8 per 10 people or 8 per 100 people or 8/100. Then we say the birth rate is 8 per 100 population.

An important point to remember is that the denominator is a commonly agreed upon one and many times is not expressed as part of that number. For example, we can say that the rate of diarrhoeal episodes is "6." We mean by this "6 cases per person" but do not say "per person" because health officials agree that "per person" is the standard (or base) by which to express the rate.

Some commonly used rates in primary health care:

$$\text{Birth Rate} = \frac{\text{Number of live births reported during the year}}{\text{Mid-year population}} \times 1000$$

$$\text{Death Rate} = \frac{\text{Number of deaths reported during the year}}{\text{Mid-year population}} \times 1000$$

$$\text{Population Increase Rate} = \frac{\text{Number of live births minus number of deaths}}{\text{Mid-year population}} \times 1000$$

$$\text{Infant Mortality Rate} = \frac{\text{Number of deaths in infants under one year of age}}{\text{Number of live births during that year}} \times 1000$$

(Note: The way to express the multiplication sign "X" is by saying "per" and the final number represents the rate with the 1000 already multiplied. With each rate, we generally say that "the rate is Y" not "per 1000." The 1000 is accepted as the

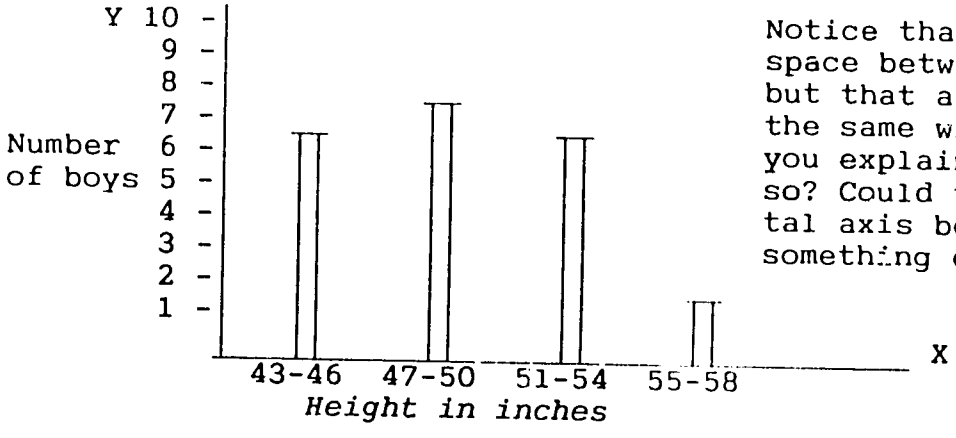
standard and understood when expressing the rate. If it is not clear as to what the rate is expressed in you may ask, "Is that per 1000 or per 10,000?" If the infant mortality rate is said to be 35, can you say that another way?)

A brief note about high or low or good or bad rates; these are judgements about the facts, the rate itself. We may say a rate is high because we feel it could be lower or that in other societies it is lower and therefore should also be lower in ours. We may say it is bad (or unnecessarily high) because we have decided it should not be that high. For example, when looking at infant deaths, we are uncomfortable at the thought of so many dying when, with better care or knowledge many could be saved. If we think we can improve the rate, that is, lower the number of deaths, then we say the rate is unacceptable. Sometimes to hide our embarrassment with what we know or think will be a high rate, we are tempted to cheat and change the rate one way or another. This is done from time to time, but it only serves to hide or confuse the facts. It never results in saved lives or improved understanding of the problems.

19.4 PRESENTATION OF HEALTH DATA

A very important part of the data development process (collection, organization, summarization) is the presentation of the data in an easily understood form to facilitate decision-making and study of what the data means. This generally means putting the data into some kind of picture form. Some generally used and easily developed forms are the bar chart, the pie chart and the graph.

Bar chart This is a graph suitable for representing numerical information from a frequency table. For example, the bar chart for the frequency table of the heights of the 20 boys would be presented as follows:



Notice that there is a space between the bars but that all bars are the same width. Can you explain why this so? Could the horizontal axis be labelled something else?

A bar chart has two sides, each of which is called axis.) The vertical axis (up and down) which in our example represents frequency, or the number of boys in each group. The horizontal axis (flat from left to right) which in our example represents intervals of heights in inches. Each group of boys in a height category in the table is represented by a bar. Therefore, for four groups there are four bars. The height of each bar tells us the frequency (or number) of boys in that group. The width of the bar depends on the width of the interval in inches.

Pie chart This is a presentation of grouped data shown as parts of a circle. In drawing a pie chart, one should remember the following:

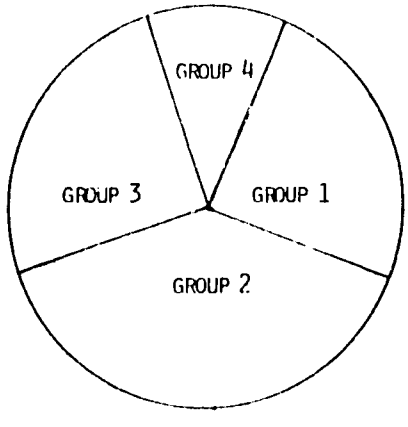
1. The circle should be drawn using a large radius, that is, a big circle.
2. The circle should be divided into the same number of sections as number of categories or groups in the frequency table.
3. The size of each portion will be determined by the number each group represents and can be determined by using the following formula:

$$\text{Portion} = \frac{\text{frequency of category (number of boys in each interval group)}}{\text{total frequency (total number of boys)}} \times 360 \text{ degree}$$

Using the height of the 20 boys again, the four groups are as follows:

Group 1	Portion	=	6/20 x 360/1 = 108 degrees.
Group 2		=	7/20 x 360/1 = 126 degrees.
Group 3		=	6/20 x 360/1 = 108 degrees.
Group 4		=	1/20 x 360/1 = 18 degrees.

This pie chart looks like this:



There are certain things we know:

1. There are 4 groups.
2. There are 20 boys in our sample
3. A circle is 360 degrees.
4. There are a certain number of boys in each group.

Our task is to show what portion each group is of the whole.

19.5 WHEN DOES DATA BECOME INFORMATION?

Data becomes information when it is used (by us or someone else) when it helps us to decide what to do. If we do not use it then we cannot say that, to us, it is information. It is only data, numbers. And sooner or later we will become careless about collecting or organizing it because it does not help us to do our work.

If we collect data that will be studied by others, we need to understand how others use it or how the decisions they make using it affect our job. If we look at the data and cannot understand what it tells us, it is not information. In this case, organizing, summarizing and presenting the data may make it useful in decision-making. Put simply, for data to be important it must be understood and used. It is your responsibility to do what you can to see that this is the case.

19.6 GENERAL RECORD KEEPING

A record is any attempt to preserve data or information. It can be written or verbal. For example, our list of 20 boys was a form of record.

A register is a book or collection of records kept over time. If we had collected, for example, the heights and weights of the same or other boys and put them into some folder or book, we could call that a register, especially if we did it periodically.

Generally we put data or information into a record or register in a form in which it can be easily used again and again. In that way these documents or collections enable us to see trends over time or develop a history of what interests us. They help us to see ahead or to see backwards in time. Can you think of a example of a record or register you keep that has helped you?

Reports are generally prepared from data from records or registers and sent to someone for analysis (study). They consist of only selected pieces of data and are used to make decisions or assess the progress of activities. They are generally prepared on a weekly or monthly basis, although sometimes they are prepared only quarterly or annually. Reports can also be prepared for special needs on a one-time basis.

Types of records, registers, reports At a Rural Health Centre or Basic Health Unit, many records, registers and reports are maintained. Some examples are:

Records: World Food Ration Card
Growth Monitoring Chart
EPI vaccination card

Registers: Out-Patient Daily Register
In-Patient Daily Register
World Food Distribution (daily) list of beneficiaries

Reports: Food Distribution Monthly Report
Food Distribution Quarterly Report
EPI vaccination reports

Problems with records, registers and reports (the 3-Rs) Like collecting or summarizing data, the three "Rs" can be a burden to the person who must fill them out. Filling them out can be time-consuming and, if the data is inaccurate or if no one uses it, a waste of time. It is a problem all administrations face in every kind of work. The situation is made even worse when several people want staff to fill out different records, registers and reports and do not coordinate with each other so that information is repeated or overlapping. All of these problems are faced by health department staff and although studies are underway to improve the situation, much has yet to be done.

The system of the 3-Rs is under review at your Centre or Unit and you will be instructed on the changes made as they are completed and adopted by the Provincial Health Authorities. In the meantime, here are the guidelines for some major existing records, registers and reports.

19.7 *OUT-PATIENT REGISTER*

The purpose of this register is to:

- Provide accurate, up-to-date data on the treatment of out-patients who are seen at Rural Health Centres and Basic Health Units.
- Provide statistical data that may be used for the allocation of resources such as staffing, drugs and medical supplies.
- Provide a cross check on drugs issued to out-patients so that this can be compared to inventory levels at the end of each month.

The register should be filled in by Health Technicians, dispensers and clerks.

