

PW. ACJ-719

106246



Deliverable 2

Protocols for essential obstetric and neonatal care



A

BASIC EOC RESOURCES

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- 2. ETHICS AND PRACTICES OF OBSTETRICS**

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1. MATERNAL MORTALITY

INTRODUCTION

Every day, at least 1,600 women die from the complications of pregnancy and childbirth. That is 585,000 women, at a minimum, dying every year. The majority of these deaths, almost 90%, occur in Asia and sub-Saharan Africa; approximately 10% in other developing regions; and less than 1% in the developed world. Between 25% and 33% of all deaths of women of reproductive age in many developing countries are the results of complications of pregnancy or childbirth.

Of all the health statistics monitored by the World Health Organization, maternal mortality is the one with the largest discrepancy between developed and developing countries. While infant mortality, for example, is almost seven times higher in the developing world, maternal mortality is on average 18 times higher. In addition to the number of deaths each year, over 50 million more women suffer from maternal morbidity, acute complications from pregnancy. For at least 18 million women, these morbidities are long-term and often debilitating.

The goal of the Safe Motherhood Initiative is to cut maternal mortality by half by the year 2000. We know what to do to reduce the tragedy of maternal mortality; what we need is the political will and strong, concerted action.

A GLOBAL SCOURGE

Worldwide, there are 430 maternal deaths for every 100,000 live births. In developing countries, the figure is 480 maternal deaths for every 100,000 live births; in developed countries there are 27 maternal deaths for every 100,000 live births.

The highest maternal mortality figures are found in Eastern and Western Africa, where in some countries more than 1,000 women die for every 100,000 live births. The lowest recorded figures are in Northern Europe, where they range from 0-11 maternal deaths for every 100,000 live births.

These maternal mortality ratios reflect a woman's risk of dying each time when she becomes pregnant; because women in developing countries bear many children and obstetric care is poor, their lifetime risk of maternal death is much higher, almost 40 times higher than in the developed world.

In addition to maternal mortality, half of all perinatal deaths* are due primarily to inadequate maternal care during pregnancy and delivery. Each year, 8 million neonatal deaths and stillbirths occur, largely the result of the same factors that cause the death and disability of their mothers: poor maternal health, inadequate care, poor hygiene and inappropriate management of delivery, as well as lack of newborn care.

* Stillbirths, fetal deaths after 28 weeks' gestation, and infant deaths up to seven days after births.

Women's Lifetime Risk of Dying from Pregnancy Related Complications	
Region	Risk of Dying
Africa	1 in 16
Asia	1 in 65
Latin America & Caribbean	1 in 130
Europe	1 in 1,400
North America	1 in 3,700
All developing countries	1 in 48
All developed countries	1 in 1,800

IN ADDITION TO DEATH, THE BURDEN OF DISEASE IS HUGE

Forty percent or more of pregnant women may experience acute obstetric problems during pregnancy, childbirth and the postpartum period. An estimated 15% of pregnant women develop life-threatening complications.

As many as 300 million women, more than one-quarter of all adult women now living in the developing world, suffer from short or long-term illness related to pregnancy and childbirth. Death and disability related to maternal causes account for 18.5% of the burden of disease among women of reproductive age in developing countries.

Long-term complications of pregnancy and childbirth include uterine prolapse, fistulae (see below), incontinence, pain during intercourse and infertility.

Up to 80,000 women each year develop fistulae, holes in the birth canal, that allow leakage of urine or faeces from the bladder or rectum, making a woman permanently incontinent. Between 500,000 and one million women now live with fistulae; many become social outcasts, turned out of homes and rejected by their husbands and families.

Obstructed labor can result in permanent nerve damage and loss of sensation and muscle deterioration in the feet and legs; women worst affected often become crippled. Infections, including sepsis, can lead to pelvic inflammatory disease (PID), the symptoms of which include chronic pain, damage to the reproductive system, infertility and a range of gynaecological disorders.

WHY ARE WOMEN DYING?

Most maternal deaths could be prevented if women had access to basic medical care during pregnancy, childbirth and the postpartum period. This implies strengthening health systems and linking communities, health centres and hospitals to provide care when and where women need it.

Most maternal deaths occur either during or shortly after delivery, yet this is the time when women are least likely to receive the health care they need. Quality health care during and immediately after the critical period of labor and delivery is the single most important intervention for preventing maternal and newborn mortality and morbidity.

ANTENATAL CARE

Millions of women in developing countries lack access to adequate care during pregnancy. Only 65% of women in developing countries receive antenatal care: 63% in Africa; 65% in Asia; and 73% in Latin America and the Caribbean. In developed countries, 97% of women receive antenatal care. Such care can detect and manage existing diseases, recognize and treat complications early, provide information and counseling on signs and symptoms of problems, recommend where to seek treatment if complications arise, and help women and their families to prepare for childbirth.

Low utilization rates for maternal health services are caused by a range of factors: distance from health services; costs, including the direct fees as well as the cost of transportation; drugs and supplies; multiple demands on women's time; and women's lack of decision-making power within the family. The poor quality of services, including poor treatment by health providers, also makes some women reluctant to use services.

DELIVERY CARE

Each year, 60 million deliveries take place in which the woman is cared for only by a family member, an untrained traditional birth attendant, or no one at all. Only 53% of deliveries in developing countries take place with the assistance of a skilled birth attendant (a doctor or midwife). Yet having a skilled health professional at delivery is essential for making motherhood safer. A skilled birth attendant can ensure hygiene during labor and delivery, provide safe and non-traumatic care, recognize complications and manage them effectively or refer the woman to a higher level of care.

POSTPARTUM CARE

Only a small proportion of women in developing countries, less than 30%, receive postpartum care. In very poor countries and regions, as few as 5% of women receive such care. In developed countries, 90% of new mothers receive postpartum care. Yet the early postpartum period is the time most maternal deaths occur. Care during the postpartum period provides opportunities to check that mother and baby are doing well, provides support to breastfeeding, and enables health workers to detect and manage any problems early.

WHAT CAN BE DONE?

Ensure access to maternal health services. Most maternal deaths, millions of cases of disease and disability, and the deaths of at least 1.5 million infants each year could be prevented through: basic maternal care for all pregnancies, including a skilled attendant (doctor or midwife) at birth; prevention and treatment of complications during pregnancy, delivery and after birth; postpartum family planning and basic neonatal care. Such care would cost about \$3 per person in low-income countries.

ADDRESS GENDER INEQUALITIES AND THE POVERTY AND DISCRIMINATION WOMEN FACE THROUGHOUT THE WORLD.

Women's status must be improved everywhere and full value accorded to women's reproductive and productive roles, specifically in contributing to household and national economies. Family and community attitudes that prevent women from receiving proper care during pregnancy and delivery must be changed.

SITUATION IN EGYPT

Most recently, in 1992-1993 the Ministry of Health and Population conducted a national maternal mortality survey. The specific objectives of the survey were:

- * **To obtain** a national figure of maternal mortality in Egypt.
- * **To identify** the main causes of maternal mortality.
- * **To determine** the avoidable factors contributing to these maternal deaths.
- * **To develop** preventive programmes to reduce maternal deaths.

The survey highlighted the following findings and conclusions:

- * The National Maternal Mortality Ratio, estimated to be 174 per 100,000 live births
- * The ratio varied widely according to the region.
 - Lower Egypt 132/100,000 LB
 - Upper Egypt 217/100,000 LB
 - Metropolitan Area 233/100,000 LB
- Within the Metropolitan Governorates, Suez Governorate has the highest ratio (564), followed by Alexandria (281), Cairo (200) and Port Said (152)
- Within Upper Egypt, ASSIUT Governorate has the highest ratio (544), followed by Qena (386), and SOHAG (307)
- Within Lower Egypt, Ismailia Governorate has the highest ratio (325), followed by Gharbia (213), and Behera (171).
- 92% of maternal deaths were considered on medical review to have had avoidable factors.

TWO MAJOR AVOIDABLE FACTORS EMERGED FROM THE STUDY:

- (1) **DELAY IN SEEKING MEDICAL CARE** by women or her family (patient factor) The delay was responsible for 42% of all maternal deaths.
- (2) **SUBSTANDARD CARE** on the part of medical Professionals, contributed to 47% of all maternal deaths.

THE MAJOR CAUSES OF MATERNAL DEATHS ARE:

- | | | |
|---|--------|---|
| - Hemorrhage | 31.9% | |
| - Hypertensive Disorders of Pregnancy | 15.9% | |
| - Genital Sepsis | 8.4% | |
| - Cesarean Section | 6.1% | |
| - Abortion | 4.5% | |
| | | |
| - <u>Direct Causes</u> of Maternal Deaths (65%) | N= 499 | } Total Deaths: 825 cases
Maternal Deaths: 772 cases
Incidental: 53 cases |
| - <u>Indirect Causes</u> of Maternal Deaths (25%) | N= 193 | |
| - <u>Unknown Causes</u> of Maternal Deaths (3%) | N= 26 | |
| - <u>Missing Questionnaires</u> (7%) | N= 54 | |
| | | |
| - About 70.6% of maternal deaths occur in medical facilities, indicating that a majority of mothers are already seeking qualified help with complicated delivery. | | |

League Table of MMR by Region

1	Lower Egypt	132
→	Egypt Metropolitan	233
2	Upper Egypt	217
	Egypt	174

League Table of MMR

1	Kafr El Sheikh	96
2	Qaliubia	103
3	Daqahlia	112
4	Menoufia	117
5	Sharqia	124
6	Aswan	135
7	Damietta	146
8	Fayoum	147
9	Beni Suef	151
10	Minya	151
11	Port Said	152
12	Behera	171
→	Egypt	174
13	Cairo	200
14	Gharbia	213
15	Giza	221
16	Alexandria	281
17	Sohag	307
18	Ismailia	325
19	Qena	386
20	Assiut	544
21	Suez	564

Frontier Governorates are not included

Egypt is not unique in having a problem with maternal mortality. Indeed, 99% of all maternal deaths worldwide occur in developing countries, where the risk of death in pregnancy is made worse by high fertility, low literacy, poverty, short spacing and lack of high-quality medical services. Egypt may, however, be in the comparatively unique position of being readily able to do something to reduce maternal mortality.

Considerable progress has already been made in one area that prevents Maternal Death. Family planning child spacing, and the increased use of contraception observed over the last few years, has an effect in three ways:

- (a) The number of pregnancies is reduced, thereby decreasing the number of times for women to face the risk of maternal death.**
- (b) High-risk pregnancy at older ages and higher parities can be avoided.**
- (c) Unwanted pregnancy, which may end up in legally induced abortion can be forestalled.**

Nonetheless, preventing pregnancy cannot be the only solution to reduce maternal mortality, as women will always want some children. The National Maternal Mortality Survey indicates that maternal mortality is remarkably sensitive to standards of obstetric care and is one of the health problems most directly and powerfully influenced by the availability of modern medical care.

In this respect, Egypt has a large number of medical doctors and a considerable health infrastructures. In addition, there is a wealth of information on the extent and causes of maternal mortality which could be a good basis for moving to the next phase – designing and implementing programs that actually prevent maternal deaths.

Reducing maternal mortality in Egypt, therefore, may not require massive new financial resources, rather, available personnel and facilities must be redirected to best meet the needs identified in the survey.

Currently the informations provided by the survey are being used by the Ministry of Health, senior policy makers, eminent members of medical profession and international donors to implement changes that will benefit women in Egypt.

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2. Medical Ethics *

INTRODUCTION

In any learned profession to set specific standards of conduct, which guides the behavior of its members, it is important to adhere to a code of ethics. Medicine has enjoyed such standards, which have been the hallmark of the good physician and a safeguard of the patient's welfare since its earliest recorded history. Since time immemorial, medicine as a profession has been accorded a place of the highest order, and those who practice it have been held as bearing a holy responsibility ⁽¹⁾. The first existing documents that dealt with medical ethics are the Egyptian papyri (from about the 16th century B.C.); they outlined methods of knowledge, attitude and practice, namely establishing diagnosis, making decisions about whether to treat, and what therapy is appropriate. As long as physicians followed the rules, they were held nonculpable should the patient die. On the other hand, if physicians transgressed, tried a new form of treatment, and the patient died, they might lose their own lives. Both Egyptian and Babylonian societies issued rules and sanctions to control the activities of physicians and surgeons ⁽²⁾.

Medical ethics are based on the moral, religious and philosophical ideals and principles of the society in which they are practiced. It is therefore not surprising to find what is ethical in one society, might not be ethical in another society. It is mandatory for the practicing physicians and critics of conduct to be aware of such background before they make their judgment on different medical practice decisions. Ethical discourse is necessary for any society to form its responses to any scientific or medical innovation ⁽³⁾. Responsible policy makers in the medical profession in each country have to decide on what is ethically acceptable in their own country guided by the international guidelines which should be tailored to suit their own society. Truly ethical conduct consists of personal searching for relevant values that leads to an ethically inspired decision.

The physician is always concerned about the legal basis of his acts undertaken on the basis of ethical precepts. He should always keep the distinctions and potential conflicts between legal and ethical duties. What is legal might not be ethical. Law rarely establishes positive duties such as beneficence. On the contrary professional medical ethics make beneficence a primary obligation ⁽⁴⁾.

The four Ethical Principles:

The four principles of ethics as known today are autonomy, beneficence, non-maleficence, and justice. Autonomy incorporated respect for individuals freedom of choice. It involves autonomy of competent persons and protection of those incapable of autonomy. The latter prevent the improper use of the powerless within a community as the mentally defective and institutionalized persons like occupants of hospital charity beds or prisoners. Beneficence upholds others' welfare. Non-maleficence is the duty not to do harm to other persons⁽⁵⁾. Justice, which the law claims primarily to serve, involves distributive justice and corrective justice. The distributive justice is concerned with the fair allocation of burdens and benefits, while corrective justice is concerned with the compensation of the wrong act⁽⁶⁾.

There are tensions among autonomy, beneficence, non-maleficence, and justice the basic rules of bioethics. They are not mutually exclusive; they must be balanced⁽⁷⁾. In broad terms one principle always takes precedence over the other three. For utilitarian, the principles of beneficence and non-maleficence are always upper most. The egalitarian always gives precedence to the principle of justice.

To these four principles of bioethics, a last one may be added, that is the human person should not be subject to commercial exploitation.

Medical Ethics through the ages with special emphasis on the Muslim World:

The primary sources of Sharia', namely the Qur'an, and Sunna, had stressed upon the four universally accepted principles of ethics all through the Islamic history. The Islamic Sharia' has also given attention to the principle of protection of the human subject against commercial exploitation.

The Hippocratic oath clearly indicated the two principles of beneficence and non-maleficence. The oath, which for a long time every practicing Physician had to swear before he practiced medicine, stated that "The regimen I adopt, shall be for the benefit of the patients, to the best of my power and judgment, not for their injury or for any wrongful purpose". It also stated: "I will not give a deadly drug to anyone though is asked of me, nor will I lead the way such council and likewise, I will not give a woman a pessary to produce abortion".

Moses Maimonides who was an Egyptian scholar and doctor and had been the private physician to Saladin the Great (1135-1204 AD) developed an oath and prayers. His oath clearly stated the two principles of beneficence and non-maleficence. It also stated: "I swear to fight through my work so as to reduce danger, noise, attempts at impairment of purity of earth, air and water pollution and fight destruction of natural beauty, mineral elements and wildlife⁽⁸⁾.

Abu El Hassan Bin Radwan who was an Egyptian scientist and doctor five hundred years ago had advised that a physician should distinguish himself with seven virtues.

He included the three principles of beneficence, non-maleficence and justice among these virtues ⁽³⁾.

The medical oath which was adopted on the occasion of opening of the medical school in Cairo during the rein of the founder of the Modern Egypt, Mohammed Ali Pasha (1806-1848 A.C.) included the three principles of beneficence, non-maleficence and justice ⁽³⁾.