In Rural Health Centres, the out-patient register is maintained at a central location in the entry way to the centre or at the dispensary window.

In Basic Health Units that have a dispenser, the out-patient register in maintained at the dispensary window. For those Units without a dispenser, the register is maintained by the person in charge of the unit.

Data The following data are recorded in the out-patient register:

- Patient's yearly number.
- Patient's monthly number.
- Patient's daily number.
- Patient's name.
- Patient's address.
- The age group of the patient.
- The sex of the patient.
- The diagnosis.
- The drugs issued:

    - Name of the drugs.
    - Quantity.
    - Purchee fee.

Filling in the register for new patients:

Option No. 1: When the patient arrives at the facility, he/she registers at the Central Registration Point. The person staffing this area records the yearly number, monthly number, patient's name, patient's address, checks the patient's age group and sex and collects the purchee fee.

The patient is issued a chit (purchee) with his/her name and yearly number on it and is directed to the health worker who can best serve his/her needs. For the first visit, this is usually the Medical Officer Incharge, Medical Officer II or Female Medical Officer. For follow-up visits this may be the dispenser, dresser or Health Technician.

The patient sees the health worker to whom he/she was directed. The health worker enters the diagnosis and treatment on the chit and directs the patient to the dispensary. The dispenser issues the prescribed drugs and retains the chit.

At the end of day, the person staffing the Central Registration Point collects the chits from the dispensary and completes the out-patient register by entering the diagnosis and drugs issued, including quantity.

Option No. 2 This option is the same as option no. 1 except that the patient is directed by the health worker to return to the Central Registration Point before going to the dispensary. In this case, the person staffing the Central Registration Point completes the register entry for each patient by entering the diagnosis, drugs prescribed and quantity and directs the patient to the dispensary.

When drugs are in short supply and the patient unlikely to receive any from the dispensary, option no. 2 is preferred because it assures that the diagnosis is recorded. An example of an out-patient register is shown on the following page.

Filling in the register for old patients:

Patients who return to the health facility for follow-up of an old complaint check in at the Central Registration Point. The person staffing this area records the patient's yearly number on the next line in the register, circles the number and completes the register according to option no. 1 or 2 described earlier.

OUT-PATIENT REGISTER

MONTH _____ 19 _____

NEW CASES THIS MONTH _____

OLD CASES THIS MONTH _____

Yearly number	Monthly number	Daily number	NAME	ADDRESS	OFFICER INCHARGE. AGE GROUP						SEX		DIAGNOSIS	DRUGS ISSUED		Pur-chase fee	Remarks
					Under 1	1-4	5-9	10-14	15-44	45-over	M	F		Name of Drug	Qty		

Fig. 19.1 Out-Patient Register.

19.8 IN-PATIENT REGISTER

The purpose of this register is to provide an accurate, up-to-date record of the treatment of in-patients at Rural Health Centres. The register is maintained by the Medical Officer Incharge, Medical Officer II or Lady Doctor.

Procedure for filling in the register:

- In-patient records are maintained in a plain register, one patient to a page.
- The health worker who admits the patient records the following information in the register:

    - Date admitted.
    - Yearly number.
    - Monthly number.
    - Name.
    - Age.
    - Sex.
    - Occupation.
    - Admitting diagnosis.

- All drugs prescribed, details of surgical operations performed, diet taken etc during the patient's stay are recorded in the register.
- The date of discharge, the number of days in the facility and the discharge diagnosis are also entered.

The number of days spent in the facility are computed by counting the day of admission as the first day and not counting the day of discharge. If a patient expires in the facility, the cause of death is recorded in the register.

19.9 LABORATORY REGISTER

The purpose of this register is to provide a record of laboratory tests performed on patients. The register is maintained by the laboratory assistant.

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Procedure for filling in the register:

The results of all laboratory tests are recorded in a plain register.

- The following data are recorded:

  - Patient's yearly number.
  - Patient's name.
  - Patient's age.
  - Patient's sex.
  - Test(s) performed.
  - Test results.

19.10 ABSTRACT REGISTER

The purpose of this register is to provide an up-to-date abstract of services provided by the health facility. It is completed at the end of each day from data recorded in the out-patient and in-patient registers. It is maintained by the Health Technician, dispenser or clerk. A sample of an Abstract Register is provided for you on the next page.

Procedure for filling in the register:

- The total number of out-patients are entered by disease category in the column for the day of the month opposite the name of the disease. In-patients only require a monthly tally by disease category, including new admissions, discharges, deaths.
- The number of new cases for in-patients and out-patients, separately by age and sex, and the number of new and old cases are entered in the appropriate column opposite the day of the month. The number of male and female patients, respectively, is entered in the sub-total column provided for this purpose.

19.11 ANNUAL RETURN REPORT

The purpose of this report is to provide an annual review of the status of staffing services available at the end of the year and services provided during the year. This report is handled by:

- The person designated by the Medical Officer Incharge.
- The person designated by the District Health Officer.
- The statistical assistant of the Deputy Director of Health Services (Divisional).

ABSTRACT REGISTER

Monthly Morbidity & Mortality Statistics

INSTITUTION _____ MONTH _____ YEAR _____

DISTRICT _____

OUT DOOR PATIENT | IN DOOR PATIENT

Name of Disease	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total		
1 Cholera																																		1
2 Enteric Fever																																		2
3 Bacillary Dysentery																																		3
4 Diarrhoea																																		4
5 Typhus																																		5
6 Scrub Typhus																																		6
7 Infectious Hepatitis																																		7
8 Infective Jaundice																																		8
9 Other Diseases of Digestive System																																		9
10 Cholera																																		10
11 Diphtheria																																		11
12 Whooping Cough																																		12
13 Pneumonia																																		13
14 Tuberculosis of Lungs																																		14
15 Other Diseases of Respiratory System Excl. Tuberculosis																																		15
16 Tuberculosis of Genital Tract																																		16
17 Diseases of Urinary Organs Excl. Tuberculosis																																		17
18 Male Generative System Excl. Tuberculosis																																		18
19 Female Generative System Excl. Tuberculosis																																		19
20 Labour Normal																																		20
21 Labour Abnormal																																		21
22 (a) Diseases of New Born (upto 4 weeks age)																																		22
(b) Tetanus																																		
(c) Neonatal Tetanus																																		
23 Malnutrition of Infants																																		23
24 Diseases of Nervous System Excl. Tuberculosis																																		24
25 Acute Infectious Encephalitis																																		25
26 Leprosy																																		26
27 Scabies																																		27
28 Other Skin Diseases Excl. Tuberculosis																																		28
29 Measles																																		29
30 Acute Injury or Poisonings																																		30
31 Malaria																																		31
32 Chicken Pox																																		32
33 Rabies																																		33
34 Trachoma and other Infectious Diseases																																		34
35 Tetanus Bites Snakes																																		35
36 Gonorrhoea Infections																																		36
37 Presence of Leucorrhoea Origin (P.U.O.)																																		37
38 Malaria																																		38
39 Diseases of Circulatory System																																		39
40 Diseases of Blood and Spleen																																		40
41 Rheumatic Fever																																		41
42 Diseases of Bones, Joints, Muscles, Fascia and Bursae																																		42
43 Trachoma																																		43
44 Cataract																																		44
45 Glaucoma																																		45
46 Other Diseases of Eye																																		46
47 Diseases of Ear																																		47
48 Diseases of Lymphoid System including Lymph Node Glands																																		48
49 Goitre																																		49
50 Other Diseases of Ductless Glands																																		50
51 Anhelminthes and other Intestinal Diseases																																		51
52 Tumours Benign																																		52
53 Tumours Malignant																																		53
(a) Rectum																																		
(b) Breast																																		
(c) Uterus																																		
(d) Others																																		
54 Other Diseases Excl. Tuberculosis																																		54
55 Congenital Diseases and Malformations																																		55
56 Minor Working Ailments																																		56
57 All other Injuries																																		57
58 Pneumonia																																		58
59 All other Diseases																																		59
Total																																		

Procedure for filling out this report:

- The annual returns are prepared by each facility: attached Sub-Health Centres, Mother and Child Health Centres, Dispensaries, Basic Health Units and Rural Health Centres.
- The official or officer in charge of the facility is responsible for preparing the annual return and submitting it to the District Health Office through the Medical Officer Incharge of the complex by January 31st.
- The returns are prepared on statements C and E which are annexed.
- After receiving the annual returns, the District Office should send them to the Divisional Deputy Director of Health Services by March 1st.
- The statistical staff of the Divisional Deputy Director's office prepares statements C and D and sends them to the Director of Health Services by June 1st.

19.12 THE WORLD FOOD PROGRAMME: REGISTERS AND REPORTS

The purpose of these registers and reports is to maintain information about the distribution of commodities and a record of beneficiaries of the World Food Programme. These are maintained by Lady Health Visitors and female Health Technicians.

Procedure for maintaining these records:

- All the food received is entered in the receipt column of the stock register.
- Pregnant/nursing mothers and malnourished children are identified.
- At the time of food distribution, a ration card is filled out which covers the particulars of the mother and child and records the food distributed. The card is kept with the mother.
- The daily distribution list is completed. This includes the registration card number, the name of the card holder, the name of the beneficiary, the kind/quality of food distributed and the receiver's signature or thumb impression.
- The register of beneficiaries is maintained. This includes a growth chart of each child registered as a beneficiary and is kept in the same register that other information like name, age, weight, kind of food distributed and health condition of the beneficiary is recorded.

- A monthly report of commodities received and issued is prepared, which is sent to the District Health Officer during the first week of the next month.
- A quarterly report of the commodities received and issued is prepared and is sent to the District Health Officer during the first week after the end of the period.

PERIOD OF FOOD DISTRIBUTION

		Month		Month
Mother (Preg)	From_____198		To_____198	
	Period_____months			
Mother (Nurse)	From_____198		To_____198	
	Period_____months			
Ist Child	From_____198		To_____198	
	Period_____months			
2nd Child	From_____198		To_____198	
	Period_____months			

	Wheat Kgs	D.S.M Kgs	V.Oil Kgs
Ration of food/month	_____	_____	_____

Form WPF No.1 MINISTRY OF HEALTH AND SOCIAL WELFARE

Project 2237

GOVERNMENT OF PAKISTAN

RATION CARD

1. Card No._____
2. Centre_____
3. Mother's Name_____ P [] N []
4. Name of child_____
   Age_____Years_____Months_____
5. Name of child_____
   Age_____Years_____Months_____
6. Address_____
   _____

Fig. 19.3 World Food Programme Ration Card.

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DAILY DISTRIBUTION LIST OF BENEFICIARIES

Province:_____ Name of Centre:_____ Name of distributor:_____

District:_____ Date of distribution:_____ ____

Registration Card No.	Name of holder of the card.	No. of beneficiaries			Quantity of food			Signature or left thu impression of the recipient
		Pregnant	Nursing	Pre-school	Wheat	Milk	Oil	

Fig. 19.4 Daily distribution list of beneficiaries.

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REGISTER OF BENEFICIARIES

Page_____ Date of Registration_____
Serial No._____ Name of health facility_____

Year Month

Name of mother_____ Age_____ _____ Pregnant/Nursing_____
Name of 1st child_____ Age_____ _____ Period of pregnancy_____
Name of 2nd child_____ Age_____ _____ Period of nursing_____
Husband's occupation_____ Identity card No._____Income per month_____

Month	Mother's weight	Husband's weight	FIRST CHILD			SECOND CHILD			RATION ISSUED			Attends Nutrition Education Yes/No	Signa-ture
			Weight	Health condition	MAC green yellow	Weight	Health condition	MAC green yellow	Wheat	Milk	Butter oil		
JAN													
FEB													
MAR													
APR													
MAY													
JUN													
JUL													
AUG													
SEP													
OCT													
NOV													
DEC													

Fig. 19.5 Register of beneficiaries.

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Form WPF No. 5
Project 2237

MINISTRY OF HEALTH AND SOCIAL WELFARE

This report should reach the District Health Officer during the first week of the next month

Page No.____

Province_____

District_____

Centre_____

MONTHLY REPORT (DISTRIBUTION CENTRE)

(A) Food Commodities Received, Distributed, Lost and Balance during month of_____

Authorized number of beneficiaries

Mothers_____

Children_____

Commodities.	1 Balance of the previous month	2 Quantities received during the present month		3 Loss in transport to the Centre	4 Total Quantities (1+2-3)	5 Quantities distributed during the month	6 Loss in distribution	7 Balance at the end of the period (4-5-6)	Actual Number of beneficiaries				No. of distributions during the month and dates
									Mother		Children	Total	
		Quantity	Date						P*	N**			
		Kgs		Kgs	Kgs	Kgs	Kgs	Kgs					
Wheat													
D.S.M.													
Veg. Oil													

(1) Reasons for losses_____

(B) Integrated Health Services

Total number of attendants during the quarter to receive health services		Nutrition Education			No. of oral rehydration packages distributed	No. Vaccinated		
		No. of classes		Total no. of attendants				
Female	Children	Verbal	Practical			Pregnant Women	No. of Children	Total

Remarks_____

P* = Pregnant women
N** = Nursing mothers

Fig. 19.6 Monthly report of commodities.

Form WPF No. 6
Project 2237

MINISTRY OF HEALTH AND SOCIAL WELFARE

This report should reach the District Health Officer during the first week of the next month

Page No. ____

Province _____

District _____

Centre _____

QUARTERLY REPORT

(A) Food Commodities Received, Distributed, Lost and Balance during month of _____

From _____ 198 To _____ 198
Reporting Periods

Authorized Number of beneficiaries

Mothers _____

Children _____

(1st January - 31st March 198) (1st April-30th June 198) (1st July-30th September 198) (1st October-31st December 198)

Commodities	1 Balance of the previous month	2 Quantities received during the present month		3 Loss in transport to the Centre	4 Total Quantities (1+2-3)	5 Quantities distributed during the month	6 Loss in distribution	7 Balance at the end of the period (4-5-6)	Total number of beneficiaries during the quarter				No. of distributions during the month and dates
									Mother		Children	Total	
		Quantity	Date						P*	N**			
		Kgs		Kgs	Kgs	Kgs	Kgs	Kgs					
Wheat													
D.S.M.													
Veg. Oil													

(1) Quantities of each food commodity required by the centre to cover the needs of the next period:
Wheat _____ Kgs D.S.M. _____ Kgs. Veg. Oil _____ Kgs.

(2) Reasons for losses _____

(B) Integrated Health Services

Total number of attendants during the quarter to receive health services		Nutrition Education			No. of oral rehydration packages distributed	No. Vaccinated		
		No. of Classes		Total No. of attendants		Pregnant Women	No. of Children	Total
Female	Children	Verbal	Practical					

(4) Remarks _____

P* = Pregnant women
N** = Nursing mothers

Fig. 19.7 Quarterly report of commodities.

19.13 *EXPANDEL PROGRAMME OF IMMUNIZATION: REGISTERS AND REPORTS*

A record keeping procedure for the Expanded Programme of Immunization should be maintained for the following diseases:

- Measles.
- Tuberculosis.
- Polio.
- Whooping Cough.
- Tetanus.
- Diphtheria.

These records are maintained by vaccinators, Health Technicians, and dispensers.

Procedure for maintaining these records:

- The work of the Expanded Programme of Immunization is carried out by mobile teams and static units.
- The supervisory district vaccinator, with the consultation of concerned staff, prepares a vaccination programme. (The proforma is attached).
- The community is approached and target homes are marked. Data is collected on the children to be vaccinated.
- Parents are motivated to bring their infants and children for vaccination.
- A check list is prepared for the items which are required in order to provide vaccination services. The list includes:

  - Vaccine carrier.
  - Table.
  - Syringes.
  - Cotton.
  - Refrigerator.
  - Dropper.
  - Thermometer.
  - Vaccines.

When a child comes for vaccination, a card is filled out and a permanent number is given to each child for future reference. This card is kept with the parent of the child. At the same time, a permanent vaccination register is filled in.

- If the card is lost by the parent, then the permanent vaccination register is referred to. All the necessary information can be obtained from this register.
- The date of vaccination for each disease is entered on the card and in the register.
- The column "others" is provided on the card and register to reccrd information like all doses completed and oral rehydration salt provided.

At the end of each month, a monthly report is prepared showing the number of children vaccinated. This is sent to the District Health Office through the Medical Officer Incharge.

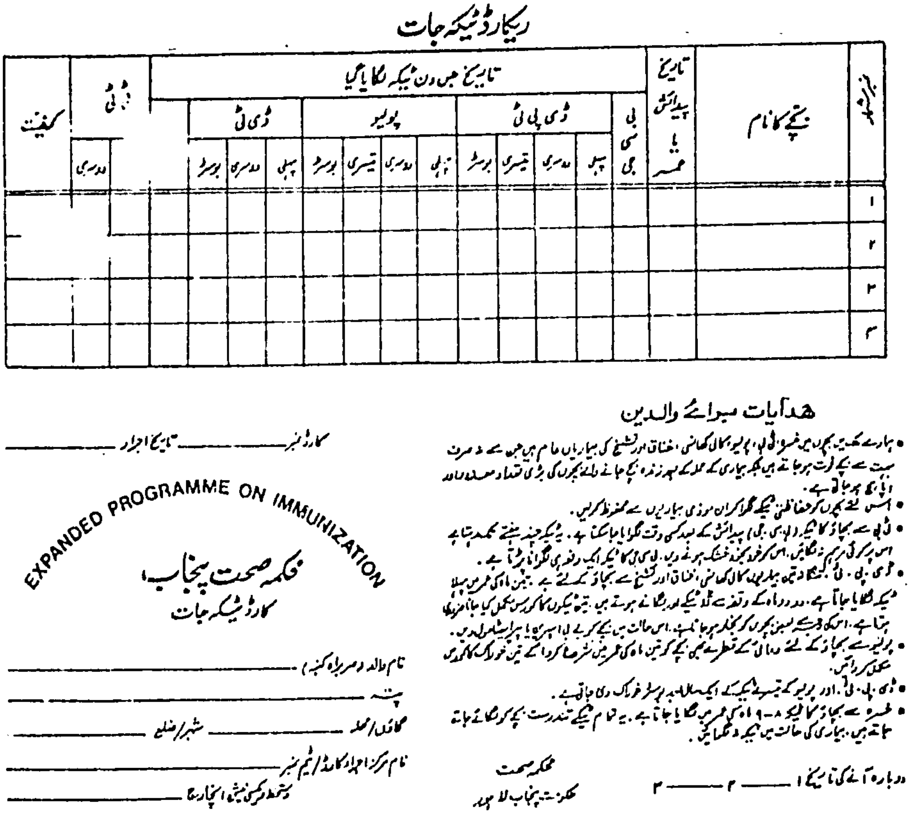

Fig. 19.8 Immunization card, front and back.