Contemporary Medical Ethics in the Muslim World:

As a result of the accelerated progress of technology and science and the marked development in medical bioengineering, there has been a need for expansions of the code of medical ethics. The long held Hippocratic Ethics during the past two decades could not stand the challenge of the complex ethical problems evolving because of many factors namely scientific advances and technology, civil rights, public education, and the effect of law and economics on the medical practice. The heterogeneity had become a reality because of the worldwide immigration and migration movements. Consequently the last two decades had witnessed changes in medical ethics much more than in the entire history of medical ethics. The oath developed by the Egyptian Medical Syndicate which doctors had to swear before they embark on medical practice, includes the three ethical principles namely beneficence, non-maleficence and justice.

The oath of the Muslim doctor, accepted by the First International conference on Islamic Medicine, held in Kuwait in 1981, and published by the Islamic Medical Organization, Kuwait, 1982, included the main four ethical principles, namely autonomy, beneficence, non-maleficence and justice ⁽⁸⁾.

The oath of the Muslim doctor adopted by the Islamic Medical society of North America included the main four ethical principles ⁽⁸⁾. It clearly indicated that the medical profession is a sacred profession, which deals with human brain, dignity and life, which should be greatly respected (autonomy).

Recently interest in bioethics has emerged in the Muslim world and, though not on a wide scale, but it certainly started. This is indicated by the appearance of quite a number of articles from the Muslim World in the literature dealing with this topic ⁽¹³⁾, establishment of some ethics committees in some Muslim countries, development of bioethics curriculum and establishment of Islamic Bioethcis network in the Muslim World.

Medical Ethics and Research:

The rapidly expanding scientific knowledge had placed the medical research at a top priority for the practicing physicians. Though scientific excellence may be one of the objectives of medical research, yet the patient's health is always the physician's first consideration. It is not therefore surprising that adherence to the ethical principles in

medical research involving the human subject is just as important as it is in therapeutic medical practice.

Though therapeutic medical practice in Islamic countries had paid attention in one way or another to the main ethical principles, medical research had neglected these principles to some extent. It is not uncommon to come across unethical biomedical research conducted in the Muslim countries. The essence of the problem is not that the physicians did not care about their patients but that they had placed the value of "scientific knowledge" and the pursuit of high technology medicine above the welfare of the research subjects⁽⁹⁾. Also the scarcity of research ethical committees to review these researches before they are conducted on human subjects and scientific journals ethical committees to review these papers before they are published for the protection of individuals from potential harm had played a role in the appearance of some scientific papers which did not adhere to the ethical principles⁽¹⁰⁾. To fill up this gap, recently the International Islamic Center for Population Studies and Research, Al-Azhar University, Cairo in collaboration with the Ford Foundation and the WHO Special Program of research Development and research Training in Human reproduction (HRP) Geneva, with the support of several other organizations, had called for and held the first International Conference on Bioethics in Human Reproduction Research in the Muslim World during the period 10-13 December, 1991, with a participation of about 200 physicians, demographers, lawyers, theologians, sociologists, ethicists, policy makers and representatives of International Organizations from all over the World. A proposed guideline on Bioethics in Human Reproduction Research in the Muslim World based on the presentation, discussions and the recommendations of this meeting had been adopted and published⁽³⁾. In this document the four ethical principles of autonomy, beneficence, non-maleficence and justice have been outlined for those conducting research in human reproduction on human subjects. Though these guidelines have observed the social, cultural and religious background of the Muslim societies, yet they adhered to the frame of internationally accepted guidelines have observed proposed by the declaration of Helsinki I and Helsinki II, the WHO and the Council for International Organization of Medical Science (CIOMS) in 1982⁽¹¹⁾, taking into consideration the marked development which occurred in the field of human reproduction and Medically Assisted Conception. It is hoped that, the different Universities, Health Institutes and research in the different Muslim countries will adopt this new guideline, and its recent updating in the international meeting on "Ethical Implications of Use of Assisted Reproduction Technology for treatment of Human Infertility", organized by the IICPSR (International Islamic Center For Population Studies and Research) in collaboration with ISESCO (Islamic Educational Scientific and Cultural Organization), August 1997.

It is quite evident from the above discussion that what we know today as ethical principles have definite roots, which extend thousands of years back. Islamic religion had specifically stressed these principles in its primary sources of Sharia'. The medical profession had recognized then principles all along its long history. Diversion from these principles by Muslims and practicing physicians had been not uncommon all over the world. This coupled with the rapid development of science and technology resulted in emerging of an increasing number of ethical problems in medical practice and research.

This necessitated the urgent need for secularization and legislation of ethical guidelines to be observed by practicing physicians and researchers.

* This article is written and presented by **Prof. Dr. Gamal Abou El Serour, FRCS (ED), FRCOG, Prof. Of Obstet. & Gynaecology and Infertility Surgery, Director, International Islamic Center for Population Studies and Research Al Azhar University**

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3. INFECTION CONTROL

SIZE OF THE PROBLEM IN EGYPT:

(MMR= 13.5/100,000)

60 maternal deaths were associated with sepsis. These formed 12% of all direct obstetric deaths and 8% of all maternal deaths.*

(NMMS 1992-1993. MOHP/CSP. 1994)

(MMR= 6/100,000)

26 deaths were (indirectly) associated with infections & parasitic diseases, representing 14% of all indirect obstetric deaths, and 4% of all maternal deaths.*

(NMMS 1992-1993. MOHP/CSP. 1994)

DEFINITION OF INFECTION:

- Is the deposition of organisms in tissues and their growth with an associated host reaction.
 - ◀ If the response of the host is slight or nil, this is usually termed "colonization"
 - ◀ Growth of organisms associated with a tissue reaction (i.e. inflammation) is usually referred to as "sepsis" or "clinical infection"
 - ◀ For infection to occur: **organisms from a source must reach a susceptible site in sufficient number**

INFECTION PREVENTION:

- To decrease infection by microorganisms and prevent transmission of life threatening diseases such as Hepatitis B and AIDS. Barriers can be constructed between the host and microorganisms.

PROTECTIVE BARRIERS FOR INFECTION PREVENTION:

- Hand washing
- Gloves and gown
- Antisepsis
- Decontamination (General)
 - ◀ Cleaning
 - ◀ Disinfection
 - ◀ High level disinfection
 - ◀ Sterilization
- Waste disposal
- Housekeeping

3.1 HAND WASHING

OVERVIEW:

- Hand washing is the most effective method for preventing the transfer of bacteria between personnel and patients within the hospital.
- Or it is the single most important means of preventing spread of infection in the hospital.

INDICATIONS:

- **Before:**
 - ◁ Any invasive procedure
 - ◁ Direct contact with a client
 - ◁ Putting on sterile or high level disinfected gloves for surgical procedures.
- **After:**
 - ◁ Any situation in which hands may be contaminated such as:
 - Handling used instruments
 - Handling contaminated items e.g. dressings, urinals, ... etc.
 - Touching mucus membrane, blood or other body fluids
 - ◁ Removing gloves as gloves may have invisible holes or tears
 - ◁ Physical contact with patients under isolation precautions or their Equipment
- **Before & After:**
 - ◁ Handling in-use patient devices e.g. catheters and respiratory equipment
 - ◁ Specimen collection
 - ◁ Caring of susceptible patients

PLANNING:

- **Goals:**
 - ◁ Cleans all skin surfaces thoroughly
 - ◁ Prevent contact with contaminated objects

- Certain basic principles that must be observed:
 - ◀ The first hand wash of the day should last for five minutes or as long as it takes to ensure that hands are clean and disinfected.
 - ◀ Nails should be short and nail polish should not be used.
 - ◀ Weak detergent can safely be used for hand washing provided there is no skin cut or abrasion.
 - ◀ A defined method of washing is advised (fig. 1)

- Agents (skin disinfectants):
 - ◀ Hexachlorophane, e.g. ster-zac DC
 - ◀ Iodophore and iodine-containing compounds, e.g. Betadine, providone-iodine & tinc. iodine.
 - ◀ Quaternary ammonium compounds, e.g. Dettol, cetavlon
 - ◀ Biguanides (chlorhexidine), e.g. Hibiscrub, savlon (chlorhexidine/citrimide mixture), etc.

- Requirements
 - ◀ Soap or disinfectant
 - ◀ Warm running water
 - ◀ Paper towel

IMPLEMENTATION:

A- Routine or hygienic hand washing:

- Washing with soap or detergent for 15-20 seconds is generally effective in removing transient microorganisms provided that an effective technique is used.
- Push wrist-watch and long uniform sleeves up above wrists. Remove jewelry, except a plain band, from fingers and arms.
- Keep finger nails short and filed.
- Stand in front of sink, keeping hands and uniform away from sink surface. Use sink with easily accessible faucet. If hands touch sink during hand washing, repeat the process.
- Turn on water. Press foot pedals to regulate flow and temperature “warm”.
- Avoid splashing water on uniform.
- Wet hands and lower arms thoroughly under running water. Keep hands and forearms lower than the elbow level during washing.

- Apply 3-5ml of the formulation to the cupped hands and carry out steps 1-6 (fig. 1) one or more times.
- Each step consists of three strokes backwards and forwards.
(N.B. Each step consists of five strokes in surgical hand washing).
- Rinse hands and wrists thoroughly, keeping hands down and elbows up.
- Dry hand thoroughly with a good quality paper towels, from fingers up to wrists and forearms.
- Discard paper towel in proper receptacle.
- Turn off water with foot or knee pedals.
- Hold the hands up and away from clothing.
- An alternative and more effective method is the application of 70% ethanol or 60-70% isopropanol with or without added disinfectant.
 - ◀ The hands and fingers are rubbed together with the preparation until dry, ensuring that all surfaces are covered as described above (fig. 1).
 - ◀ This method provides a convenient, rapid and effective alternative to hand washing in situations where there is no gross soiling of the hands or where a sink is not readily available or during an outbreak of infection.

B- Surgical hand washing:

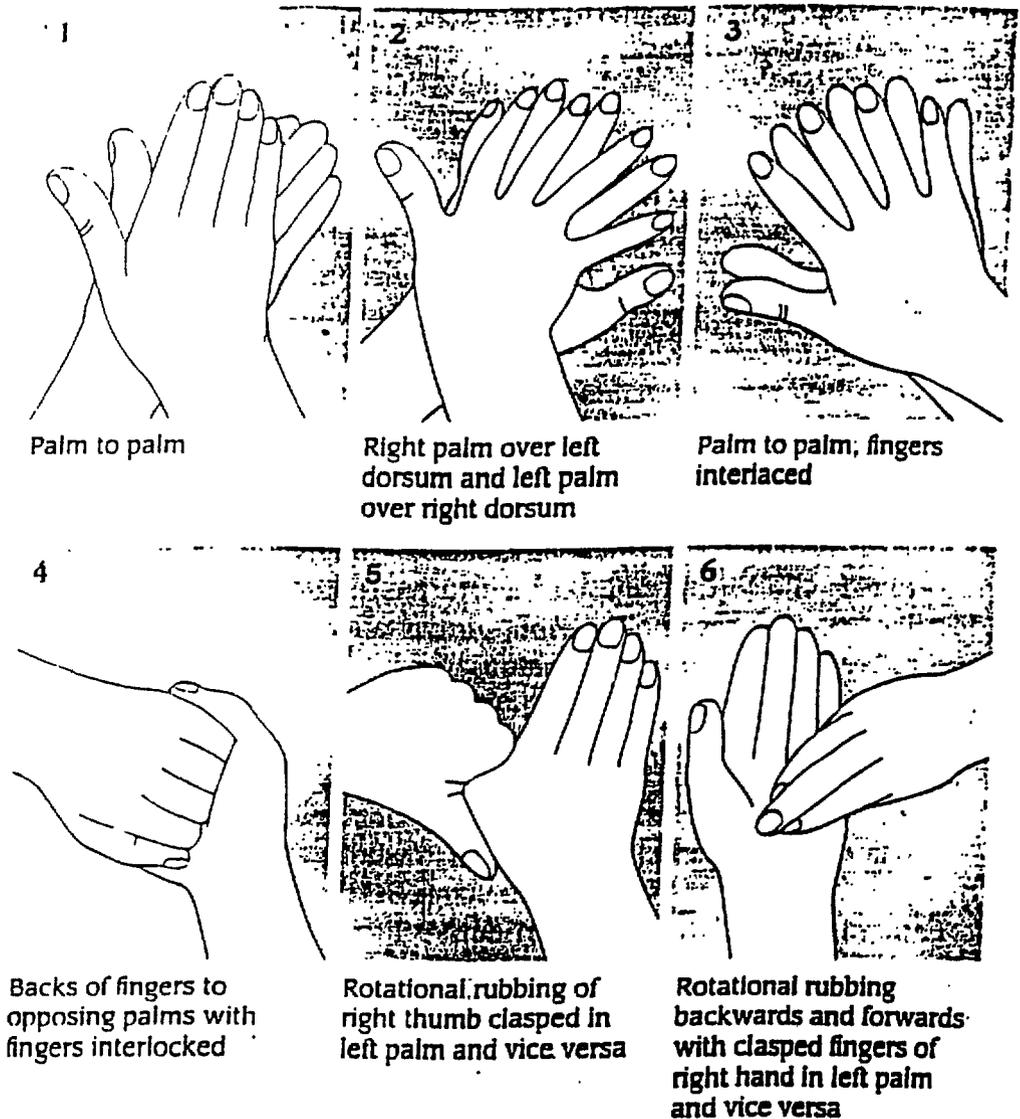
- It requires the removal or killing of transient skin-microflora and a substantial reduction and suppression of the resident population.
- It is indicated before any surgical procedure.
- Preparations that are in current use include 4% chlorhexidine-detergent and a povidone-iodine solution containing 0.75% available iodine.
- Turn on the water and ensure that it is warm and the flow is moderate.
- Wet and lather hands and forearms with the selected agent. Keeping hands above level of elbows during entire procedure.
- With hands under running water, clean under nails with nailbrush. Discard after use.
- The same hand washing steps (fig. 1) are recommended with the wrist and forearm being included for a period not less than 2 minutes.

- Rinse hands and arms thoroughly under running water. Remember to keep hands above elbows.
- If a brush is used, it is to be used only for the first scrub of the day.
- Scrub each hand with brush for 45 sec. Holding brush perpendicular to fingers. Scrub all sides of each digit, including web spaces between, and palm and back of hand.
- Then using the same brush, scrub each arm to 5cm above the elbow dividing the arm into thirds: scrub each lower forearm 15 seconds, each upper forearm 15 sec. and 5 cm above each elbow 15 seconds.
- Discard brush and rinse hands and arms thoroughly.
- Using a second brush. Scrub each hand for 30 seconds. Then use the same brush to scrub each arm up to the elbow by dividing the arm in half: scrub each lower forearm 15 sec. and each upper forearm 15 sec.
- Discard brush and rinse hands and arms thoroughly. Turn off water with foot pedal .
- Keep hands higher than elbows and away from the body.

Note:

- ◀ Repeated scrubbing tends to damage the skin and may be associated with an increase in the numbers of resident organisms, possibly allowing staph. aureus to colonise the hands.
- ◀ A more rapid effect can be obtained with an alcoholic solution (e.g. 0.5% chlorhexidine in 60-70% ethanol or isopropanol) rubbed vigorously into hands and forearms until dry. Two applications of 5 ml are recommended. A single application of the preparation between cases on the operating list should be sufficient. The defined method (fig. 1) of application of the agent should be used.

CHEMICAL DISINFECTION IN HOSPITALS



Apply 3–5 mL of the formulation to the cupped hands and carry out steps 1–6 one or more times using the following procedure. Each step consists of three strokes (routine or hygienic hand-disinfection) or five strokes (surgical hand-disinfection) backwards and forwards. (See also Ayliffe GA, *et al.*, 1978; Lawrence JC, 1985.)

Figure 1 Hand washing and disinfection technique

3.2 GLOVES & GOWN

GLOVES OVERVIEW:

- Once thorough handwashing is completed, sterile gloves act as an additional barrier to bacterial transfer.