STANDARD E.P.I. VACCINATION PROGRAMME FROM AUGUST, 1985 TO JANUARY 1986

Name of Vaccinator: _____ Union/Council/Ward: _____

Tehsil: _____ Headquarter: _____

Sr. No.	Name of Locality	Population	Target Children	Expectant Mothers	Kit Station	DATES OF THE MONTH					
						Aug 85	Sep 85	Oct 85	Nov 85	Dec 85	Jan 86

Fig. 19.9 Standard vaccination programme record for EPI.

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EXPANDED PROGRAMME OF IMMUNIZATION
VACCINE STOCK & TEMPERATURE

District:_____ Refrigerator

Place:_____ Deep freezer No._____ Month_____Year____

Date	Quantity of vaccine						Temperature				Remarks
							Morning		Afternoon		
	BCG	DPT	POLIO	DT	TT	MEASLES	Max	Min	Max	Min	
1.											
2.											
3.											
4.											
5.											
6.											
7.											
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25.											
26.											
27.											
28.											
29.											
30.											
31.											

Fig. 19.10 Vaccine stock and temperature register.

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19.14 *FAMILY HEALTH RECORD*

The purpose of the family health record is to maintain a continuous record of the health status of individuals in the family. Information can be entered either during home visits or during patient visits to the RHC/BHU by the Health Technician. The family health record is in the form a "Kapi." Fill in the information on the first two pages. From page 3, the papers are blank to allow for continuing notes to be kept on individual members of the family.

Procedure for completing the family health record:

1. Fill in the name of the person who is the head of the family.
2. Write the street name, house number, village, hamlet or any other information that will help locate the family.
3. Give the names of all individuals living under that roof as well as their age, sex and any remarks.
4. Write the name of the RHC, BHU and Union Council the family belongs to.
5. Health status: After assessing the family for their health needs, evaluate and record their health status. Identify any needs and list them on page three.
6. Describe the housing as either temporary or permanent and the type, such as tents, huts, concrete building, as well as the size of the house and number of rooms.
7. Lighting: Describe the lighting situation during the day when you visit as well as in the evening.
8. Ventilation: Record the number of windows and doors in the house. Are they kept shut or open during the day?
9. Heat: During the cold months, what kind of heat is used to warm the house or individual, for example, extra clothing, gas stove, kerosene or wood fire.
   For light, ventilation and heat, gather detailed information and state whether or not the family's needs are met. If not, identify the need under the section described in number 15.
10. Check the source of water and describe how the available water is made safe to drink.
11. Describe where adults and children defecate and urinate.

12-15. Check appropriate box for items 12 - 15.

On the blank pages that follow the above data, list the needs of the individual or family and how you will meet them.

PRIMARY HEALTH CARE PROJECT
FAMILY HEALTH RECORD

1. Name of the head of the family_____

2. Address/locating information_____

3.

Name of dependent	Relationship	Age/Date of birth	Remarks

4. District_____ RHC_____ BHU_____
Name of Union Council's Chairman_____

5. Health status of family members:

Fig. 19.11 Page 1 of family health record.

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6. Housing (Type and size).

7. Lighting
[ ] adequate
[ ] inadequate

8. Ventilation
[ ] adequate
[ ] inadequate

9. Heat
[ ] adequate
[ ] inadequate

10. Water supply:
[ ] Municipal
[ ] Tapewater
[ ] Well
[ ] Canal
[ ] River
[ ] Tube well
[ ] Other

11. Toilet facilities (described)

12. Waste disposal
[ ] adequate
[ ] inadequate

13. Flies/insects
[ ] present
[ ] absent

14. Rodents
[ ] present
[ ] absent

15. Accidents and hazards in the kitchen.
[ ] present
[ ] absent

Fig. 19.12 Page 2 of family health record.

19.15 THE HEALTH TECHNICIAN'S DAILY ACTIVITY REPORT

The purpose of this report is to record the place and type of service provided by Health Technicians as well as the age group served. You are to fill out one form for each day you work.

Procedure for completing the daily activity report:

1. Write down your name as it appears on your pay voucher.
2. Write down your ID card number.
3. The date, include month and year.
4. Write down the name/number of the BHU/RHC you are using as a base of operation.

5,6. Under site of visit, the places a Health Technician may visit are listed. Under number, write the number of places you visited that day. For example, on January 2, 1987, you worked at the BHU in the morning and saw three antenatal cases, then went to a village nearby to demonstrate to a group of mothers (10) preparation of nutritious snacks with locally available foods. On your way back to the BHU, you stopped at a home to see a woman who was in labour. For that day you would put under site of visit:

Home visit	1	and under the other sites you will put a 0.
BHU	1	
Community group	1	
Other sites	0	

If on the same day, instead of a home visit, you stopped by another BHU, then you will put down:

Home visit	0
BHU	2
Community group	1

If you are working at a BHU and do not see anyone that day, you still fill out one of these forms and put a check mark by BHU and put a 0 under the type of visit.

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HEALTH TECHNICIAN'S DAILY ACTIVITY REPORT

1. Name
2. ID Number
3. Date
4. BHU/RHC village name(s)

5. Site of visit	6. No.	7. Type of visit	8. No.	9. Age of person receiving service	10. Male	11. Female
Home visit		Antenatal		Under one.		
		Labour and Delivery		1-5 years.		
School		Postnatal, newborn		6-14 years.		
Community group		Health promotion, nutrition.		15-45 years.		
BHU		EPI		45+		
		Family Planning				
RHC		Communicable diseases: Malaria Tuberculosis Diarrhoea Other				
Other		Sick visit				
		Health/ group education				
		Environmental health: Water Sanitation Other				
		Referral				

Fig. 19.13 Health Technician's daily activity report.

7,8. Type of visit: Write down the number of persons seen under each category or the number of activities performed. Female Health Technicians will or should have more antenatal, labour and delivery, postnatal and newborn visits, which may be on an individual basis. Male Health Technicians, on the other hand, may have more group visits under environmental health or education. For these cases, you would write the number of families you talked to and also indicate the number of group education sessions held under each topic. Group education sessions can be held for all types of visits. In this case, a check mark is placed under the appropriate topic and the number of sessions under group education. Referral is filled in if you refer someone to another service.

9,10,11. Age of person served. For services to individuals, write down the age and sex for each. For group activities you only need to check the age group most participants belong to. For example, if you are giving a session on weaning food to mothers you may want to check the 15 to 45 age group and females. For environmental health and sanitation check 15 to 45 age and male group.

DIARY

You should keep a diary of all your activities for each day you work. In it you need to write down:

- Information on your visits.
- Plans you make with people about a return visit.
- New information you need to find out about.
- Questions you were not able to answer during the visit.
- Any other information you feel is important. For example, family's health practices in nutrition, health maintenance, management of illness, etc.

19.16 DRUGS AND MEDICAL SUPPLIES REGISTERS

Inventory control The purpose of the inventory control is to provide for the efficient use of drugs and medical supplies. Inventory control is maintained by storekeepers, dispensers, and Health Technicians.

Inventory is the stock of goods on hand at any given time. The inventory of drugs at Rural Health Centres and Basic Health Units includes drugs in the storeroom, dispensary, laboratory, Medical Officer's office and emergency room. The control of inventory is accomplished by keeping records of the stock of drugs of medical supplies. Each time stock is received or issued, the transaction must be recorded.

Bin Cards They should be kept in the storeroom with each lot. Receipts and issues are recorded on the bin card at the time of the transaction. For example, when the stock is received in the storeroom, the quantity of each drug is entered on the bin card and the balance on hand is updated. Similarly, when drugs are issued from the storeroom, the amount issued is recorded on the bin card and the balances updated. The balance on the bin card should always be equal to the quantities of stock in the storeroom.

The advantages of using bin cards in the Integrated Rural Health Complexes include:

- Providing a continuous up-to-date record of the quantities of all drugs in stock. This alerts the storekeeper to reorder a drugwhen the supply of that drug gets low. For example, when the supply of a drug drops to a certain specified level, the storekeeper should make arrangements for reordering.
- Providing a ready reference to the deadline for using each drug according to the expiration date on the bin cards. When a drug is close to its expiration date, (within six months), the storekeeper should attach a red tag to the card. This will alert the storekeeper to monitor its utilization more carefully. If the items cannot be used before the expiration date, the Medical Officer Incharge of the Integrated Rural Health Complex should distribute the drugs to other facilities within the Complex that have a shortage of that particular drug.

BIN CARD

Name of Drug: Paracetamol (Tab)

Page No. of Stock Registers: 31

Date	Received Qty	Issued Qty	Balance Qty	Expired Date	Initial
1-6-85			200	31-5-85	
15-6-85	1000		1200	200/31-5-85 1000/31-12-86	
30- 9-85		100	1100	200/31- 5-85 900/31-12-85	
5-11-85		200 Expired & Destroyed	900	31-12-86	

Fig. 19.14 Bin card.

Daily Expense Register The daily expense register is maintained in order to have a record of the total quantities of each drug issued to patients on a daily basis. At the end of the month, the quantities are totaled, and transferred to the stock register in order to update the balances.

Since the daily expense register provides a chronological record of the consumption of drugs, it can be used as a tool for estimating drug requirements.

Out-patient and in-patient registers Other sources of informatiuon on drugs issued to patients include in-patients and out-patients registers (discussed previously). These registers have columns where you record the amount of drugs issued to each in-patient and out-patient.

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DAILY EXPENSE REGISTER

Month:_____ Year:_____

Stock Register Page No.	Name of Drug	Day of month 1	2	3		28	29	30	31	Total

Fig. 19.15 Daily expense register.

At the end of each day, the quantities of each drug issued are totaled from the out-patient and in-patient registers and transferred to the daily expense register.

Srock Register Every drug storeroom, large or small, should have a perpetual or "running" record of inventory. In Rural Health Centres and Basic Health Units, separate stock registers are maintained for drugs from the Government Medical Stores Depot and for drugs from UNICEF. All pages in the stock register are serially numbered and a separate page is used for each drug.

When drugs are received from the District Health Office or any other source of supply, they should be recorded in the stock register and the balances updated. Every transaction is recorded separately on the day the drugs are received. One entry every month should include the quantity of a drug issued to patients during that month. This can be calculated from the monthly totals of each drug in the daily expense register. The entry should be posted in the stock register on the last working day of the month and the balances updated. Drugs issued to non-patients will not appear in the daily expense register as these drugs are not recorded in the out-patient or in-patient register. All such issues from the storeroom should be recorded directly in the stock register.

STOCK REGISTER

Name of Drug: Paracetamol (Tab) Page No: 31

Date	Received from/Issued to	Received Qty	Issued Qty	Balance Qty	Initial
1- 6-85				200	
15- 6-85	DHO Office	1000		1200	
30- 9-85	Patients		100	1100	
5-11-85	Expired & Destroyed		200	900	

Fig. 19.16 Stock register.

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19.17 *INVENTORY, STORAGE AND DISTRIBUTION OF DRUGS*

Taking inventory of drugs The purpose of taking an inventory is to provide a periodic physical count of the drugs on hand. This task is performed by the storekeeper, dispenser or Health Technician.

Taking inventory is accomplished by actually counting the stock of each drug in the storeroom and dispensary. Every three months all drugs available at the health facility should be counted and checked for expiration dates, spoilage, pilferage and shortages. At the time of this inventory, information collected on each drug is compared to the data in the daily expense register, bin cards and stock register. If any differences are found during inventory, a detailed analysis and enquiry is conducted and deficiencies corrected.

Storage of drugs The storekeeper and dispenser are responsible for inventory management and the storage of drugs and medical supplies. They are accountable to the Medical Officer Incharge of the Rural Health Center.

At the Basic Health Unit, the dispenser or Health Technician is responsible for inventory management and the storage of the drugs and medical supplies. They are responsible to the person in charge of the Basic Health Unit.

When drugs are received at the health facility, they should be checked for leakage, breakage, shortages and expiration dates. Drugs having the soonest expiration date should be kept at the front of the shelves and issued first. Drugs which have been classified as narcotics should be stored in a separate locked cabinet. Narcotics should be issued directly to patients and should not be kept in the dispensary.

Expired drugs (drugs which were not used prior to their expiration date) should be kept separate from other stock. These should be destroyed as soon as possible. In the Basic Health Units, expired drugs are destroyed by the Medical Officer Incharge of the Integrated Rural Health Complex. In the Rural Health Centres, expired drugs should be destroyed by the District Health Officer or Assistant District Health Officer. The quantities of the drugs destroyed are recorded under the "Issued" column of the bin card and stock register with the narration "Expired/Destroyed." This should be signed by the officials who destroyed the drugs.

Distribution of drugs The District Health Officer receives drugs from the Government Medical Stores Depot on an annual and supplementary basis throughout the year. Essential drugs are then supplied to the Rural Health facilities on a

quarterly basis. There are two alternative procedures for distributing these drugs. These procedures have been approved by the Provincial Health Departments of Punjab, Sind, NWFP and Baluchistan. The Health Officials who are responsible for the distribution of drugs for Integrated Rural Health Complexes could adopt one of these two procedures, depending on their situation.

Using the Rural Health Centre as a supply point When storage facilities are adequate at the Rural Health Centre, drugs for the entire complex can be received from the District Health Office within a few days after arrival from the Government Medical Stores Depot. This establishes the Rural Health Centre as the supply point for the Basic Health Units. Under this system, drugs are supplied to the Basic Health Units on a quarterly basis.

The quantity of each drug consumed in each Basic Health Unit is entered on the requisition form of the stock register. This quantity will vary from one Basic Health Unit to another, depending on average daily patient attendance.

The person in charge of the Basic Health Unit fills in the "quantity on hand" column of the requisition form, subtracts the total for each item from the "quantity consumed last quarter" and enters the difference in the "quantity required" column. After preparing the requisition form in duplicate, the Basic Health Units send both copies to the Rural Health Centre. The Rural Health Centre issues the drugs, records the quantity issued in the column provided for that purpose, retains the original of the requisition form and returns the copy to the Basic Health Unit with the drugs requested.

In this procedure, the Rural Health Centre will have to set aside a section in the storeroom for drugs for the entire complex and use a separate section for drugs for their own use.

The District Health Office as a supply point When adequate storage facilities are not available at the Rural Health Centres, drugs should be distributed to the Rural Health Centres and the Basic Health Units by the District Health Office on a quarterly basis. The procedure for requisitioning drugs from the District Health Office is the same as that which is followed by the Basic Health Unit when requisitioning drugs from the Rural Health Centre.

In both procedures, the quantity and type of drugs will

vary depending on the level in the Integrated Rural Health Complex. For example, a Rural Health Centre or Basic Health Unit with a doctor and a Basic Health Unit without a doctor require different drugs and the quantity of each drug may be different. With the adoption of list "A" of the Essential Drugs List, all Rural Health facilities should receive the same drugs according to the type of facility. The Essential Drugs List will make it easier to complete the requisition form.

Redistribution of drugs Drugs should be redistributed from health facilities that have a surplus or large quantity to other facilities so they can be consumed before they expire. Redistribution is the task of the storekeeper or dispenser.

Monitoring consumption A system for monitoring and redistributing drugs within an Integrated Rural Health Complex has been adopted by the Provincial Health Departments. Under this system, Rural Health Centres and Basic Health Units prepare a quarterly report on their use of drugs and current stock levels. The Basic Health Units submit this report to the Rural Health Centres to which they are attached.

The reports from all facilities in the complex are consolidated at the Rural Health Centre. This enables the Medical Officer in charge of the complex to redistribute any surplus drugs from one facility to another within the complex. If the surplus items are not needed by other facilities within the complex, the District Health Officer could then arrange to reallocate these drugs to other health facilities in the district.