PLANNING:

- Basic principles:
 - ◁ As a precaution gloves should be worn by all staff prior to contact with blood and body fluids from any client.
 - ◁ A separate pair of gloves must be used for each client to avoid cross contamination.
 - ◁ Using new, single use disposable gloves is preferable.
 - ◁ In areas where gloves are not readily available, Latex gloves can be washed with soap and water, dried, powdered and reused.
 - ◁ Gloves can be washed and high level disinfected by boiling before reuse.
 - ◁ Sterilization is preferable for surgical procedures.
 - ◁ Do not use gloves which are cracked, peeling or which have detectable holes or tears.
 - ◁ A recent report found that surgeons wearing single gloves had a blood hand contact rate of 14%, while surgeons wearing double gloves had a rate of 5%.
- Equipment:
 - ◁ Package of sterile gloves in proper glove size
 - ◁ Flat working surface e.g. table above waist level
- Implementation: the open and closed gloving methods
 - ◁ **Open method**
 - Arrange glove package on flat surface.
 - Remove the outer package wrapper by carefully peeling apart sides.
 - Grasp the inner package and lay it on a clean, flat surface above waist level
 - Identify right and left glove.
 - Glove dominant hand first.
With thumb and first two fingers of non-dominant hand grasp edge of cuff of glove for dominant hand. Only touch the inside surface of gloves.

- Carefully push the fingers of the dominant hand into the glove leaving a cuff and being sure cuff does not roll up wrist.
- With gloved dominant hand, slip fingers underneath second glove's cuff.
- Carefully pull second glove over non-dominant hand.
- Once second glove is on, interlock fingers. Cuffs usually fall down after application. Be sure to touch only sterile sides.

◀ Closed method

- With the thumb and forefinger collect the glove pack from inside the gown.
- Put the pack on the sterile towel and open flat.
- Through the gown, grasp the right glove with the left hand. Turn the right hand so that the palm is upward. Place the palm of the glove to the palm of the hand, with the thumb of the glove over the thumb of the hand.
- Grasp the palm side of the glove cuff with thumb and forefinger, through the gown.
- With the left hand, still inside the cuff, grasp the top cuff of the glove and pull it over the fingers.
- Push the fingers into the glove. Grasp the sleeve and glove and pull on.
- Repeat the procedure for the left hand.
- Gloves can now be adjusted.

GOWN OVERVIEW:

- As a precaution, gowns should be worn by all staff prior to handling a patient.
- They could be of benefit in situations where soiling of staff clothing is likely when dealing with patients with infected or discharging wounds or when cleaning soiled material.
- Gowns should be sterilized in sterile container or drum.

IMPLEMENTATION:

- Pick up the gown firmly. It should be packed inside out to avoid the risk of touching the outside with the ungloved hand.
- Find the top of the gown.
- Hold the gown at arm length away from your body and allow the gown to unfold by itself.

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- Open shoulder seams, and insert each hand through the armholes.
- Extend the hands towards the gown cuff.
- Have a circulating nurse. Tie the back tapes of the gown.

3.3 ANTISEPSIS

DEFINITION:

- Is the prevention of infection by killing or inhibiting the growth of microorganisms on the skin and other body tissues.

OVERVIEW:

- Antiseptic solutions kill or inhibit many resident microorganisms including most vegetative bacteria and many viruses.
- Antiseptic solutions are designed to remove as many microorganisms as possible without damaging or irritating the skin or the mucus membranes on which they are used.
- Some antiseptic solutions have residual effects, meaning, their killing action continues for a period of time after they have been applied to the skin or mucus membrane.
- With the exception of iodine and alcohol, antiseptic solutions should never be used to disinfect inanimate objects such as instruments and reusable gloves.
- Personnel with allergies to antiseptics or detergents may use plain soap followed by an alcohol rub.
- Antiseptic solutions should be reserved for certain situations such as:
 - ◀ Surgical scrub, skin or vaginal preparation for procedures, Norplant insertion and removal, IUD insertion and for injection.
 - ◀ Hand washing prior to touching clients who are susceptible to infection such as immuno-suppressed persons.

STORAGE AND DISPENSING OF ANTISEPTICS:

- Antiseptic solutions can be contaminated with microorganisms such as staphylococcus, gram-negative bacilli and some endospores.
- Contamination of antiseptic solutions can be prevented by the following:
 - ◀ Do not store gauze or cotton wool in aqueous antiseptics as this promotes contamination.

- ◀ Antiseptics should be prepared in a small reusable container for daily use.
- ◀ Wash the reusable container thoroughly with soap and water and dry before refilling.
- ◀ Antiseptics should be stored in a cool, dark area. Never store chemicals in direct sunlight or in excessive heat.

PREPARING A STERILE FIELD:

- It is an area considered free of microorganisms and may consist of a sterile tray or a surface draped with a sterile towel.
- A sterile drape establishes a sterile field around a treatment site.
- The drape provides a larger work surface for placing sterile supplies and for manipulating items with sterile gloves.

PLANNING:

- Develop goals for the procedure.
 - ◀ Maintain sterility of all items added to sterile field.
- Prepare the following equipment and supplies:
 - ◀ Large package containing sterile items or kit into which items are to be added.
 - ◀ Supplies specific to procedure, e.g. Dressings, sterile needles, catheter, or instrument sets.
 - ◀ Sterile container
 - ◀ Sterile solutions specific to procedure, e.g. alcohol or betadine solution.
- Check dated labels or chemical tapes for date when sterilization period expires.
- Position client comfortably for specific procedure to be performed.
- Explain to client purpose of procedure and importance of sterile technique.

IMPLEMENTATION:

- Apply cap and mask
- Select a clean work surface above waist level.
- Assemble equipment at bedside.

- Wash hands thoroughly
- Prepare a sterile drape (described later).
- Prepare the skin with the selected antiseptic solution according to the recommended steps (mentioned later).

Activity of Antiseptics (skin disinfectants) against micro-organisms

Group	Gram positive	Most gram negative	TB	Viruses	Fungi	Endo Spores	Relation speed of action	Surgical scrub	Skin prep.	Comments
<u>Alcohols</u> eg. 70% ethanol, 60-70% isopropanol	Very good	Very good	Good	Good	Good	None	Fast	Yes	Yes	Not for use on mucus membrane
<u>Chlorhexidine</u> eg. Hibiscrub, Hibitane & savlon (chlorhexidine /citrimide mixture)	Very good	Good	Poor	Fair	Fair	None	Slow	Yes	Yes	Has good persistent effect
<u>Hexachlorophane</u> eg. Ster-Zac DC & Ster-Zac powder	Good	Poor	None	Fair	Poor	None	Slow	Yes	No	Rebound growth of bacteria may occur
<u>Iodine preparation</u> eg. Aqueous iodine, tinc. iodine	Very good	Very good	Good	Good	Good	Poor	Intermediate	No	Yes	Not for use on mucus membrane

Group	Gram positive	Most gram negative	TB	Viruses	Fungi	Endo Spores	Relation speed of action	Surgical scrub	Skin prep.	Comments
<u>Iodophors</u> eg. Betadine, Disadine, Videne	Very good	Good	Good	Good	Good	None	Slow	Yes	Yes	Can be used on mucus membrane

PREPARING STERILE WORK SURFACE:

- ◁ Preparing sterile kit or package containing sterile items on clean, flat work surface above waist level.
- ◁ Open sterile kit or package containing sterile items.

- Sterile kit:
 - ◁ Grasp or separate edge of paper wrapper on sterile kit and slowly tear it pulling away from your body. Do not touch inside of wrapper.

- Package:
 - ◁ Remove tape or seal with expiration date.
 - ◁ Grasp outer surface of tips of outer most flap.
 - ◁ Open outer most flap away from body, keeping arm out stretched and away from sterile.
 - ◁ Grasp outside surface of edge of first side flap.
Open side flap pulling to side, allowing it to lie flat on table surface. Keep your arm to side and not over sterile surface.
 - ◁ Repeat steps for second side flap.
 - ◁ Grasp outside border of last and inner most.
 - ◁ Stand away from sterile package and pull flap back, allowing it to fall flat on table.
 - ◁ Use opened kit or package wrapper as sterile field.

- Preparing a sterile drape:

Note: This technique may be optional but is useful when a large work surface is desirable).

- ◁ Place pack containing sterile drape on flat surface and open as described above for package.
With fingertips of one hand pick up the folded top edge of the sterile drape.
- ◁ Gently lift the drape up from its outer cover and let it unfold by itself without touching any object.
- ◁ With the other hand grasp an adjacent corner of the drape and hold it straight up and away from your body.
- ◁ Holding the drape, first position the bottom half over the intended work surface.
- ◁ Allow the top half of the drape to be placed over the work surface last.

CLIENT SKIN PREPARATION PRIOR TO SURGICAL PROCEDURES:

- While skin cannot be sterilized, skin preparation with antiseptic solutions minimizes the number of microorganisms on the client's skin that may contaminate the surgical wound and cause infection.

STEPS FOR SKIN PREPARATION PRIOR TO SURGICAL PROCEDURE:

- Do not remove hair from the operative site unless absolutely necessary. If hair removal must be done, trim the hair close to the skin surface immediately before surgery. Shaving increases the risk of wound infection as the tiny nicks in the skin provide an ideal setting for microorganisms to grow and multiply.
- Ask the client about allergic reactions before selecting an antiseptic solution.
- Thoroughly clean the client's skin with soap and water before applying an antiseptic.
- Apply antiseptic as:
 - ◀ Savlon, Betadine
 - ◀ Iodine (1-3%) followed by 60-90% alcohol
- Using dry, disinfected forceps and cotton soaked in antiseptic, thoroughly clean the skin by gently scrubbing. Work from the operative site outward for several inches.
- Do not allow the antiseptic to pool underneath the client's body (This step reduces skin irritation).
- Allow the antiseptic to dry before beginning the procedure.

STEPS FOR SKIN PREPARATION PRIOR TO INJECTION:

- Cleanse skin with 60-90% ethyl or isopropyl alcohol
- With a fresh cotton swab and alcohol solution, wipe the injection site thoroughly using a circular, over lapping motion starting at the centre.
- Allow to dry before giving the injection.

3.4 DECONTAMINATION

DEFINITION:

- Decontamination is a process which removes or destroys micro-organisms to render an object safe.
- It includes cleaning, disinfection and sterilization.

DEFINITIONS:

• **CLEANING:**

◁ It is a process which removes foreign material (e.g. soil, organic material, micro-organisms) from an object.

• **DISINFECTION:**

◁ It is a process which reduces the numbers of pathogenic micro-organisms, but not necessarily bacterial spores from inanimate objects or skin, to a level which is not harmful to health.

• **HIGH LEVEL DISINFECTION:**

◁ It is often used for a process which kills *Mycobacterium tuberculosis* and enteroviruses in addition to other vegetative bacteria, fungi and more sensitive viruses.

• **STERILIZATION:**

◁ It is a process which destroys all micro-organisms including bacterial spores.

Note:

The level of decontamination should be such that there is no risk for infection when using the equipment. The choice of the method depends on a number of factors, including type of material of object, number and type of organisms involved and risk of infection to patient or staff.

3.5 CLEANING

OVERVIEW:

- Cleaning is a process which removes foreign material (e.g. soil, organic material, micro-organisms) from an object.
- It is the most effective way to reduce the number of microorganisms on used soiled instruments and equipment.
- Both sterilization and high-level disinfection procedures are not effective without prior cleaning.

MANUAL CLEANING:

- Cold water is preferred as it will remove most of the protein material (blood, sputum ... etc) which would be coagulated by heat or disinfectants.
- Instruments should be cleaned with a soft brush in soapy water to remove all foreign matter. It is important to do this cleaning below the surface of the water to prevent the release of aerosoles.
- Use of detergent is important for effective cleaning, since water alone will not remove protein, oils and grease.
- The use of hand soap is discouraged because the fatty acids in soap react with minerals in hard water leaving a residue or scum (insoluble calcium salt) which is difficult to remove.
- Do not use abrasive cleaners or steel wool as these products can scratch or pit metal or stainless steel.
- After cleaning, instruments should be thoroughly rinsed with water to remove soapy residues which can interfere with chemical disinfection.
- Gloves should be worn while cleaning instruments and equipment.

ENVIRONMENTAL CLEANING:

- Floors, surfaces, sinks and drains should be cleaned with warm water and detergent. Routine use of disinfectants is unnecessary.
- If there is spillage (e.g. blood, sputum), disinfection before cleaning is sometimes recommended in high risk areas or following spillage from a known infected patient.
- Clean/wipe the surface using 0.5-1% sodium hypochlorite or other chlorine releasing agent (5000 – 10000 PPM of Cl_2) “household bleach”.
- Gloves should be worn.
- Release of chlorine gas from disinfection of large spillage can be hazardous to staff.
- If spillage is immediately removed, general disinfection of the room is not necessary, thorough cleaning will suffice.

3.6 a) DISINFECTION

OVERVIEW:

- Disinfection is the process that eliminates most, but not all disease-causing micro-organisms.
- It is the process used to reduce the number of micro-organisms but not usually of bacterial spores.
- It does not necessarily kill or remove all micro-organisms but reduces their number to a level which is not harmful to health. The term is applicable to the treatment of inanimate objects and materials and may also be applied to the treatment of the skin, mucous membranes and other body tissues and cavities.

3.6 b) HIGH LEVEL DISINFECTION

OVERVIEW:

- High level disinfection (HLD) will destroy all microorganisms (including vegetative bacteria, Tuberculosis, yeasts and viruses) except some bacterial endospores.
- Methods of HLD:
 1. Boiling in water
 2. Soaking instruments in various chemical disinfectants.

Note: Organic matter (serum, blood, pus or faecal material) interfere with the antimicrobial efficiency of either method. The larger the number of microbes present the longer it takes to disinfect. Thus scrupulous cleaning before disinfection is of greatest importance.

HIGH LEVEL DISINFECTION BY BOILING:

- Thermal disinfection (by boiling) is preferred whenever possible. It is generally more reliable than chemical processes, leaves no residues, more easily controlled and non-toxic.
- Boiling will not reliably kill all endospores and thus will not achieve sterilization.
- Boiling “100° C” for at least 5 minutes (holding time) is a simple and very reliable method for the inactivation of micro-organisms including hepatitis B virus, human immunodeficiency virus and mycobacteria. Provided it is carefully carried out it is a high level disinfection procedure.
- Instructions:
 - ◀ Decontaminate and clean all instruments or equipment to be disinfected.
 - ◀ Completely submerges precleaned objects in the water. Adjust the water level so that there is at least 2.5cm of water above the instruments.

Note: For items which float in water (e.g. plastic syringes or rubber items):
Place items in a bag made of plastic netting or nylon netting. Cotton bags are less desirable because they dry more slowly after use.
Place a weight in the bag (a speculum or other metal instrument will do), so that all items in the bag are at least 2.5cm below the surface of the water.

- ◀ Close lid over pan and bring water to a gentle, rolling boil.
- ◀ Start timer and record the time a rolling boil begins. No objects or water should be added after timing starts.
- ◀ Lower heat to keep water at a rolling boil.
- ◀ Boil instruments for 20 minutes starting from the time a rolling boil begins.
- ◀ Addition of a 2% solution of sodium bicarbonate helps to prevent corrosion of the instruments and utensils.
- ◀ After boiling for 20 minutes, remove objects and netted bag with dry forceps.
- ◀ If cheater forceps are used these should be boiled (or autoclaved) with the holder at least daily and stored dry.

Note: Never leave boiled instruments in water which has stopped boiling (as the water cools and steam condenses, air and dust particles are drawn down into the container and may contaminate the instruments).

- ◀ Air dry disinfected items in a clean area of the room, away from flying insects, dust particles and contaminated surfaces.

- ↖ Use objects immediately or store for up to one week in a covered, dry, HLD container.
- Preparing and HLD container:
 - ↖ To prepare an HLD Container, boil (if small), or fill it with 0.5% chlorine solution and soak for 20 minutes, rinse thoroughly with boiled water, then air dry before use
- Protecting the life of instruments which are frequently boiled
 - ↖ Lime deposits may form on metal instruments which are frequently boiled.
 - ↖ By following these steps, this problem can be minimized:
 - Boil the water to 10 minutes at the beginning of each day before use. (This precipitates much of the lime in the water before objects are added).
 - Use the same water throughout the day, adding only enough to keep the surface at least 2.5 cm above the equipment to be disinfected.
 - Drain and clean the boiler at the end of each day to remove lime deposits in the boiler. Standing water promotes growth of bacteria and algae.