19.18 A LIST OF REGISTERS AND REPORTS

I. *DISEASES/PATIENTS*

1. Out-patient Register
2. In-patient Register
3. Medico-legal Register
4. Operations Register
5. Emergency Register
6. Postmortem Register
7. Laboratory Tests Register
8. Dog Bite Register
9. Register for T.B. Patients
10. Malaria Record/Register/Reports
11. Abstract Register
12. Annual Return

II. *STOCK/STORES*

1. Drug Stock Registers

   - IRHC
   - Main Store, RHC/BHU
   - Dispensary
   - Emergency
   - Laboratory
   - Operation Theatre
   - T.B. Control
   - Afghan Refugees

2. Bin Cards
3. Daily Expense Register
4. Essential Drugs List
5. Medicines Indent Book
6. Quarterly Consumption Report of Drugs
7. Contingent Stock Register
8. Instruments/Equipment Stock Register
   - Main Store RHC/BHU
   - Dispensary
   - Laboratory
   - Operation Theatre
   - Dressing Room
9. Clothing Stock Register
10. Furniture Stock Register

III. *OTHERS/GENERAL*

1. Attendance Register
2. Salary Register
3. Cash Book
4. Dispatch Register
5. Visitor's Book
6. Office Order Register
7. Dak Book/Peon Book
8. Daily Register of letters received
9. Tour Notes Register of letters received
10. CHW Survey Register
11. MCH Survey Register
12. Vehicle/Motorcycle Log Book
13. Contingency Bill Register
14. Health Education Register
15. OPD Income Book Register

IV. *IMMUNIZATION*

1. Daily Vaccination Register for Static Centre
2. Daily Vaccination Register for Outreach
3. Permanent Vaccination Register for Static Centre
4. Permanent Vaccination Register for Outreach
5. Motivation Register
6. Registration Record Register
7. Stock Register for Vaccine/Instruments
8. EPI Contingent Stock Register
9. EPI Visitor's Book
10. Monthly Immunization Return
11. Monthly Immunization
12. EPI Articles Demand Form
13. Refrigerator Inventory Sheet
14. Sterilization Inventory Sheet
15. EPI Defaulters List
16. Registration Card
17. Advance Outreach Monthly Programme
18. Yearly Progress Chart
19. Monthly Surveillance Report

V. *WORLD FOOD PROGRAMME*

1. Ration Card
2. Register of Beneficiaries
3. Daily Distribution List to Beneficiaries
4. Monthly Report, Distribution Centre
5. Quarterly Report
6. Food Stock Register
7. Food Demonstration Register

VI. *MCH/FAMILY PLANNING*

1. Daily OPD Register
2. Family Folder Register
3. Family Folder Card
4. Antenatal Register
5. Antenatal Card
6. Birth Register
7. Confinement Register
8. Labour Room Register
9. Infant Register
10. Infant Case Card
11. Toddler Register
12. Toddler Case Card

13. Register of Cards Discarded
14. Death Register
15. Home Visiting Daily Register
16. Centre Total Register
17. Monthly Reports of Maternity and Child Welfare Centre
18. Annual Report of Maternity and Child Welfare Centre
19. Dais Training Register
20. UNICEF Medicine Stock Register
21. UNICEF Instruments Stock Register
22. Government Employment's Register
23. Health Talk Register
24. Family Planning Daily Attendance Register
25. Family Planning Medical/ Instruments Stock Register
26. Monthly Progress Report of Contraceptive and Delivery Services.

19.19 THE HEALTH TECHNICIAN'S RESPONSIBILITIES IN MAINTAINING RECORDS, REGISTERS AND REPORTS

Now that you have some knowledge about how information on health is gathered, organized and presented, you may be wondering what your responsibility is.

Your main responsibility lies in keeping an accurate record of day-to-day activities you are responsible for. You do not need to organize, summarize and present the data. This is done at the district, provincial, and federal level. However, if you do not provide accurate information, the work done at the district, provincial and federal level will be inaccurate and result in false conclusions. It is important that you fill out the records and registers accurately on a day-to-day basis, so that reports from the district, provincial and federal level will be accurate.

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GLOSSARY

Average: A single value that summarizes or represents the general significance of a set of unequal numbers; a middle point.

Bar chart: A chart for comparing different quantities with bars or rectangles representing the data.

Data: Factual information.

Denominator: The part of a fraction below the line; the bottom number.

Diary: A record of events or observations kept daily or at frequent intervals.

Frequency: The number of times a condition or fact repeats itself in a given time period.

Graph: A diagram that represents variations in data compared to another variable (time, numbers).

Health status: The health condition of a person.

Horizontal axis: The reference line of a graph or chart that goes from left to right.

Indicator: A group of values that taken together give an indication of the situation.

In-patient: A patient who is admitted to hospital.

Interval: The difference between two numbers.

Inventory: A list of goods or materials on hand.

Mean: The same as the average.

Median: A value in a set of values which is the middle point.

Numerator: A top number of a fraction.

Out-patient: Patient who visits a clinic or dispensary for treatment but is not hospitalized.

Percentage: A part of a whole expressed in hundredths.

Pie chart: A circular chart cut into segments that represent relative numbers.

Proportion: The relationship of one number or part to another.

Range: A series of things or values between two limits.

Rate: A fixed ratio between two things.

Ratio: A relationship in quantity or size between two or more things.

Record: To set down in writing.

Register: A written record containing regular entries of items.

Report: A detailed account or statement.

Requisition: The formal act of requiring or demanding something to be furnished or supplied.

Standard: Substantially uniform and well-established by usage.

Statistics: The collection, interpretation and presentation of data.

Stock: The equipment, materials or supplies of a facility.

Table: A systematic arrangement of data in rows or columns for easier reference.

Vertical axis: The reference line of a graph or chart that goes from down to up along one side.

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Review questions:

1. How is the health status of individuals or a community measured and compared?
2. Why is accuracy so important in filling out health forms?
3. Name the steps involved in the organization of health data from its collection to presentation in a frequency table.
4. What is a range?
5. What is a frequency table?
6. What is meant by interval of the data?
7. What is meant by the following terms?

   - An average.
   - A ratio.
   - A proportion.
   - A percentage.
   - A rate.

8. In what forms can data be presented? Describe each form.
9. What is the difference between a record, register and report?
10. List the types of records, registers and reports which are maintained at a RHC or BHU.

Suggested learning activities:

1. Fill out all the records and registers in the BHU and RHC.
2. For every home visit make an entry in the family health record.
3. Fill out the daily activity report form for every day worked.

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EVALUATION FORM

*CHAPTER*_____

Organization of content	[ ]	Appropriate
	[ ]	Inappropriate
Method of presentation	[ ]	Simple to understand
	[ ]	Difficult to understand
Amount of content	[ ]	Adequate
	[ ]	Inadequate

Any other comments:

Write a paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

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CHAPTER 20

THE HEALTH TECHNICIAN'S ROLE IN REFERRALS AND IN THE REPAIR AND MAINTENANCE OF THE HEALTH FACILITY

Objectives After completing this chapter you will be able to:

1. Describe what referral means.
2. Identify nine types of community resources.
3. List five types of information necessary in order to utilize each community resource.
4. Describe how to use a resource appropriately upon referral.
5. Describe the joint activities of the Health Technician and the individual or family to make each referral effective.
6. State what a proper method of referral is.
7. Describe the usual chain of referral in a health delivery system and state under which conditions you would not follow this.
8. State why the topic of maintenance of the health facility, the equipment and the supplies is important.
9. List five principles applicable to the maintenance of the facility, equipment and supplies.
10. Describe how rubber articles should be cared for.
11. Describe ways to care for glass articles.
12. Describe ways to keep the inside of the RHC or BHU clean.
13. Describe the cleaning and storing of linens and bed clothing.

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CHAPTER 20

THE HEALTH TECHNICIAN'S ROLE IN REFERRALS AND IN THE REPAIR AND MAINTENANCE OF THE HEALTH FACILITY

Referral means to direct or refer someone to a person or place for information or anything else required. In earlier chapters, when the needs of an individual and/or family were discussed, the resources appropriate to meet those needs were also discussed, with the emphasis on the importance of personal resources. This chapter will identify various community resources and describe how these resources could and should be used on a referral basis.

20.1 EXISTING COMMUNITY RESOURCES

Community resources are sources of information or services existing in the community. In this context, community means the village as well as the nation. Therefore, the resources discussed may be available locally in the same village or may be far away. The nature of the need determines what kind of resources are required. For some, the simple and limited health services of the BHU may suffice, but for others, with more complicated signs and symptoms of illness, referral to a teaching hospital may be necessary. This discussion relates to medical needs only.

In order help people in the community attain the highest level of health. Health Technicians will need to be aware of existing resources in health, education, social welfare, agriculture, industry, law enforcement and other areas, depending upon the nature of the identified needs. Some of the frequently utilized community resources are listed in the following table together with a list of the services they provide.

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TABLE 20.1 GENERAL INFORMATION ON COMMUNITY RESOURCES

Category	*Institutions*	*Services*
Health	Dispensaries, MCH centres, Sub-Health centres, Basic Health Units.	- Provide outreach services to the community via male and female health workers. - Provide simple and immediate medical diagnosis and treatment. - Provide preventive and MCH services including delivery. - Serve as a point for initiating referral to RHC and District Headquarters.
	Rural Health Centres.	- Promote illness prevention and good health. - Provide a limited amount of medical and surgical treatment. - Conduct health education sessions. - Provide school health coverage. - Carry out certain simple and routine laboratory tests on blood, urine and stool. - Serve as a storehouse for drugs and vaccines. - Serve as a distribution point for the World Food Programme. - Undertake medico-legal advice, post-mortem examinations. - Train students in Primary Health Care.

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TABLE 20.1 GENERAL INFORMATION ON COMMUNITY RESOURCES

Category	*Institutions*	*Services*
Health	District Headquarters/ Tehsil hospitals.	- Provide comprehensive medical and surgical services in all medical specialities. - Handle all complicated cases. - Carry out standardized laboratory and x-ray tests of all kinds. - Provide hospital training to physicians, nurses, Health Technicians and all other health workers. - Serve as a site for paramedical schools. - Receive referrals from the community, BHU and RHC in complicated and difficult cases.
	Teaching schools.	- Focus mainly on training physicians. - Provide medical and surgical services in all medical specialities. - Initiate medical services and research on new diseases and health problems.
Education	Elementary, High and Mosque schools. Technical or occupational training schools and institutions.	- Provide basic education to children locally. - Provide training of short duration in one or more subject. Upon completion of the training programme, boys and girls become eligible for employment.