HIGH LEVEL DISINFECTION BY CHEMICALS:

- The main requirement for chemical disinfection is for heat-labile equipment where single use is not cost effective.
- Endoscopes (laparoscopes) and other instruments that would be damaged by boiling can safely undergo HLD using chemical disinfectants such as 2% glutaraldehyde for 20 minutes, 6% hydrogen peroxide for 20 minutes, 0.2-0.35% peracetic acid for 5 minutes.
- Chemical disinfection of needles and syringes should be avoided because chemical residues (unless completely removed by rinsing) may interfere with the action of medications being injected.
- The object must be thoroughly rinsed with sterile water after disinfection. If sterile water is not available, freshly boiled water can be used. After rinsing, items must be kept dry and well protected from being recontaminated.
- Other products frequently used to disinfect equipment are 1 – 2% phenol (e.g. phenol) and lysol (5% carbolic acid). Phenolics and carbolic acid are low level disinfectants and should be used only to decontaminate environmental surfaces when chlorine solutions are not available.
- When it is not possible to immerse an item (a surface), wiping with a clean cloth soaked in the chemical agent may be used, followed by rinsing and drying.

On a clean surface alcohol is rapidly bactericidal and rinsing is not required. Alcohol combined with a detergent is more effective as it prevents micro-organisms from being trapped in organic material.

- Alcohols and iodophors are not classified as high-level disinfectants.
- Mercury solutions (such as mercury lavrel), are too toxic to use as either disinfectants or antiseptics.
- Products that should not be used as high-level disinfectants are.
 - ◀ Acridine derivatives (gentian or crystal violet)
 - ◀ Cetrimide (cetavlon)
 - ◀ Cetrimide with chlorhexidine gluconate (savlon)
 - ◀ Chloroxylenol (dettol).
- Operating instructions:
 - ◀ Decontaminate, thoroughly clean then dry all equipment and instruments to be disinfected.
 - ◀ Cover all items completely with correct dilution of properly stored disinfectant.
 - ◀ Soak for 20 minutes.
 - ◀ Rinse well with boiled water and air dry.
 - ◀ Store for up to one week in high level disinfected, covered container or use immediately

- As a possible alternative for unwrapped instruments or utensils, a domestic pressure cooker may be used. Holding time at least 30 minutes.

Note: Allow all items to dry before removing.

- Steam is an effective sterilant for two reasons:
 - ◁ Saturated steam is an extremely effective “carrier” of thermal energy.
 - ◁ Steam can soften any resistant outer protective layer of the microorganisms, allowing coagulation of the sensitive inner portions of the organism.
- Sterilization by steam requires four conditions:
 - ◁ Adequate contact
 - ◁ Sufficiently elevated temperature
 - ◁ Proper time
 - ◁ Sufficient moisture.
- Operating instructions:
 - ◁ Decontaminate, clean and dry all instruments to be sterilized. All jointed instruments should be in the opened or unlocked position. To prevent dulling of sharp points and cutting edges, wrap the sharp edges and needle points in gauze before sterilizing.
 - ◁ Instruments should not be held tightly together by rubber bands or by any other means that will prevent steam contact with all surfaces.
 - ◁ Arrange packs in the chamber to allow free circulation and penetration of steam to all surfaces.
 - ◁ When using an autoclave, it is best to wrap clean instruments or other clean objects in a double thickness of muslin or newsprint (unwrapped instruments are only sterile if used immediately after removal from the autoclave, unless kept in a covered, sterile container). If using a pressure cooker or kerosene-powered (non-electric)cooker bring water to boil until steam escapes from the pressure valve only; turn down heat but keep steam coming out of pressure valve.
 - ◁ Sterilize for 30 minutes for wrapped objects, 20 minutes for unwrapped objects. The temperature should be 121°C (250°F); the pressure should be 106 Kpa. Sterilization must always be continuous without interruption (i.e. the temperature must never be allowed to drop below 121 °C even for a second).
 - ◁ Wait 20 to 30 minutes to permit the sterilizer to cool sufficiently. Then open the lid to allow steam to escape. Allow instrument packs to dry completely before removal, which may take up to 30 minutes.
 - ◁ To prevent condensation when removing the packs from the chamber, place sterile trays and packs on a surface padded with paper or fabric.
 - ◁ After sterilizing, objects wrapped in cloth or paper are considered sterile for one week only if kept dry, one month if sealed in a plastic bag. Unwrapped objects must be used immediately.

- Problem solving:
 - ◀ If steam escapes from the safety valve instead of the pressure valve. The pressure valve must be cleaned and inspected.
 - ◀ If steam escapes from under the lid. The gasket (rubber ring) must be cleaned and dried or replaced.
 - ◀ If steam escapes from the safety valve or under the lid, the autoclave is not working correctly, and the autoclave is merely a boiling pot.

STERILIZATION BY DRY HEAT:

- Dry heat is ideal for sterilizing reusable needles and glass syringes. (Also for ointments, powders, oils etc).
- Use only for items that can withstand a temperature of 170°C.
- In dry heat, death of microorganisms occurs with the slow burning-up (coagulation) of the protein in microorganisms
- A hot air oven equipped with a fan or conveyor will ensure even distribution of heat.
- Operating instructions:
 - ◀ Decontaminate, clean and dry all instruments to be sterilized.
 - ◀ If desired, wrap instruments in cotton muslin or aluminum foil or place in a metal lidded container. (Wrapping helps prevent recontamination prior to use). Cotton muslin can be used if temperatures in the oven's chamber do not exceed 204°C.
 - ◀ Place instruments in metal containers or on trays in oven and heat to desired temperature.
 - ◀ After the desired temperature is reached, begin timing.
 - ◀ The following temperature / time ratios are recommended:

180° C	(340° F)	60 minutes
170° C	(320° F)	120 minutes
 - ◀ Depending upon the temperature selected, the total cycle time (preheating, sterilization time and cool-down) will range from about 2 ½ hours at 180° C to 3 ½ hours at 170° C.
 - ◀ After cooling remove loose items with sterile forceps / pickups, and store in sterile covered containers.

CHEMICAL STERILIZATION (COLD STERILIZATION):

- Chemical methods of sterilization are used for instruments for which heat sterilization is unsuitable, i.e. thermolabile items such as flexible fibre-optic endoscopes and many plastic devices.
- Sterilization takes place by soaking at least 3 hours in a 2% alkaline glutaraldehyde or at least 24 hours in 8% formaldehyde solution.
- Glutaraldehyde, such as Cidex, often are in short supply and expensive, but they are the only practical sterilants usable for some instruments, such as laparoscopes, which can not be heated.
- Although formaldehyde is more toxic than glutaraldehyde, the vapors of both chemicals are irritating to the skin, eyes and respiratory tract.
- Rinsing of treated instruments with sterile water after use of the chemicals is essential.
- When using either formaldehyde or glutaraldehyde gloves should be used, exposure time limited and both chemicals used only in a well-ventilated area.
- Do not dilute with chlorinated water as a dangerous gas (bis-chloromethyl-ether) is produced.
- Operating instructions:
 - ◀ Decontaminate, clean and dry all instruments to be sterilized.
 - ◀ Prepare a fresh glutaraldehyde solution by adding the powder or liquid supplied with the solution and / or diluting according to the manufacturers instructions.
 - Available solutions of formaldehyde (which contain 35 – 40% formaldehyde) should be diluted with boiled water 1:5 (final solution contains about 8% formaldehyde).

Note: Do not dilute with chlorinated water.

- ◀ Using a container with a lid, cover clean instruments and other clean objects completely with the solution.
- ◀ Leave for at least 3 hours in a 2% glutaraldehyde
- ◀ Leave for at least 24 hours in 8% formaldehyde
- ◀ Remove objects from the solution with sterile large forceps, rinse in sterile water, air dry.
- ◀ Wrap in sterile paper or cloth without touching either the sterilized instruments or the inside of the sterile wrap or place in a covered sterile container.
- ◀ Store in a sterile container with a lid if not used immediately.

- Chemical sterilization with paraformaldehyde:
 - ◀ Paraformaldehyde, a solid polymer of formaldehyde, may be vaporized by dry heat in an enclosed area to disinfect or sterilize objects.
 - ◀ This process is especially well suited for sterilizing endoscopes (laparoscope).

OTHER STERILIZATION METHODS:

- Radiation:
 - ◀ Ionizing radiation, electron beams and gamma radiation are used on a commercial basis for the sterilization of a wide variety of prepackaged hospital articles. The items are exposed to a source of gamma rays, usually Cobalt-60, within a thick-walled brick chamber. The total sterilizing time is measured in days.
- Gas:
 - ◀ The sterilizing gas (occasionally pure ethylene oxide but more usually 10 – 15% ethylene oxide mixed with an inert gas, e.g. carbon dioxide) is pumped into a chamber containing the items for sterilization. Total sterilizing and cycle times, at 60° C with high humidity (over 70%), takes many hours.
 - ◀ This method can be used for a large range of heat-labile materials, e.g. implants, electrical apparatus, and anaesthetic machines and equipment.
 - ◀ Ethylene oxide gas is toxic and potentially explosive if recommended safety precautions are not followed.

3.8 WASTE DISPOSAL

OVERVIEW:

- Domestic and clinical waste are likely to contain moisture and protein which will allow organisms to multiply. Since Gram-negative bacilli are commonly present and will grow more readily than other organisms, these will usually predominate regardless of the source of the waste material. All waste should therefore be regarded as heavily contaminated and handled with care.
- Proper handling of waste items minimizes the spread of infection to clinic personnel and to the local community.
- Wastes from family planning and health care facilities may be non-contaminated (paper, trash, boxes, bottles and plastic containers) or contaminated (blood, pus, urine, stool and other body fluids).
- Persons handling wastes should wear heavy gloves.

TIPS FOR HANDLING WASTE CONTAINERS:

- Use non-corrosive washable containers with covers.
- Place waste containers at convenient places for users.
- Equipment which is used to hold and transport wastes must not be used for any other purpose.
- Wash all waste containers with a disinfectant cleaning solution (0.5% chlorine solution).
- When possible, use separate containers for waste to be burned and waste not to be burned.
- Use heavy work gloves when handling waste.
- Wash hands after handling wastes.

HOW TO DISPOSE OF DOMESTIC WASTE:

- Non-contaminated wastes "Domestic waste" should be transported to disposal sites in covered containers (e.g. black plastic bags, the tops of which should be

securely closed when full). It is important that bags are not over filled so that they can be properly sealed.

HOW TO DISPOSE OF CLINICAL WASTE:

- Clinical waste should include all material predictably contaminated with microbes known to cause specific human infections, and not normally found in substantial numbers in the environment e.g. material contaminated with blood, excreta or secretions from cases of Hepatitis B, HIV infection, tuberculosis, salmonellosis, enteric fevers or other infections specified by the microbiologist.
- They should be sealed in (yellow plastic bags) and disposed of by incineration. Storage in a secure area while awaiting collection is required.

Note: Contaminated clinical wastes should be incinerated but they can be buried if special arrangements are made to ensure they are not likely to be left uncovered or accessible to the general public.

HOW TO DISPOSE OF SHARP OBJECTS (NEEDLES, RAZORS AND SCALPEL BLADES):

- Wear thick, household gloves
- Dispose of all sharp items in a puncture-resistant container. Avoid accidental needlesticks; do not bend or break needles prior to disposal. Needles should not be recapped routinely, but if necessary, a one-handed recap method should be used:
 - ◀ First, place cap on a hard, flat surface, then remove hand.
 - ◀ Next, with one hand, hold syringe and use needle to “Scoop-up” cap.
 - ◀ Finally, when cap covers needle completely, use other hand to secure cap on needle.
- When the ‘sharps’ container is $\frac{3}{4}$ full; cap, plug or tape it tightly closed.
- These containers should not at any time be kept where they are readily accessible to children (e.g. in hospital corridors) and should not be placed on a wet surface.
- Temporary storage must be secure.
- Sharps containers should not be handled more than necessary since penetration of the container can occur.
- Dispose of container when it is $\frac{3}{4}$ full by burying.

- Wash hands after handling sharps containers and decontaminate and wash gloves.

HOW TO DISPOSE OF FAECES, URINE, WASTE WATER, etc...:

- When disposing of urine, faeces or other contaminated fluids (e.g. used cleaning water), it should be remembered that it is likely to be highly contaminated and disposal should be into a sluice, sink, lavatory or flushable toilet.
- Wear thick gloves when handling and transporting wastes.
- Wastes should carefully be poured into the sluice, sink or the flushable toilet. Avoid splashing.
- Rinse the toilet thoroughly with water to remove residual wastes. Avoid splashing.
- Decontaminate specimen container with 8.5% chlorine solution, by soaking for 10 minutes before washing.
- Wash hands after handling liquid wastes and decontaminate and wash gloves.

HOW TO DISPOSE OF LABORATORY WASTE:

- All cultures and patient specimens for discard and any item that have been in contact with the culture or specimen should be microbiologically safe before leaving the laboratory usually by autoclaving.
- Incineration of combustible materials is an acceptable alternative, and if transport is necessary should be treated as clinical waste.
- Most other waste from the lab. that has not been in contact with the lab. waste or specimens can be regarded as domestic waste.

HOW TO DISPOSE OF HUMAN TISSUE:

- Human tissue should be immediately enclosed in a yellow plastic bag and transported to an operating incinerator under the supervision of a responsible person and placed directly into the incinerator.
- If an operating incinerator is not immediately available it should be stored in a mortuary until incineration can be arranged.

- If human tissues are to be transported outside of the hospital for disposal, the yellow plastic bag should be placed inside a rigid locked container labelled (waste requiring special disposal, please contact ----- Tel. No. -----)

HOW TO DISPOSE OF SOLID WASTES:

- Wear thick gloves when handling and transporting wastes.
- Dispose of solid wastes in non-corrosive washable containers with tight fitting covers.
- Collect the waste containers on a regular basis and transport the ones to burn to the incinerator. Bury waste that cannot be burned.
- Wash hands after handling wastes, and decontaminate and wash gloves.

HOW TO DISPOSE OF USED CHEMICAL CONTAINERS:

- Glass containers may be washed with detergent, rinsed and reused.
- Plastic containers should be rinsed three times with water and disposed by burial. Do not reuse.

INCINERATION:

- It is the best method as it:
 - ◀ Provides high temperatures and destroys microorganisms.
 - ◀ Reduces the bulk size of wastes to be buried.

HOW TO BUILD A SIMPLE DRUM INCINERATOR FOR WASTE DISPOSAL:

- Select a site down wind from the clinic
- Build a simple incinerator using local materials (mud or stone). The size depends on the amount of daily waste collected.
- Place the burner on hardened earth or a concrete base.
- Make sure the incinerator has:
 - ◀ Sufficient air inlets underneath or good combustion.
 - ◀ Loosely place fire bars to allow for expansion.

- ◀ An adequate opening for adding fresh refuse, and for removal of ashes.
- ◀ A long enough chimney to allow for a good draft and evacuation of smoke.
- Burn all combustible wastes.
- Ash from incinerated material can be treated as non-contaminated waste.

Note: Open burning is not recommended.

HOW TO MAKE AND USE A BURIAL SITE FOR WASTE DISPOSAL:

- Bury in a specified location
 - ◀ Select a site at least 50 meters away from any water source.
 - ◀ The site should have proper drainage, be located down hill from any wells, and free of standing water.
 - ◀ Make certain the burial site is not in an area which floods.
- Dig a pit 1-meter wide and 2 meters deep.
- Cover with 15 –30 cm of earth each day.
- Fence the site in to keep animals and children away.

Note:

- **Collection:**

Since discarded waste is a nidus for multiplying microbes, it should be removed from the patient environment at regular intervals. Collection should be twice daily and not less than daily for wards. It is preferable to collect hazardous materials (e.g. human tissue, sputum pots, etc...) separately to prevent mixing other refuse.

- **Storage:**

Storage sites should be properly planned, sited to avoid offence, secured against access by unauthorized personnel, cats, dogs, mice, birds and other pests, and should be protected from the weather. The area should be cleaned at regular intervals. Poorly maintained refuse areas attract vermin which may open bags and distribute the contaminated contents over the surrounding environment. Refuse storage areas can also attract children in search of syringes, toys. .. etc., itinerant dealers in search of saleable scrap, and mentally handicapped patients who are unaware of potential hazards. Security is therefore of some importance.

3.9 HOUSEKEEPING

OVERVIEW:

- House keeping refers to the general cleaning of the clinic environment which includes floors, walls, tables and other surfaces.
- Cleaning methods should be determined by the type of surface, the amount and type of organic matter present, and the purpose of the area.
- Low-risk areas such as waiting rooms can be cleaned with detergent and water.
- In high-risk areas such as toilets and latrines and the operating room a disinfectant should be added.

INSTRUCTIONS:

- Frictional cleaning (scrubbing) is the best way to remove dirt and microorganisms.
- Always wear gloves to clean heavily contaminated areas such as toilets.
- Use a damp or wet cloth for wall, floors and halls. Avoid dry sweeping and dusting.
- Use separate equipment (brushes, cloths) for high risk cleaning areas.
- Change cleaning solutions when they are obviously dirty.
- Clean and dry brushes, cloths and other housekeeping equipment between uses.
- Wash from top to bottom, so that debris which falls on the floor will be cleaned-up last.
- When using disinfectants, follow dilution instructions. Too much or too little water may reduce the killing activity of disinfectants.

WHEN AND HOW TO CONDUCT ROUTINE CLEANING IN LOW RISK AREAS:

- Establish a schedule and provide written guidelines for cleaning environmental surfaces.
 - ◁ Walls and ceilings: when visibly dirty wipe with a damp cloth, then wash with detergent and water (routine damp dusting is adequate for this area).
 - ◁ Chairs, lamps, tabletops and counters: Wipe daily, and whenever visibly soiled, with a damp cloth using detergent and water. A disinfectant should be used when contamination is expected.
 - ◁ Floors: Clean frequently with a damp mop using detergent and water (twice daily and as needed).
 - ◁ Sinks: Using a disinfectant cleaning solution scrub frequently (daily or more) with a separate cloth or brush. Rinse with water.
 - ◁ Toilets and latrines: Wear gloves. Use a disinfectant solution and scrub frequently (daily or more) with a separate cloth or brush. Rinse with water.
 - ◁ Waste containers: Wear gloves. Use a disinfectant cleaning solution and scrub to remove soil and organic materials. Clean contaminated waste containers after emptying each time. Clean non-contaminated waste containers when visibly soiled (at least once a week).

WHEN AND HOW TO CLEAN THE OPERATING ROOM:

- Total cleaning:
 - ◁ Remove covered decontamination bucket and transport to central supply or processing room. A fresh bucket containing 0.5% chlorine solution, should be provided at the beginning of each day.
 - ◁ For contaminated waste:
 - Collect waste and place in strategically placed waste basket (with garbage bag).
 - Remove bag slowly from waste basket.
 - Tie bag with double knot.
 - Clean garbage container (waste basket) with germicidal detergent then replace garbage bag.
 - Discarded boxes should be folded prior to placing in garbage cart.
 - Ensure that the person handling the waste has protective clothing.
 - All infectious waste should be placed in colour coded bags (yellow or red).
 - If no coloured bags, a label should be tied to the bags stating that the contents are "infectious".
 - Waste should be placed in a designated area for no longer than 24 hours.
 - When loading the colour coded bags into the cart check that non are leaking/torn. If so, then place torn bag into another coloured bag.

- ◁ With a cloth soaked in disinfectant cleaning solution, wipe down all surfaces. Wash from top to down.
 - ◁ Do not dry sweep the operating room. This causes dust, debris, and microorganisms to rise and contaminate clean surfaces.
- Between each client:
 - ◁ Operating and instrument tables (Trolley or Mayo stand).
 - Decontaminate with a cloth dampened with 0.5% chlorine solution and rinse with clean water.
 - ◁ Spills:
 - Small spills: wear gloves, remove visible materials using a cloth soaked in 0.5% chlorine solution.
 - Large spills: wear gloves, flood the area with 0.5% chlorine solution, mop up solution, then clean as usual with detergent and water.

TRAFFIC FLOW AND ACTIVITY PATTERNS:

- An important goal of infection prevention is to minimize the level of microbial contamination in areas where “clean activities” take place.
 - ◁ These include:
 - Procedure areas
 - Surgical areas
 - Work areas for disinfecting, sterilizing and storing instruments, gloves and equipment.
- Microbial contamination can be minimized by reducing the number of people permitted into these areas and by defining the activities which take place there.
- Clean and contaminated areas should be separated as much as possible.
- Separate rooms should be available in the facility for performing client examinations and minor surgical procedures.
- Space and equipment requirements:
 - ◁ Specific space and equipment requirements remain the same for each procedure, regardless of the types of services offered.
 - ◁ Separate rooms with at least one sink for processing instruments and equipment is desirable.
 - ◁ Ideally, the processing area should include more than one room. If only a single room is available, receiving and cleaning used equipment should be done in an area of the room away from where equipment is sterilized or high level disinfected.
 - ◁ Ambulatory surgical procedures, including laparoscopy and minilaprotomy, need special space and equipment requirements which include:
 - A processing area for further decontamination, cleaning,

sterilization or HLD of instruments.

- A space for storing sterile packs and containers with disinfected instruments.
- An operating room, as well as a separate staging area, where clients are examined and evaluated prior to surgery.
- A recovery area for patient observation after surgery.
- A changing room and scrub area.

4. INTERPERSONAL COMMUNICATION & COUNSELING

PROBLEM IN EGYPT:

Many Women in Egypt, especially in rural area do not like to deliver in a public hospital. This places them at a high risk of natural morbidity and mortality especially if the delivery attended by an untrained birth attendant.

REASONS WHY WOMEN DO NOT LIKE TO DELIVER IN A PUBLIC HOSPITAL:

- ◀ Poor personal treatment by hospital staff.
 - ◀ Leaving the patient for hours before receiving treatment.
 - ◀ Repeated vaginal exams by various doctors.
 - ◀ Insults and hitting during delivery.
 - ◀ Leaving the woman naked in the delivery room.
 - ◀ No explanation about c-section.
- Observations from the field have shown inadequate communication between health care providers and clients.
 - **During pre- natal care:**
 - ◀ Warning signs explained to 23.6% of clients.
 - ◀ Physical exam explained to 1% of clients.
 - ◀ Place of delivery discussed in 8.2% of cases.
 - **At delivery:**
 - ◀ No explanation of when delivery will take place.
 - ◀ No explanation of procedure to be followed.
 - The interaction between the health care provider and the client is a critical element of any effective health care delivery system.

ELEMENTS OF QUALITY OF CARE:

- ◀ Provider's technical competence.
- ◀ Understanding client's needs.
- ◀ Provider-client interpersonal relations.
- ◀ Information to clients.
- ◀ Appropriate constellation of services.
- ◀ Continuity of services.

UNDERSTANDING CLIENT'S NEEDS

The health care provider should make every effort to understand the client's physical, social and emotional needs. This will help him in selecting the treatment regiment that is most effective and acceptable to the client.

Understanding client's needs is achieved through paper history taking.

COMPONENTS OF CLIENT'S HISTORY:

- ◀ Medical history e.g. complaint, present history...
- ◀ Social background e.g. client's living conditions, number of children financial conditions.
- ◀ Psychological aspects e.g. client's concerns, client's attitudes husband's attitudes.

SKILLS OF HISTORY TAKING:

- **Questioning skills**

A health care provider asks questions that encourage the client to talk about herself. The following elements help the provider achieve this goal:

1. Conduct the interview in a private place.
2. Help the client feel at ease.
3. Do not ask interrogative questions e.g. did you try to induce the abortion?
4. Use a tone of voice that shows interest, concern and friendliness.
5. Ask only one question at a time, then wait for an answer.
6. Ask the same question in different ways if you think the client has not

understood.

7. Start with open ended questions to get the story from the client's perspective e.g. "Tell me, how did the bleeding start?"
8. Follow with closed -ended questions to get more specific information e.g. was the bleeding light, heavy or moderate?
9. Avoid leading questions because they do not give the client a chance to express herself e.g. Of course you will have the delivery at the hospital, right?
10. Use facilitator to encourage the client to talk e.g. nodding, uhmm, yes... etc.

- **Listening skills**

The health care provider should know how to listen carefully to be able to understand the problems that bring the clients to the clinic.

SIX ESSENTIAL TECHNIQUES FOR ACTIVE LISTENING:

1. Use silence appropriately: show respect by not interrupting during pauses made by the patient. Patient should not be interrupted nor should they be rushed.
2. Clarify anything that you did not understand e.g. by asking the client "what do you mean?"
3. Paraphrasing what the client just said in your own words. This helps the provider verify if what he/she has heard is correct.
4. Reflect on what the client has just said. Reflection is similar to paraphrasing but with adding an emotional tone to the message given by the client e.g. "I can see that you are feeling guilty about having lost this pregnancy".
5. Use proper non -verbal techniques to help the client feel at ease and to show her that you are interested.

R: Relax (avoid nervous movements).

U: U Be open and flexible.

L: Lean forward towards the clients.

E: Maintain eye contact.

S: Sit squarely.

6. Summarize: at the end of history – taking summarize all what you have heard from the client. Summarizing helps you group the issues and identify priority areas for intervention. Provider, client interpersonal relation's health care provider must establish good relation with the client. This will help the provider gain the client's trust and hence a successful and effective relationship will be established between the Provider and the client.

HOW TO COMMUNICATE A POSITIVE ATTITUDE TO THE CLIENT

- < Facial expressions.
- < Words (use patient's name. introduce yourself).
- < Be patient.
- < Praise and encourage.
- < Reassure.
- < Show empathy.

INFORMATION TO THE CLIENTS

Information is a basic right for every client. Through information the care client can make an informed decision about her health and she can take care of her health. For every medical procedure the client should know the following:

- < Why is the procedure necessary.
- < What the procedure involves.
- < Risks and benefits of the procedure.
- < Long-term effects of the procedure
- < Option to decide against the procedure (not in an emergency).

The above should be given to the client before the procedure is performed. It constitutes part of the informed consent procedure.

SKILLS OF THE INFORMATION- GIVING:

- < Use simple language which clients can understand easily. Avoid technical or medical language.
- < Use pictures or printed materials to illustrate what you are saying (whenever possible).
- < Stop from time to time and ask the client if she understood.
- < Repeat instructions.
- < Ask the client to repeat instructions.
- < Ask the client if she has questions.

COUNSELING

Definition: A person to person interaction in which the provider helps the client make an informed decision about her health. Counseling helps the patient in exploring, clarifying, defining and understanding her feelings, handling her own decisions and resolving her own problems.

MOTIVATION:

Definition:

The provider encourages (persuades) the client to new health behavior.

HEALTH EDUCATION:

The provider gives the client specific objective information without recommending a specific behavior to her.

SUMMARY

ELEMENTS OF PROVIDER – CLIENT COMMUNICATION IN OBSTETRIC CARE:

These elements can be summarized by the acronym GATHER

- G: Greet the client warmly and politely.
- A: Ask the client about the problem and herself.
- T: Tell her what is going to happen.
- H: Help the client make a decision.
- E: Explain procedure / exam / medical condition to the client.
- R: Ask the client to return if problems.

PROVIDER – CLIENT COMMUNICATION BEFORE EXAM / MEDICAL PROCEDURE

1. Reassure the client about her condition.
2. Take proper history including physical, social and psychological aspects.
3. Explain procedure to be performed.
4. When will the procedure be performed

PROVIDER – CLIENT COMMUNICATION DURING EXAM / MEDICAL PROCEDURE

1. Ensure privacy / respect client's modesty.
2. Reassure the client.
3. Monitor the client.
4. Explain each step to the client before it happens.

PROVIDER – CLIENT COMMUNICATION AFTER EXAM / MEDICAL PROCEDURE

1. Outcome of procedure / exam / (what did you find).
2. Time of discharge (when will the patient be discharged).
3. Additional investigations (what are they, why are they necessary).
4. Signs of normal recovery / pregnancy.
5. Warning signs that require immediate return.
6. Follow – up appointment.

5. ANTENATAL CARE

5.1 BACKGROUND

PROBLEM IN EGYPT

It is important for the mother and newborn to be cared for by a physician who can correctly take a full history and do a complete physical examination of the pregnant woman, so as to be able to achieve the antenatal care objectives, and to give diagnosis and correct management. It was noted that only 13% of the women visiting the MOH centers during pregnancy do so for antenatal care.

DEFINITION:

- A program of preventive obstetrics, which include a group of observations, history taking, examinations, investigations, medical care and advice with the idea of getting pregnancy, labor and puerperium as near to normal as possible.

OBJECTIVES:

- Best possible health status for mother and fetus.
- Early detection and management of high risk pregnancy.
- Education of the mother about:
 - ◁ physiology of pregnancy
 - ◁ nutrition
 - ◁ alarming symptoms
 - ◁ infant care
 - ◁ breast-feeding
 - ◁ child spacing.
- Reduction of maternal and perinatal mortality and morbidity rates.

SCHEDULE OF ANC VISITS:

- Until 28th weeks gestation —————> Every 4 weeks
- From 28th - 36th weeks gestation —————> Every 2 weeks
- Thereafter —————> Every week

Note: Additional ANC visits should occur at any time when it is needed.

5.2 BOOKING PROCEDURES (REGISTRATION)

Note: Accurate record keeping is indispensable for the work plan of antenatal clinics.

HISTORY:

- Personal history:
 - ◁ Name
 - ◁ Age
 - ◁ Address
 - ◁ Occupation (both partners)
 - ◁ Duration of marriage
 - ◁ Consanguinity.
- Complaint:
 - ◁ In details and its duration.
- Menstrual history:
 - ◁ LNMP (1st day)
 - ◁ Calculation of gestational age.
- Obstetric history:
 - ◁ Pregnancy, labor and puerperium of previous pregnancies
 - ◁ Mode of termination
 - ◁ Birth weight
 - ◁ Mode of infant feeding
 - ◁ Date of last labor and last abortion (L.L & L.A.)
- Present Obstetric History:
 - ◁ Symptoms of pregnancy
 - ◁ Symptoms of pre-eclampsia
 - ◁ Symptoms of any trouble in any system
 - ◁ Fetal movements
- Family history:
 - ◁ Diabetes mellitus
 - ◁ Hypertension

- < Multiple pregnancy
- < Congenital-anomalies

- Past history: _____

- < Diseases:

- Diabetes mellitus
- Hypertension
- Urinary tract troubles
- Heart diseases
- Viral infection
- Drugs

- < Operations:

- Repair
- Cerclage

- < Others:

- Blood transfusion
- Rh. incompatibility
- X-ray exposure

EXAMINATION (MINIMAL PHYSICAL PARAMETERS TO BE EVALUATED):

- General (Systemic)

- Local (Obstetric)

- < Inspection:

- Contour and size of abdomen
- Fundal height
- Scars of previous operations
- Signs of pregnancy
- Fetal movements
- Varicose veins
- Hernial orifices and back

- < Palpation:

- Fundal grip
- Umbilical grip
- 1st & 2nd pelvic grips

- < Auscultation: F.H.S.