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TABLE 20.1 GENERAL INFORMATION ON COMMUNITY RESOURCES

Category	*Institutions*	*Services*
Education	College and professional schools.	- Prepare students for professional careers.
	Adult literacy classes.	- Help adults learn to read and write.
Social welfare	Local colleges or small handicraft industries.	- Provide training for the development of certain skills in unskilled adults. - Provide small jobs locally.
	Banks, women's organizations and child welfare associations.	- Provide income-generating activities for women.
	Schools for the disabled and handicapped.	- Provide basic training on self-care. - Provide educational and occupational training. - Organize patient welfare services.
Agriculture	Small family-owned farms.	- Provide seasonal employment to locals.
	Large farms.	- Provide fulltime employment.
	Schools and colleges.	- Provide short-and long-term training. - Provide services to the nearby community upon request, such as group education. - Rent out heavy machines. - Have the latest information on irrigation, fertilizer, seeds, etc.

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TABLE 20.1 GENERAL INFORMATION ON COMMUNITY RESOURCES

Category	*Institutions*	*Services*
	Livestock and animal husbandry departments.	- Provide information and service on prevention and treatment of diseases in domestic animals.
Industry	Small local industries.	- Provide limited training and employment.
	Larger industries.	- Provide a variety of employment opportunities. - Supply products for the community. - May provide training. - Purchase local raw material if appropriate.
	Medical/health pharmaceutical industries.	- Produce and market commonly prescribed drugs and treatment supplies. - May produce or be able to obtain new or rare drugs or other medical supplies through their contacts. - Supply a certain amount of their products as samples without cost. - Conduct research on their products.
Law enforcement	Police stations and Thana.	- Provide information and general law enforcement. - Protect the citizens of the community. - Direct people to appropriate law enforcement sections according to their needs.
Religious	Mosques	- Serve as the place to gather and pray. - Provide religious education. - Provide information on the whole community.

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TABLE 20.1 GENERAL INFORMATION ON COMMUNITY RESOURCES

Category	*Institutions*	*Services*
		- Support and sponsor community activities. - Maintain a Zakat fund. - Distribute food to the deserving on certain specified occasions, such as Ramazan, Sabrat, Milad, Khabra Koram. - Provide aid and counseling to individuals and families in crisis situations due to disaster, death and illness. - Bring the community together by the Pesh Imam participating in services related to birth, marriage and death.
Transportation and travel	Buses, trains, roads and airports.	- Provide local and long distance transportation.
Nutrition	World Food Programme.	- Provides supplemental food: wheat, dry skim milk and oil to pregnant and lactating women and young children.
Local government	Union Council	- Issues certificates of birth, death, domicile and legal affairs. - Settles small disputes. - Maintains law and order. - Recommends and nominates candidates for admission to schools and colleges.

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20.2 SPECIFIC COMMUNITY RESOURCES

The community resources listed so far have been general. A detailed list of specific community resources as they exist in each locality has yet to be developed. Health Technicians, as pioneers in initiating and developing outreach activities, could develop this list as information about resources in the community is gathered. In developing this more specific list, you need to include the following items to make the list more useful:

1. Identifying information:

   - Name of the institution or service.
   - Location: Address and locating information relating to certain well-known landmarks. For example, near the mosque.

2. Who to contact: Name and title of a person.
3. What are the requirements for using this resource?

   - Is it for males or females?
   - What age group?
   - Who is eligible: those who are unemployed, unable to read and write, poor, have passed class eight, a resident of the village, district, etc.

4. How can one make use of this resource?

   - By applying in person.
   - By writing to request the service.
   - By referral from the community leader, Pesh Imam, government official, Medical Officer or anyone else.

5. When are the services of the resource available?

   - Usual government office hours.
   - Specific days of the week or month.
   - Specific times of the year.
   - Twenty-four hours around the clock.

For example, the World Food Programme operates from a BHU, RHC or a MCH centre. Any pregnant or lactating woman who is underweight and any malnourished child are eligible. The family needs to go to the centre and apply.

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20.3 *APPROPRIATE USE OF THE REFERRAL SYSTEM*

When members of the health team, including Health Technicians, refer an individual or a family to a person or place, they must make sure that the referral is appropriate. What this means is that one has to be sure that the identified resource will meet some of the identified needs. In order to be sure of this, the needs and resources should be quite specific. Specific requirements and the services available to meet them should be organized as a list.

It is not enough just to match the need with the resource. The next step is to use the resource appropriately. To do this, Health Technicians should outline their activities as well as those of the individual or family going to the source of help. These respective activities are listed on the following pages.

Health Technicians activities The Health Technician should go over the following points with the person(s) being referred:

- Identify all needs.
- Identify the possible resources.
- Provide locating information and directions on how to get there.
- Provide information on who to see. Give the name and title of the person.
- Explain what to say and how to say it. "I have been sent here by_____ for the purpose of _____ and I have a letter with me."
- Provide the letter or note. This is the referral form.
- Explain what to take, such as money for transport, lodging, food, registration forms, medicines etc.
- Explain the transportation. The BHU or RHC should have the schedule of buses and trains to major hospitals or centres which are frequently used for referrals.
- Ask the person to repeat and explain the above points to make sure (s)he has understood everything.

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Individual or family activities The individual or family must be able to:

- Take direction from the Health Technician.
- Understand all instructions.
- Take the required money, reports, specimens and referral slip.
- Get to the institution and seek out the appropriate person.
- Communicate relevant information to this person and hand over the report, referral slip, specimen etc.
- Cooperate with the person(s) helping him, interact well by answering all questions to the best of his ability, consent to being examined and participate in the testing procedures.
- Ask any questions or concerns.
- Understand the explanation of the problem or situation, what needs to be done and how and when to do it.
- Thank the person, leave the centre and return to the community.

Joint activities The individual or family and the Health Technician need to meet together and go over the following points:

- Evaluate the client's (individual or family) experience with the referral.
- Evaluate the client's understanding of the directions given.
- Evaluate the client's plans based on the directions and assistance provided.
- Determine if your help is required in implementing the plan. If so, provide it.
- Agree upon a schedule and method for evaluating the course of events leading to a solution of the identified need/problem.
- Check and evaluate the progress of the agreed method and schedule.
- Use your findings for your future activities.
- When existing needs or problems are met or solved satisfactorily and no new needs/problems are seen, conclude your services by summarizing your activities and tell the client to contact you if your services are required further.

20.4 REFERRAL METHODS

As already discussed, refer means to direct someone to a person or place. When a person is referred someplace, (s)he must interact with another person and must provide essential information. Most people are not able to transmit information properly. Therefore, it is best if the person who makes the referral communicates directly with the person who receives the referral. In some cases, this can be done over the telephone, but in other cases a written note which conveys essential information may be necessary.

Four kinds of information are required on all referrals, including:

1. Who started or initiated the referral.
2. Who is to receive the referral.
3. Who is the person being referred.
4. The reason for the referral.

If you want to organize this information into a format, it would look like this:

From: Name and title,
address/institution.

To: Name and title,
address/institution.

Person being referred: name and age.

Reason(s) for referral:

20.5 CHAIN OF REFERRAL

The purpose of a referral system is to help people get the needed care as close to home, and as soon as possible. Generally speaking, the Health Technician is to refer all medical cases to the Medical Officer at the BHU. However, keeping in mind the purpose of a referral system - to provide needed care quickly and close to home - the Health Technician, in the absence of a Medical Officer at a BHU, may refer cases to the RHC or even a Tehsil hospital if it is closer.

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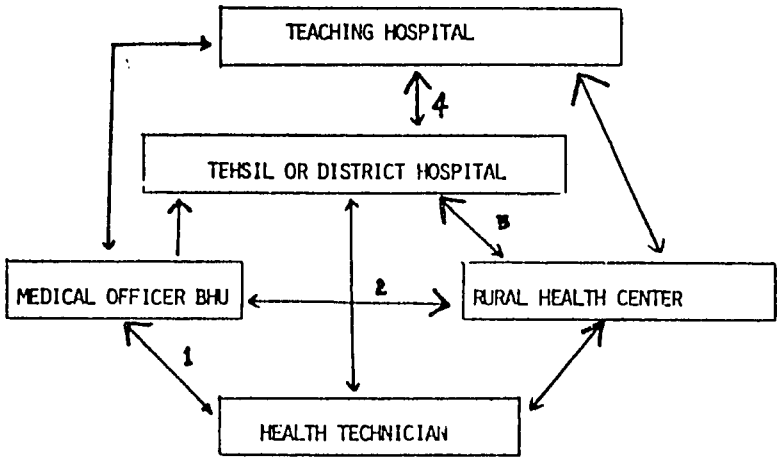

Fig. 20.1 *The usual chain of referral is indicated by numbers 1-4.*
(The size of the arrow represents the proportion of referrals).