- At 10 weeks, Sonicaid
- At 20 weeks, Pinard's

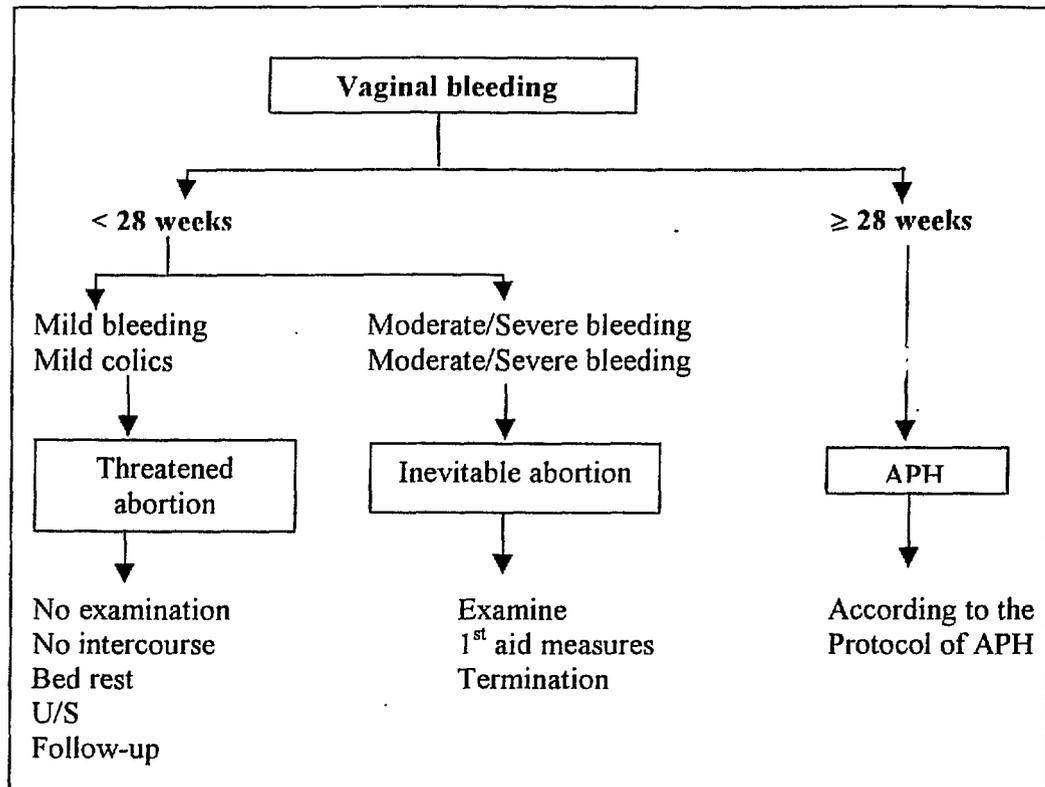
- < Investigations:

- Urine analysis
- Stool analysis for ova and parasites
- Blood analysis:
 - ◇ Complete blood picture
 - ◇ ABO grouping & Rh typing

- ◇ Blood sugar
- ◇ VDRL
- ◇ Toxoplasmosis: Ig M & Ig G

ALARMING SYMPTOMS AND SIGNALS:

- Vaginal bleeding:



- Symptoms of P.E.

- < Severe persistent headache
- < Blurring of vision
- < Epigastric pain
- < Generalized edema (L.Ls, face, fingers)

- Abdominal pain (2nd half):

- < Accidental hemorrhage suspected if:
 - Trauma
 - PET
 - F.L > period of amenorrhea
 - Fetal parts difficult to feel
 - Hard tender uterus
 - F.H.S usually absent

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- Persistent vomiting
- Dysuria
- Chills or fever
- Escape of fluid from vagina (PROM)
- Marked changes in frequency or intensity of fetal movements

5.3 PERIODIC VISITS

EXAMINATION:

- General:
 - ◁ Weight
 - ◁ B.P.
 - ◁ L.L.s
- Local:
 - ◁ Fundal level
 - ◁ Fetal lie
 - ◁ Fetal presentation
 - ◁ FHS

ASSESSING FETAL WELLBEING:

- Maternal weight
 - ◁ Little or no gain = Fetal jeopardy
- Fetal size
 - ◁ Through assessment of F.L
- Fetal Kick count
 - ◁ At least 10 movements in 12 hours
- Fetal movements
 - ◁ Absence precedes IUFD by 48 hours
- Fetal heart sounds
- Ultrasonography

Note: Also record any new complaints.

5.4 HEALTH EDUCATION FOR PREGNANT WOMEN

ADEQUATE NUTRITION:

- Calories (2500/day)
 - ◁ Excess calories leads to fat deposition and obesity, and predisposes to PET.
 - ◁ The caloric requirement is the same as in the non-pregnant state.
 - ◁ During pregnancy increased metabolism is compensated for by decreased activity

- Protein (85 gm/day)
 - ◁ Animal source: Meat, fish, cheese, milk, eggs
 - ◁ Plant source: Peas, beans, lentil
 - ◁ Insufficient protein in diet leads to:
 - Fetal prematurity
 - Maternal anemia and PET

- Calcium (1.5 gm/day)
 - ◁ Sources: Milk, cheese, yogurt, calcium carbonate
 - ◁ Insufficient calcium in the diet leads to:
 - Fetal:
 - ◇ Rickets
 - ◇ Dental caries
 - Maternal:
 - ◇ PET
 - ◇ Osteoporosis
 - ◇ Tetany
 - ◇ Uterine inertia
 - ◇ If Ca deficiency is repeated & PPH it leads to osteomalacia
 - ◇ Nervousness
 - ◇ Muscle cramps
 - ◇ Bone pains

- Iron (30 mg/day)
 - ◁ Animal source: liver, red meat
 - ◁ Plant source: green vegetables or ferrous gluconate and ferrous fumarate
 - ◁ Insufficient iron in the diet leads to:
 - Fetal anemia after delivery
 - Maternal iron deficiency anemia, PET

- Folic acid (1 mg/day)

CLOTHING:

- Should be loose, light & hanging from shoulders
- Avoid: high heels, flat shoes, thin soles, belts or corset

TEETH CARE:

- Examine twice during pregnancy
- Daily teeth brushing after meals

BREAST CARE:

- Daily washes to reduce cracking
- Massage
 - ◁ Express breast secretion
 - ◁ Open lacteal ducts & sinuses
- Nipples
 - ◁ If there is dried secretion treat with a mixture of glycerin & alcohol
 - ◁ If retracted treat by pulling out
- Brassiere to support heavy breast (light & not tight)

SEXUAL INTERCOURSE:

- Allowed with moderation
- Avoided in last weeks, tendency to abortion or induce premature labor

TRAVELLING:

- Allowed when comfortable
- Avoided in last month, tendency to abortion or induce premature labor

SLEIGHT GAIN (10 –12 KGM):

- 1st trimester 1- 2 kgm
- 2nd trimester 6 -7 kgm
- 3rd trimester 3 - 4 kgm

BATHS:

- Showers are preferable over tube baths

EXERCISES:

- Should be mild, preferable walking
- House work apart from fatigue should be allowed

REST & SLEEP:

- 8 hours by night & 2 hours in the afternoon
- To be increased towards term

DRUGS:

- Avoid all unnecessary drugs during pregnancy
- Minor complaints should be managed without the use of drugs whenever possible

SMOKING:

- Ptyalism
- Nervousness
- Hyperemesis
- Spasm of placental blood vessels leading to:

- ◁ Fetal anoxoia, LBW, IUGR, IUFD
- ◁ Prematurity, PROM
- ◁ Congenital malformation
- ◁ Abruptio placentae

IMMUNIZATION:

- Live attenuated vaccines are contraindicated
- Any pregnant woman who comes in contact with rubella should be tested for rubella antibodies
- Tetanus toxoid to prevent tetanus

COMMON PHYSIOLOGICAL COMPLAINTS DURING PREGNANCY:

- Nausea & vomiting
- Heart burn & hyperacidity
- Ptyalism
- Constipation
- Hemorrhoids & varicose veins
- Edema
- Leg cramps
- Leucorrhoea
- Musculoskeletal fetal system:
 - ◁ Pelvic givè
 - ◁ Ulnar paraesthesia
 - ◁ Backache
 - ◁ Pendulous abdomen

HIGH RISK PREGNANCY

5.5 RISK FACTORS IN PREGNANCY, THEIR POTENTIAL ADVERSE EFFECTS AND ACTION TO BE TAKEN DURING PREGNANCY

Definition: Conditions associated with child bearing which includes hazards to maternal health or fetal welfare

Risk factors for evaluation	Potential adverse effects on the current pregnancy	Action to be taken
1. <u>Personal Factors</u> Less than 18 years old	<ul style="list-style-type: none"> • Unplanned pregnancy • Poor clinic attendance • ↑ Incidence of abortion • ↑ Incidence of IUGR • ↑ Incidence of premature labor • ↑ Incidence of PET • ↑ Incidence of operative interference 	<ul style="list-style-type: none"> • Intensive and repetitive health education during pregnancy • Prevention and early diagnosis of such adverse effects • Referral of premature laboring women
More than 35 years old	<ul style="list-style-type: none"> • Down syndrome • ↑ Incidence of PET • ↑ Incidence of IUGR • ↑ Fetoplacental dysfunction • ↑ Incidence of prolonged labor • ↑ Incidence of obstructed labor 	<ul style="list-style-type: none"> • Prenatal education • Prenatal genetic screen by amniocentesis (15-18 weeks gestation) • Serial ultrasound • Supplementary counseling • Chromosomal study • Confirmatory chromosomal analysis of the newborn • Consider termination if +ve for Down • Assessment of fetoplacental function
Lives far from hospital or health facility	<ul style="list-style-type: none"> • Delivery on the way to the hospital • Birth trauma • Neonatal asphyxia or hypothermia 	<ul style="list-style-type: none"> • Scheduled admission early in/before labor
• Positive consanguinity	<ul style="list-style-type: none"> • Congenital malformations 	<ul style="list-style-type: none"> • Prenatal health education

HIGH RISK PREGNANCY
5.5 RISK FACTORS IN PREGNANCY, THEIR POTENTIAL ADVERSE EFFECTS
AND ACTION TO BE TAKEN DURING PREGNANCY

Risk factors for evaluation	Potential adverse effects on the current pregnancy	Action to be taken
	<ul style="list-style-type: none"> • Repeated/Habitual abortion 	<ul style="list-style-type: none"> • Genetic amniocentesis • Supplementary counseling
<ul style="list-style-type: none"> • Smoking habits 	<ul style="list-style-type: none"> • ↑ Incidence of spontaneous abortion, prematurity, PROM, sudden IUGR syndrome and abruptio placentae • Chronic fetoplacental dysfunction 	<ul style="list-style-type: none"> • Prenatal health education • Assessment of fetoplacental function
<ul style="list-style-type: none"> • Long duration of marriage with infertility and ovulatory drugs 	<ul style="list-style-type: none"> • Anxiety with pregnancy • Multiple pregnancy • Premature labor • ↑ Incidence of ectopic pregnancy 	<ul style="list-style-type: none"> • Intensive and repetitive health education • Reassurance via careful prenatal care • Rule out multiple or ectopic pregnancy • Ultrasound



And at any time when referral is needed

HIGH RISK PREGNANCY
5.5 RISK FACTORS IN PREGNANCY, THEIR POTENTIAL ADVERSE EFFECTS
AND ACTION TO BE TAKEN DURING PREGNANCY

Risk factors for evaluation	Potential adverse effects on the current pregnancy	Action to be taken
<p>2. Obstetrical History</p> <ul style="list-style-type: none"> • Primigravida \geq 30 years old (or if all previous pregnancies have ended in abortion) 	<ul style="list-style-type: none"> • \uparrow Incidence of pregnancy induced hypertension • Fetoplacental dysfunction 	<ul style="list-style-type: none"> • TORCH titres • Serial assessment of fetoplacental function
<ul style="list-style-type: none"> • Parity of \geq5 (greater than 20 weeks gestation) 	<ul style="list-style-type: none"> • \uparrow Incidence of prolonged or obstructed labor • Rupture uterus • Post-partum hemorrhage • Chronic fetoplacental dysfunction 	<ul style="list-style-type: none"> • Prevention of prolonged labor • Plan for safe easy smooth delivery • Serial assessment of fetoplacental function
<ul style="list-style-type: none"> • No spacing 	<ul style="list-style-type: none"> • Nutritional deficiencies • Weak general health 	<ul style="list-style-type: none"> • Reassurance via careful prenatal care • Contraceptive advice
<ul style="list-style-type: none"> • Previous IUFD or neonatal death 	<ul style="list-style-type: none"> • Depending on the cause of death • Prematurity • IUGR • Fetal malformation • Chronic fetoplacental dysfunction • Recurrence of risk factors 	<ul style="list-style-type: none"> • Determine the cause of death from previous records • Assessment of fetoplacental function • TORCH titres • Glucose Tolerance Test
<ul style="list-style-type: none"> • Previous small for gestational age 	<ul style="list-style-type: none"> • IUGR • Chronic fetoplacental dysfunction • Fetal demise • Recurrence of risk factors 	<ul style="list-style-type: none"> • Serial assessment of fetoplacental function and fetal growth pattern • Consider induction of labor 38 – 39 weeks gestation
<ul style="list-style-type: none"> • Previous large for gestational age 	<ul style="list-style-type: none"> • Gestational diabetes • Diabetes mellitus • Recurrence of risk factors 	<ul style="list-style-type: none"> • Prenatal health education • Glucose tolerance test • Serial measurement of fetal weight by

HIGH RISK PREGNANCY
5.5 RISK FACTORS IN PREGNANCY, THEIR POTENTIAL ADVERSE EFFECTS
AND ACTION TO BE TAKEN DURING PREGNANCY

Risk factors for evaluation	Potential adverse effects on the current pregnancy	Action to be taken
	<ul style="list-style-type: none"> • Dystocia • Birth trauma • Excessive weight gain • Polyhydramnios 	<p style="text-align: center;">Ultrasound</p>
<ul style="list-style-type: none"> • Previous fetal malformation 	<ul style="list-style-type: none"> • Congenital anomalies • Hereditary disorders 	<ul style="list-style-type: none"> • Discuss the case with neonatologist prior to 14 weeks gestation • Serial ultrasound evaluation • Genetic counseling • Genetic amniocentesis
<ul style="list-style-type: none"> • Previous spontaneous 2nd trimester abortion or premature labor 	<ul style="list-style-type: none"> • Persistence of risk factors • Premature delivery • Incompetent cervix 	<ul style="list-style-type: none"> • Serial ultrasound to assess cervical incompetence • Cerclage should be considered • Consider tocolysis
<ul style="list-style-type: none"> • Previous 1st trimester abortion 	<ul style="list-style-type: none"> • Recurrence of risk factors 	<ul style="list-style-type: none"> • Chromosomal study • Genetic counseling
<ul style="list-style-type: none"> • Previous hypertensive disorders during pregnancy 	<ul style="list-style-type: none"> • Pregnancy associated hypertension • Recurrence of the risk factors • Renal affection • Chronic fetoplacental dysfunction • IUGR • Prematurity • Accidental hemorrhage 	<ul style="list-style-type: none"> • Careful prenatal care • Fundus examination • Check creatinine, uric acid, BUN and protein in urine regularly • Consider termination for eclamptic patient

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5.5 RISK FACTORS IN PREGNANCY, THEIR POTENTIAL ADVERSE EFFECTS
AND ACTION TO BE TAKEN DURING PREGNANCY

Risk factors for evaluation	Potential adverse effects on the current pregnancy	Action to be taken
<ul style="list-style-type: none"> • Previous Rh-immunization or hydrops fetalis 	<ul style="list-style-type: none"> • Recurrence of risk factors • Still birth • Fetomaternal incompatibility 	<ul style="list-style-type: none"> • Indirect Coomb's as screening early in pregnancy and every 4 weeks between 18-36 weeks. • Spectrophotometric analysis for bilirubin level in amniotic fluid by amniocentesis • Antepartum administration of Anti-D antigen (RhoGAM) in cases of bleeding, abortion, ectopic, abruptio placentae and following amniocentesis • Prophylactic use of Anti-D in midpregnancy has also been suggested
<ul style="list-style-type: none"> • Previous retained placenta or post partum hemorrhage 	<ul style="list-style-type: none"> • Recurrence of the problem 	<ul style="list-style-type: none"> • Arrange for delivery in a well equipped hospital • Try to detect the cause
<ul style="list-style-type: none"> • Duration of labor < 4 hours 	<ul style="list-style-type: none"> • Delivery on the way to the hospital • Neonatal asphyxia and/or hypoxia • Neonatal hypothermia 	<ul style="list-style-type: none"> • Scheduled admission early in/before labor
<ul style="list-style-type: none"> • Previous instrumental delivery (vacuum extraction or forceps) 	<ul style="list-style-type: none"> • Prolonged labor • Obstructed labor • Rupture uterus • Cephalopelvic disproportion 	<ul style="list-style-type: none"> • Try to detect the cause • Prevention of recurrence • Arrange for delivery in well equipped hospital