Generally speaking, the chain of referral goes from the Health Technician to the BHU, from the BHU to the RHC, RHC to Tehsil or District hospital and Tehsil or District hospital to a Teaching hospital. Sometimes, however, following this chain of referral may delay services that are needed immediately. Therefore, in referring routine cases for diagnosis and treatment, this chain may be followed as applicable. But if the situation requires immediate serious medical care, then the person should be sent to the nearest appropriate facility.

20.6 MAINTENANCE AND REPAIR OF THE HEALTH FACILITY, SUPPLIES AND EQUIPMENT

All Health Technicians should know how to maintain the building(s) of the health centre as well as who is responsible for reporting and requesting repairs and maintenance. In addition to the maintenance of the facility, Health Technicians also need to be familiar with appropriate methods of cleaning, storing and maintaining equipment and supplies. You and the Medical Officer are responsible for the proper maintenance of the facility, including the supplies and equipment.

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A number of principles need to be followed in order to keep the facility and equipment in good condition. These are:

- The health facility should set an example of a health promoting environment.
- The government facility, supplies and equipment should be used with the same care and concern that you have for your own personal items.
- Supplies and equipment should be kept in working condition, ready for use when required.
- An accurate account of all equipment and supplies should be kept.
- Know the proper procedure for ordering drugs, supplies and equipment.
- Know the proper procedure for requesting service for maintenance and repair of the building.

The health facility as an example All health facilities should be an example of a healthful environmental living and should look attractive. In order to accomplish this, the following duties should be performed:

- Maintain the cleanliness of the centre, inside as well as outside.
- Make sure that the toilets are working properly for patients and visitors.
- Be sure there is plenty of drinking water available for patients and visitors.
- Provide a handwashing facility for visitors and patients.
- Make sure that waste is disposed of properly (refer to the Environmental Health chapter).
- Have a vegetable and/or flower garden within the compound.

Utilization of government property As Health Technicians, you need to use government property with the same concern and care that you use with your own property. This means:

- Be careful and economical in the use of equipment, supplies, water and electricity. Use them properly and when necessary. Do not use anything unnecessarily or wastefully.
- Clean, disinfect and follow manufacturer's instructions for all equipment.

Keep things available and in working and ready to use condition:

- Clean, dry and store everything after each use.
- Know the procedure for getting repairs done and request repairs when you notice that something is not in working condition.
- Replace all broken items or submit an order request.
- Keep all broken or out-of-order equipment for evaluation later by the Medical Officer.
- Repair all torn sheets, towels and curtains immediately.

Keep an accurate account of all equipment and supplies:

- Take a monthly inventory of all furniture, linen and other things.
- Keep an accurate record of what goes out and is returned by the dhobi.
- Fill out the appropriate stock register when you use certain supplies.
- Report losses, breakage, and wear and tear.

Procedure for ordering equipment, drugs and supplies:

- The Medical Officer or Health Technician in charge of the BHU submits a request to the Medical Officer Incharge at the IRHC for all necessary items periodically, monthly or quarterly.
- For items that are used up rapidly, the person in charge needs to submit a request well before the supply is fully consumed.

Procedure for requesting services for maintenance and repair of the building and premises:

- Maintenance and repair of the health facility and residential buildings is done by the Civil Works Department (CWD) on an annual basis.
- The person in charge of the BHU and RHC submits a request to the Medical Officer Incharge at the IRHC.
- The Medical Officer Incharge recommends, on a priority basis, the repair and maintenance work that needs to be carried out to the District Health Officer (DHO).

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- The DHO prepares a proposal for civil work on the RHC and communicates this to the Deputy Director of Health Services for approval and introduction to the Provincial Building Department.
- A meeting between the Superintendent of Engineering and the DHO is held to finalize the proposal. Decisions made at this meeting are communicated to the Executive of Engineering.
- The Executive of Engineering issues the necessary instructions to the concerned Sub-Division Officer for carrying out the required maintenance and repair.
- The Medical Officer Incharge at the RHC is informed of the work to be carried out so that he may know when the work will be done and monitor the completion of it.
- There is a fund available for use in minor repair work of each health facility, at the discretion of the person in charge.

Plants and trees:

- Take an inventory of all plants.
- Do not allow trees to be cut or destroyed.
- If a big tree falls, inform the Forest Department and request removal. Send a copy of the letter to the DHO.

20.7 *MAINTENANCE OF COMMONLY USED ARTICLES*

Rubber gloves These are expensive and require special care:

- After completing a procedure, gloves should be washed while on the hands of the wearer before removing them to prevent adherence of blood or other organic material.
- After washing them thoroughly with soap and water or disinfectant:
  - Hang them on a string and let them air dry.
  - Powder the gloves lightly to prevent them from sticking.
- Powdering your hands before putting on the gloves makes it easier to slip them on and helps prevent tearing.

Other rubber articles:

- These should be boiled for 15 minutes unless they are used for surgical procedures. In this case sterilization by steam under pressure is indicated.
- Ryle's tube (NG tube), rubber sheets and hot water bottles should be washed with soap and water and then air dried.
- Some rubber articles should be stored only after lubricant is used to prevent the sides from sticking to each other.

Glassware:

- Immediately rinse with cold water after each use to remove any debris.
- Contact with soap and disinfectant should not be longer than is necessary for cleaning.
- Glassware should to be boiled or sterilized if its contents will be used internally.
- Instructions for boiling syringes and needles is covered in the Immunization chapter.

Cleaning and dusting of floors Floors are considered contaminated and should be cleaned daily:

- Floors should be first swept and then mopped with Phenol solution.
- Allow them to air dry.
- The best time for cleaning floors is the end of the day so that they can air dry.
- Clean as necessary.

Walls and ceilings These should be cleaned with a broom or mop periodically to remove dust and cobwebs.

Cleaning and dusting of furniture

- Furniture should be dusted each day. The end of the day may be more appropriate for cleaning than the beginning of the day.
- Anything spilled on furniture should be cleaned immediately.

Cleaning of linen and bed clothing:

- Wash all washable articles in soap and water and sun dry.
- Finis (insecticide) is used for blankets.

- The matresses and pillows of the examining tables should be exposed to sunlight once a week for approximately two hours. All mattress and pillow surfaces should be exposed to the sun.
- A mattress on which a person with a communicable disease has been lying should have all sides exposed to sunlight for six hours before someone else uses it.
- Mattresses, blankets and linen should be stored with "Camphor" or "Phenol."

In this chapter, general information is given on making appropriate referrals and maintaining a health facility adequately. You will have to obtain specific information from your own observations and experiences and by consulting reference materials as your needs arise.

GLOSSARY

Inventory: A list of goods on hand.

Medico-legal: Relating to both medicine and law.

Referral: A means of directing a person or persons to another person or place.

Relevant: Having importance to the matter at hand.

Resource: A source of supply or support.

Post-mortem: An examination of a body after death for determining the cause of death.

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Suggested learning activities:

1. Make three appropriate referrals for each category below and follow up on these cases.

Health			
Education or welfare			
Other			

2. Either perform or supervise the cleaning and maintaining of:

   - The RHC/BHU.
   - Rubber and glass articles.

3. Develop a table consisting of 5 to 10 specific community resources in your assigned area and include:

   - Identifying information.
   - Who to contact.
   - How one can make use of this resource.
   - When the services are available.

Review questions:

1. What does the word referral mean?
2. What do you have to know before referring a person to a community resource?
3. How many types of community resources exist?
4. Is a BHU a community resource? Give reasons for your answer.
5. When would you refer someone to a District Headquarter hospital instead of a BHU or RHC?
6. What services does a District Headquarter or Teaching hospital have to offer?
7. Why do you need to know about social, educational and agricultural resources in your community?
8. What services does the Livestock and Animal Husbandry Department provide? When would you refer someone to this Department?
9. If someone wants to rent a heavy machine for agricultural purposes, where would you refer that person?
10. If a person needs a job, where would you refer him or her?
11. Where would you send poor families for meals on certain days of the year?
12. What services does the Union Council provide?
13. Where would one go to obtain a domicile record?
14. What essential information do you need about a community resource before you can refer a person to it?
15. How can you be sure that you are making an appropriate referral?
16. Do you have a role in following-up a referral? Explain.
17. What is the best referral method?
18. What is the purpose of a referral?
19. What is the Health Technician's role in making a referral?
20. Why does a Health Technician need to know about maintenance and repair of a health facility?
21. What seven principles do you need to follow in maintaining a RHC/BHU facility and its equipment?
22. Describe how you would care for the following:
    - Rubber articles.
    - Glass articles.
    - Stainless steel articles.
    - Bedding and linen.
23. What is the Health Technician's responsibility in keeping the RHC and BHU clean?

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EVALUATION FORM

*CHAPTER*_____

Organization of content [ ] Appropriate
[ ] Inappropriate

Method of presentation [ ] Simple to understand
[ ] Difficult to understand

Amount of content [ ] Adequate
[ ] Inadequate

Any other comments:

Write a paragraph stating:

How useful the work plan has been.

In what way could this work plan be improved?

CHAPTERS 13 - 20

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