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HIGH RISK PREGNANCY
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AND ACTION TO BE TAKEN DURING PREGNANCY

Risk factors for evaluation	Potential adverse effects on the current pregnancy	Action to be taken
<ul style="list-style-type: none"> • Previous cesarean section delivery 	<ul style="list-style-type: none"> • Dehiscence of the previous scar • Uterine rupture 	<ul style="list-style-type: none"> • Scheduled admission to hospital at term • Discuss route of delivery • Plan for elective cesarean delivery if > 2 cesarean deliveries



And at any time when referral is needed

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HIGH RISK PREGNANCY
5.5 RISK FACTORS IN PREGNANCY, THEIR POTENTIAL ADVERSE EFFECTS
AND ACTION TO BE TAKEN DURING PREGNANCY

Risk factors for evaluation	Potential adverse effects on the current pregnancy	Action to be Taken
3. Past History <ul style="list-style-type: none"> • Hypertension 	<ul style="list-style-type: none"> • Pregnancy exaggerate hypertension • Renal affection • Chronic fetoplacental dysfunction • Chronic hypertension 	<ul style="list-style-type: none"> • Prenatal health education to prevent excess weight gain • Administration of safe hypotensive drug • Serial assessment of fetoplacental function
<ul style="list-style-type: none"> • Heart disease or heart murmur 	<ul style="list-style-type: none"> • Heart failure & pulmonary edema • Respiratory distress 	<ul style="list-style-type: none"> • Consultation with cardiologist
<ul style="list-style-type: none"> • Tuberculosis or antituberculus drugs 	<ul style="list-style-type: none"> • Congenital infection of the newborn • Teratogenicity of antituberculus drugs 	<ul style="list-style-type: none"> • Test for purified protein derivative (PPD) • Chest x-ray • Sputum, gastric aspirate and morning urine for culture and acid-fast stains • Investigate other household members for active disease • Consider bronchoscopy and infant separation after delivery if the mother had an active disease
<ul style="list-style-type: none"> • Epilepsy or anti-epileptic drugs 	<ul style="list-style-type: none"> • Teratogenicity of anti-epileptic drugs (AEDs) • Traumatic seizures 	<ul style="list-style-type: none"> • Preconception and prenatal health education • Minimum effective antiepileptic dose to prevent seizures • Adequate folate intake • Administration of Vit K during last month
<ul style="list-style-type: none"> • Chronic illness 	<ul style="list-style-type: none"> • The illness may affect the pregnancy or vice versa 	<ul style="list-style-type: none"> • Plan of management agreed upon by obstetrician, medical doctor and neonatologist
<ul style="list-style-type: none"> • Uterine anomalies including uterine fibroid or other pelvic masses 	<ul style="list-style-type: none"> • Second trimester miscarriage • Premature labor 	<ul style="list-style-type: none"> • Bed rest • Tocolysis for increased uterine activity

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5.5 RISK FACTORS IN PREGNANCY, THEIR POTENTIAL ADVERSE EFFECTS
AND ACTION TO BE TAKEN DURING PREGNANCY

Risk factors for evaluation	Potential adverse effects on the current pregnancy	Action to be Taken
	<ul style="list-style-type: none"> • IUGR • Abnormal placentation • Malpresentation • Antepartum and/or postpartum hemorrhage • Acute abdomen due to fibroid degeneration • Rupture uterus 	<ul style="list-style-type: none"> • Serial assessment by ultrasound • Serial evaluation of fetoplacental function • Consider cerclage
<ul style="list-style-type: none"> • Previous myomectomy 	<ul style="list-style-type: none"> • Rupture uterus • Abnormal placentation • Antepartum and/or post partum hemorrhage • Retained placenta 	<ul style="list-style-type: none"> • Prenatal health education • Bed rest • Scheduled admission before labor
<ul style="list-style-type: none"> • Previous cerclage 	<ul style="list-style-type: none"> • Incompetent cervix • ↑ Incidence of abortion 	<ul style="list-style-type: none"> • Plan for cerclage • Bed rest • No intercourse • No douching • Tocolysis to prevent premature delivery
<ul style="list-style-type: none"> • Previous successful classical repair 	<ul style="list-style-type: none"> • Difficult delivery • Soft tissue obstruction • Rupture vagina 	<ul style="list-style-type: none"> • Plan for safe, smooth delivery otherwise Cesarean delivery should be considered to avoid recurrence
<ul style="list-style-type: none"> • Previous successful repair of fistula 	<ul style="list-style-type: none"> • ↑ Incidence of recurrence 	<ul style="list-style-type: none"> • Plan for cesarean delivery

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AND ACTION TO BE TAKEN DURING PREGNANCY

Risk factors for evaluation	Potential adverse effects on the current pregnancy	Action to be taken
<ul style="list-style-type: none"> • Previous blood transfusion 	<ul style="list-style-type: none"> • Fetomaternal incompatibility 	<ul style="list-style-type: none"> • Indirect Coomb's as screening



And at any time when referral is needed

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HIGH RISK PREGNANCY
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AND ACTION TO BE TAKEN DURING PREGNANCY

Risk factors for evaluation	Potential adverse effects on the current pregnancy	Action to be taken
4. Family History <ul style="list-style-type: none"> • Fetal abnormality 	<ul style="list-style-type: none"> • Fetal malformations 	<ul style="list-style-type: none"> • Discuss the case with neonatologist prior 14 weeks gestation • Alfa-fetoprotein at 14 weeks gestation • Genetic counseling and amniocentesis • Consider serial ultrasound
<ul style="list-style-type: none"> • Twin or multiple pregnancy of mother and sister 	<ul style="list-style-type: none"> • ↑ Incidence of twins and multiple pregnancy 	<ul style="list-style-type: none"> • Ultrasound evaluation
<ul style="list-style-type: none"> • Hypertension 	<ul style="list-style-type: none"> • Pregnancy exaggerated or associated hypertension 	<ul style="list-style-type: none"> • Hypotensives
<ul style="list-style-type: none"> • Diabetes 	<ul style="list-style-type: none"> • ↑ Incidence of gestational diabetes • ↑ Incidence of spontaneous abortion • ↑ Incidence of congenital anomalies • Macrosomic baby 	<ul style="list-style-type: none"> • Glucose tolerance test • Prevention of excessive weight gain



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HIGH RISK PREGNANCY
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Risk Factors for Evaluation	Potential adverse effects on the current pregnancy	Action to be Taken
5. Current situations affecting Obstetrics <ul style="list-style-type: none"> • Unknown LMP 	<ul style="list-style-type: none"> • Post date 	<ul style="list-style-type: none"> • Clinical evaluation of gestational age • Consider ultrasound
<ul style="list-style-type: none"> • Gait “Limping” 	<ul style="list-style-type: none"> • Cephalopelvic disproportion • Obstructed labor 	<ul style="list-style-type: none"> • Assess pelvic capacity • Allow smooth, safe vaginal delivery otherwise C.S should be considered
<ul style="list-style-type: none"> • Color: -Pallor 	<ul style="list-style-type: none"> • Anemia with pregnancy • IUGR • Premature labor 	<ul style="list-style-type: none"> • Laboratory evaluation of Hb% • Prenatal health education about diet • Iron supplementation
<ul style="list-style-type: none"> - Jaundice 	<ul style="list-style-type: none"> • Biliary colic • Obstructive jaundice • Acute cholecystitis • Pancreatitis 	<ul style="list-style-type: none"> • Hospitalization for bed rest • Ultrasonic evaluation of gall bladder and liver • Laboratory investigations: CBC, urine analysis & culture, liver function tests, serum amylase levels to rule out pancreatitis and stool analysis
<ul style="list-style-type: none"> • Maternal weight > 90 kilograms “Excessive obesity” 	<ul style="list-style-type: none"> • Gestational diabetes • Hypertension • Inadequate maternal weight gain • Macrosomic infants • Possible problems include: prolonged 2nd stage – shoulder dystocia – primary cesarean section – wound/episiotomy infection 	<ul style="list-style-type: none"> • Prenatal health education on diet • Early glucose screening • Testing and induction of labor as indicated • Consider low-dose aspirin if the patient at risk for development of P.E.T

HIGH RISK PREGNANCY

5.5 RISK FACTORS IN PREGNANCY, THEIR POTENTIAL ADVERSE EFFECTS AND ACTION TO BE TAKEN DURING PREGNANCY

Risk Factors for Evaluation	Potential adverse effects on the current pregnancy	Action to be Taken
<ul style="list-style-type: none"> Maternal weight < 45 kilograms 	<ul style="list-style-type: none"> IUGR Premature labor Fetoplacental dysfunction 	<ul style="list-style-type: none"> Prenatal health education on diet Serial assessment of fetoplacental function
<ul style="list-style-type: none"> Maternal length ≤ 150 cm 	<ul style="list-style-type: none"> Cephalopelvic disproportion obstructed / prolonged labor 	<ul style="list-style-type: none"> Counseling on mode of delivery Allow smooth safe vaginal delivery otherwise consider cesarean delivery
<ul style="list-style-type: none"> Marked varicosities of lower limbs 	<ul style="list-style-type: none"> Severe leg pain ↑ Incidence of vulval varicosities as well as uterovesical plexus varicosities ↑ Incidence of hemorrhoids 	<ul style="list-style-type: none"> Prenatal health education to avoid prolonged standing Advise for leg elevation and elastic stocking Plan for smooth safe delivery
<ul style="list-style-type: none"> Excessive weight gain: > 2 kg 1st trimester > 7 kg 2nd trimester > 4 kg 3rd trimester (Normal 10-12 kgm ± 10% during all trimesters) 	<ul style="list-style-type: none"> Gestational diabetes Multiple pregnancy ↑ Incidence of PET Macrosomic infants Dystocia 	<ul style="list-style-type: none"> Prenatal health education on diet Glucose tolerance test
<ul style="list-style-type: none"> Poor weight gain ≤ 8 kilogram 	<ul style="list-style-type: none"> IUGR Fetal jeopardy Fetoplacental dysfunction 	<ul style="list-style-type: none"> Dietary recommendations Serial assessment of fetoplacental function

HIGH RISK PREGNANCY
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AND ACTION TO BE TAKEN DURING PREGNANCY

Risk Factors for Evaluation	Potential adverse effects on the current pregnancy	Action to be Taken
<ul style="list-style-type: none"> • Hyperemesis gravidarum 	<ul style="list-style-type: none"> • Hypotension • Tachycardia • Dehydration • Weight loss • Electrolyte imbalance • Jaundice • Bile pigments in urine • Retinal changes • Oliguria 	<ul style="list-style-type: none"> • Rule out other causes of nausea and vomiting • Simple dietary instructions • Hospitalization for resistant cases for fluid, electrolyte replacement, sedatives, antiemetics, emotional support and reassurance
<ul style="list-style-type: none"> • Non immune against tetanus neonatorum 	<ul style="list-style-type: none"> • Tetanus neonatorum 	<ul style="list-style-type: none"> • Consider giving TT₁ and TT₂ for the first time after 3rd month of pregnancy (4 weeks apart) or further dose if she is immune
<ul style="list-style-type: none"> • Absent fetal movements 	<ul style="list-style-type: none"> • Uncertain LMP • Molar pregnancy • IUFD 	<ul style="list-style-type: none"> • Ultrasonography
<ul style="list-style-type: none"> • Marked changes in frequency and/or intensity of fetal movements 	<ul style="list-style-type: none"> • Fetoplacental dysfunction • IUFD • IUGR 	<ul style="list-style-type: none"> • Fetal kick count • Count (not less than 10 movements in 12 hours continuously) • Ultrasound for biophysical profile
<ul style="list-style-type: none"> • Smaller uterine size than gestational age 	<ul style="list-style-type: none"> • Inaccurate LMP • IUGR • IUFD • Oligohydramnios • Missed abortion 	<ul style="list-style-type: none"> • Consider ultrasound • Serial assessment of fetoplacental function

HIGH RISK PREGNANCY
5.5 RISK FACTORS IN PREGNANCY, THEIR POTENTIAL ADVERSE EFFECTS
AND ACTION TO BE TAKEN DURING PREGNANCY

Risk Factors for Evaluation	Potential adverse effects on the current pregnancy	Action to be Taken
<ul style="list-style-type: none"> • Larger uterine size than gestational age 	<ul style="list-style-type: none"> • Inaccurate LMP • Diabetes mellitus • Multiple pregnancy • Molar pregnancy • Polyhydramnios 	<ul style="list-style-type: none"> • Consider ultrasound • Glucose tolerance test • Serial assessment of fetoplacental function
<ul style="list-style-type: none"> • Vaginal bleeding in early pregnancy 	<ul style="list-style-type: none"> • Ectopic pregnancy • Threatened abortion • Missed abortion • Molar pregnancy 	<ul style="list-style-type: none"> • Serum B-submit HCG • Ultrasonography • Bed rest • Advise for no intercourse or travelling • Consider termination • Postevacuation follow-up in case of molar pregnancy
<ul style="list-style-type: none"> • Blood pressure $\geq 160/100$ 	<ul style="list-style-type: none"> • Severe persistent headache, epigastric pain, blurred vision and generalized edema • ↑ Incidence of eclampsia development • IUGR • Renal disease • Accidental hemorrhage • Fetoplacental dysfunction • Post partum hemorrhage 	<ul style="list-style-type: none"> • Bed rest/hospitalization • Antihypertensives • Sedation • Dietary instructions • Serial assessment of fetoplacental function • Consider induction of labor at 38 weeks gestation

HIGH RISK PREGNANCY
5.5 RISK FACTORS IN PREGNANCY, THEIR POTENTIAL ADVERSE EFFECTS
AND ACTION TO BE TAKEN DURING PREGNANCY

Risk factors for evaluation	Potential adverse effects on the current pregnancy	Action to be taken
<ul style="list-style-type: none"> • Excess amniotic fluid 	<ul style="list-style-type: none"> • Fetal malformations • Premature labor • Maternal respiratory distress 	<ul style="list-style-type: none"> • Ultrasound • Consider admission depending on the case
<ul style="list-style-type: none"> • Diminished amniotic fluid 	<ul style="list-style-type: none"> • Fetal malformations (renal, ureteral, pulmonary hypoplasia) • IUGR • Still birth • IUFD 	<ul style="list-style-type: none"> • Consider ultrasound • Serial assessment of fetoplacental function
<ul style="list-style-type: none"> • Premature uterine contractions 	<ul style="list-style-type: none"> • Premature labor 	<ul style="list-style-type: none"> • Admit to hospital for tocolysis and fetal monitoring
<ul style="list-style-type: none"> • Third trimester vaginal bleeding 	<ul style="list-style-type: none"> • Placenta previa • Accidental hemorrhage • IUGR • IUFD • Intrapartum hemorrhage • Post partum hemorrhage • DIC 	<ul style="list-style-type: none"> • Hospitalization • Bed rest • Serial ultrasound • Serial evaluation of fetoplacental function • Coagulation profile • For patients whose gestation is ≥ 34 weeks, consider termination within the first 24 hours
<ul style="list-style-type: none"> • Sudden gush of vaginal watery fluid 	<ul style="list-style-type: none"> • Ruptured membranes (PROM) • Prematurity • Cord prolapse • Maternal infection (Chorioamnionitis) 	<ul style="list-style-type: none"> • If <34 weeks, labor induced only if chorioamnionitis is present or if it later develops. Otherwise watchful expectancy is followed

HIGH RISK PREGNANCY
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Risk factors for evaluation	Potential adverse effects on the current pregnancy	Action to be taken
	<ul style="list-style-type: none"> • Fetal infection • IUFD • Still birth • Neonatal infection 	<ul style="list-style-type: none"> • Observe temperature, pains, bleeding and vaginal discharge • Consider ultrasound, use of antibiotics and glucocorticoids
<ul style="list-style-type: none"> • Hemoglobin <11g% 	<ul style="list-style-type: none"> • Anemia in pregnancy • IUGR • Prematurity • Anemia of the newborn 	<ul style="list-style-type: none"> • Dietary instructions • Prohibit bad habits • Iron and folic acid supplementation
<ul style="list-style-type: none"> • Proteinuria > +1 	<ul style="list-style-type: none"> • Urinary tract infection • Renal disease • PET 	<ul style="list-style-type: none"> • Urine analysis • Urine culture • Uric acid • Creatinine
<ul style="list-style-type: none"> • Glucosuria 	<ul style="list-style-type: none"> • Lowered renal threshold • Gestational diabetes 	<ul style="list-style-type: none"> • Glucose tolerance test
<ul style="list-style-type: none"> • Bacteriuria (more than 100,000 bacteria in urine culture) 	<ul style="list-style-type: none"> • Urinary tract infection • Pyelonephritis • Pyelitis 	<ul style="list-style-type: none"> • Urine culture and sensitivity • Antibiotics given accordingly • Creatinine
<ul style="list-style-type: none"> • Acute toxoplasmosis 	<ul style="list-style-type: none"> • Maternal infection (fever, fatigue headache and lymphadenopathy) • Incidence of spontaneous abortion • Congenital toxoplasmosis (fetal ventricular dilatation – intracranial and 	<ul style="list-style-type: none"> • Screening all pregnant women at risk • Ask for IgM and IgG • Consider Rovamycin treatment for 3 weeks followed by reevaluation

HIGH RISK PREGNANCY
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Risk factors for evaluation	Potential adverse effects on the current pregnancy	Action to be taken
	intrahepatic calcification - thickness and hyperdensity of the placenta – fetal ascites – blindness – deafness – mental retardation)	<ul style="list-style-type: none"> • Serial ultrasound • Prenatal health education to refrain from eating raw or undercooked meat, to wash their hands thoroughly after handling raw meat, to avoid gardening in dirt and to wash hands after contact with soil
<ul style="list-style-type: none"> • Rubella exposure 	<ul style="list-style-type: none"> • Severe fetal damage or death if infection occurred during the first 5 months of pregnancy • Congenital fetal infection (heart damage – cataract – deafness, mental retardation) • Severe disease during the neonatal period (bleeding – hepatosplenomegaly myocarditis and thrombocytopenia) 	<ul style="list-style-type: none"> • Test for IgM if any woman exposed to rubella or had any rash similar to rubella • Counseling on the basis of severe damage to the fetus • Consider termination in case of affected Fetuses
<ul style="list-style-type: none"> • Cytomegalovirus 	<ul style="list-style-type: none"> • Reactivation of a prior infection is common • Congenital malformations (mental retardation – deafness – chroiretinitis- thrombocytopenia – hepato-splenomegaly – cerebral calcification • Fetal death 	<ul style="list-style-type: none"> • Consider amniocentesis for documenting in utero infection • Consider termination in case of affected fetuses
<ul style="list-style-type: none"> • Herpes 	<ul style="list-style-type: none"> • Spontaneous abortion • Generalized flu-like symptoms • IUGR • Reactivation • Prematurity 	<ul style="list-style-type: none"> • Papanicolaou smear • Assessment of potential fetal – neonatal risk if initial infection occurs during pregnancy

HIGH RISK PREGNANCY
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Risk factors for evaluation	Potential adverse effects on the current pregnancy	Action to be taken
	<ul style="list-style-type: none"> • PROM • Neonatal herpes infection • IUFD • Congenital herpes (cutaneous, ocular and neuralgic malformations) 	<ul style="list-style-type: none"> • Consider acyclovir therapy during pregnancy for those with primary infection • Consider induction of labor for patients with recurrent herpes at term who are clinically free of the disease
<ul style="list-style-type: none"> • Non engagement of fetal heads at 40 weeks gestation in primigravida 	<ul style="list-style-type: none"> • Cephalopelvic disproportion • Malposition (mainly occipitoposterior) 	<ul style="list-style-type: none"> • Delivery in a well equipped hospital • Estimation of pelvic capacity
<ul style="list-style-type: none"> • Malpresentation (breech or transverse lie) 	<ul style="list-style-type: none"> • Prematurity • PROM • Rupture uterus • Prolonged labor • Obstructed labor • Cord presentation • Cord prolapse 	<ul style="list-style-type: none"> • Consider cesarean delivery • Delivery in a well equipped hospital • Rule out congenital anomalies • Consider cesarean delivery



And at any time when referral is needed

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GLOSSARY

1. BLEEDING IN PREGNANCY

1.1 BEFORE 20 WEEKS GESTATION

PROBLEM IN EGYPT:

Hemorrhage accounted for almost one third (32%) of all maternal deaths and almost half (46%) of all direct causes of maternal deaths. MMR for hemorrhage was 51.7/100,000. Abortion account for 4.5% of all maternal deaths, and 6.4% of direct obstetric deaths. There were 32 cases died involving abortion, 19 were judged to be spontaneous and 13 judged to be induced. There were also 4 cases died due to ectopic. 98% of antepartum hemorrhage deaths and 99% of postpartum hemorrhage deaths were avoidable.

(NMMS 1992-1993, MOHP/CSP, 1994)

DEFINITION:

- Bleeding from the reproductive tract during pregnancy before 20 weeks gestation.

POSSIBLE CAUSES:

- All kinds of abortions, ectopic pregnancy, trauma, molar pregnancy, local causes e.g. polyps.

PRESENTING CLINICAL FEATURES:

- Vaginal bleeding that is light (spotting), moderate (like a menstrual period), or heavy. It can present as a brown or maroon vaginal discharge. It may be accompanied by lower abdominal pain and signs of hypotension, and fainting.

LABORATORY EXAMINATIONS:

- Hematocrit, complete blood count
- Urinalysis
- Ultrasound
- Serum or urine chorionic gonadotropins

PROPER ASSESSMENT AND MANAGEMENT:

- Complete history, including the 1st day of the last menstruation, the pattern and amount of the bleeding, the presence and type of pain, dizziness, urinary symptoms etc. Also, any history or reproductive tract infections.
- Meticulous examination of the external genitalia and vagina for signs of trauma, infection etc.
- Bimanual examination documenting:
 - ✧ Condition of the cervix (open or closed)
 - ✧ Size, shape and consistency of uterus
 - ✧ Presence of pain and/or adnexal masses
- Speculum examination documenting:
 - ✧ The presence of blood or products of conception in the vagina or cervix
 - ✧ The condition of the cervix
 - open or closed
 - cervicitis
 - products of conception visible

Note: The cervix can be considered open even if the patient has not passed any products of conception.

- Obtain laboratory examinations and diagnostic studies as necessary (see Laboratory Examinations, above).

IF THE CERVIX IS OPEN:

- Before 12 weeks: Consider incomplete or inevitable abortion, or molar pregnancy. In these cases conduct an evacuation in the operating room.

- After 12 weeks Consider incompetent cervix, incomplete or inevitable abortion, or molar pregnancy.
- Conduct an ultrasound examination. A gestational sac should be visible in a normal pregnancy six weeks after the last menstrual period and when serum chorionic gonadotropins are equal to or greater than 6,000 mIU/ml.
- Check serum chorionic gonadotropin levels which double every two days in 66% of normal pregnancies. If the level is decreasing or has plateaued, consider an ectopic pregnancy or a blighted ovum. Consider a molar pregnancy if the levels of chorionic gonadotropins are very high (more than 100,000 mIU/ml serum or 1,000,000 IU/liter urine).
- For cervical incompetence, the management is cervical cerclage.
- For threatened abortion, admit the patient and follow expectant management; if the situation changes into an inevitable abortion, evacuate the uterus.
- If there is a molar pregnancy, conduct a suction curettage in the operating room, with blood available for transfusion if it becomes necessary. Begin oxytocin infusion at the start of evacuation.
- Follow-up by clinical assessment and lab tests.

Note: Especially with molar pregnancy, be prepared for an emergency laparotomy in cases where there is uncontrollable hemorrhage.

IF THE CERVIX IS CLOSED:

- Consider ectopic pregnancy, threatened or missed abortion, and molar pregnancy.
- Conduct an ultrasound examination. A gestational sac should be visible in a normal pregnancy six weeks after the last menstrual period and when serum chorionic gonadotropins are equal to or greater than 6,000 mIU/ml.
- Check blood chorionic gonadotropin levels, which double every two days in 66% of normal pregnancies. If the level is decreasing or has plateaued, consider an ectopic pregnancy or a blighted ovum. A molar pregnancy may exist if the levels of chorionic gonadotropins are very high (more than 10,000 mIU/ml serum or 1,000,000 IU/liter urine).
- If there is a high suspicion of an ectopic pregnancy, or if the diagnosis is in doubt, conduct a laparotomy with further management according to findings.

- If a diagnosis of threatened abortion is made, recommend bedrest and no sexual relations. Follow weekly in the outpatient clinic. Serial examinations of hematocrit and chorionic gonadotropins are useful.
- In the case of a missed abortion, an evacuation procedure should follow.
- If there is a molar pregnancy conduct a suction curettage in the operating room, with blood available for transfusion if it becomes necessary. Begin oxytocin infusion.

Note: Be prepared for an emergency laparotomy in cases where there is uncontrollable hemorrhage.

Note: If there is cervicitis, urinary infection or signs of external trauma, treat locally or with appropriate antibiotics.

IMPORTANT CONSIDERATIONS:

Remember that a patient can lose a lot of blood little by little. Monitor for signs of hypovolemia and tell patients to consult the hospital if they become dizzy or suffer from nausea, vomiting or faintness.

The key to good treatment is an early diagnosis. The key to an early diagnosis is a high clinical suspicion. **THINK** of an ectopic or molar pregnancy when a patient presents with bleeding prior to 20 weeks gestation.

Consider if she is anaemic before pregnancy.

1.2 AFTER 20 WEEKS GESTATION

PROBLEM IN EGYPT:

229 cases of maternal deaths are due to hemorrhage out of 772 maternal deaths, 58 antepartum, 178 postpartum and 6 due to other causes. Hemorrhage is the contributor to maternal mortality in Egypt and accounted for almost one third of all maternal deaths and almost half (46%) of all direct maternal deaths. M.M.R for hemorrhage was 51.7/100,000LB. The maternal mortality ratio for APH was 13/100,000. The large majority of (APH) deaths (84%) were associated with placental abruption, while the remainder were due to placenta previa.

DEFINITION:

- Bleeding from the reproductive tract during pregnancy after 20 weeks gestation. This bleeding must be considered due to a placenta previa or abruptio placenta until proven otherwise.

POSSIBLE CAUSES:

- Placenta previa, abruptio placenta, trauma, tumors, infection, vasa previa.

PRESENTING CLINICAL FEATURES:

- Vaginal bleeding that is light (spotting), moderate (like a menstrual period), or heavy. It can present as a brown or maroon vaginal discharge. It may be accompanied by lower abdominal pain and signs of hypotension.
- With placenta previa, there is usually no pain and the uterus is soft. The principal danger in placenta previa is blood loss when labor begins, or during contractions prior to the initiation of true labor.
- In the case of abruptio placenta, the uterus may be painful and tense (as if it is in a tetanic contraction) in addition to the presence of vaginal bleeding. Also fetal parts are difficult to feel and F.H.S. may be absent. There are often signs of hypovolemia (tachycardia, hypotension, nausea, vomiting, oliguria and even shock) in the absence of a lot of visible external hemorrhage. Coagulopathies

occur in 30% of cases where the abruptio is severe enough to kill the fetus. Port wine colored amniotic fluid suggests a placental abruptio.

- Remember that patient with abruptio placentae may be normotensive because this condition is very common in hypertensive patients

LABORATORY EXAMINATIONS:

- Hematocrit, complete blood count with platelet count
- Urinalysis
- Ultrasound
- Fibrinogen, partial thromboplastin time, prthrombin time (in cases of abruptio placentae).

PROPER ASSESSMENT AND MANAGEMENT:

- Complete history, including the date of the last menstruation, the pattern and amount of the bleeding, the presence and type of pain, symptoms and signs of hypovolemia (nausea, vomiting, dizziness, pallor, diaphoresis), the presence or absence of fetal movements or fetal heart sounds, and any urinary symptoms.
- Meticulous examination of the external genitalia and vagina for signs of trauma, infection etc.
- Ultrasound examination, looking for placental location and the presence of any retroplacental clots.

PLACENTA PREVIA:

- If the ultrasound examination demonstrates a placenta previa or a low lying placenta:
 - ◀ Hospitalization with complete bedrest.
 - ◀ Hemoglobin and hematocrit levels tested twice a week with blood transfusions as needed to keep hematocrit above 30%.
 - ◀ Daily evaluation of fetal well-being with fetal movement counts or Non-Stress Test (NST) for fetal monitoring, twice weekly with a biophysical profile.
 - ◀ Serial ultrasound examinations every 4 weeks documenting fetal growth and placental location

- ↘ Cesarean delivery when any of the following conditions are present.
 - Fetal pulmonary maturity is documented by amniocentesis,
-OR-
 - 38 weeks gestation are completed,
-OR-
 - There is uncontrollable hemorrhage,
-OR-
 - There is another obstetric or medical indication (ex: pre-eclampsia, evidence of severe fetal compromise, etc.).
- ↘ Have available 1 or 2 units of blood during the hospital stay if possible, and always have this available in the operating room at the time of the cesarean section.
- ↘ Be prepared for uterine atony (have oxytocin, ergometrine and prostaglandins on hand) and for the possibility of a placenta accreta (be ready to perform an emergency hysterectomy).
- If there is uncertainty about the diagnosis of a placenta previa, or if ultrasound examination is not available, the patient should be treated as if she had a placenta previa until proved otherwise. When labor begins, a vaginal examination must be performed to see if there is placenta covering the cervix and impeding the birth of the baby.

Note: This examination must always take place in the operating room, with everything ready to perform an emergency cesarean section (anesthesiologist, nurses, instruments open and counted, blood available) and for the management of a severe hemorrhage (two intravenous lines etc.).

- A vaginal examination can provoke catastrophic bleeding in the presence of a placenta previa, and only if everything is ready for immediate action can the mother's and baby's lives be saved. If the placenta is not felt on vaginal examination the patient may be allowed to labor, always monitoring her for hemorrhage.

ABRUPTIO PLACENTA:

- If an abruptio placentae is diagnosed clinically or on ultrasound examination:
 - ↘ Hospitalization with complete bedrest.
 - ↘ Rapid evaluation of the maternal condition, including orthostatic vital signs, abdominal examination, fundal height measurement, and evaluation of other possibly co-existing conditions (pre-eclampsia, chronic hypertension, etc.).

- ✧ Diagnose whether the patient is in labor.
- ✧ Intravenous line x 2 : one of these should be central in moderate and severe cases, or if pre-eclampsia, chronic hypertension or other associated condition exists.
- ✧ Obtain laboratory examinations (see orders).
- ✧ Insert Foley's catheter.
- ✧ Oxygen via nasal catheter.
- ✧ Evaluate fetal state: alive or dead, presence of fetal distress, gestational age.
- ✧ With a mild abruptio and an immature fetus, management is conservative. In all other cases the fetus must be delivered, preferably vaginally:
 - Amniotomy in all patients.
 - Continuous monitoring of fetal heart rate and uterine activity.
 - Oxytocin augmentation when necessary, but with caution (the uterine response to oxytocin may be erratic, and there is an increased chance of uterine rupture, especially in multiparas).
 - Cesarean delivery for obstetrical indications (fetal distress, failure to progress in labor). Give fresh frozen plasma and platelets to patients with coagulopathies who are going to be operated upon.
 - Aggressive transfusions of whole blood or packed red blood cells, using urinary output (greater than 30ml/hr) and central venous pressure (12-15cm/H₂O) as guides.

Note: Do not use the observed blood loss as a guide for transfusion. This will almost always underestimate the actual loss in a patient with abruptio placentae.

Note: Other obstetric causes of antepartum hemorrhage are vasa previa, placental edge bleeding, and a ruptured uterus.

Note: Other gynecological causes include: carcinoma of the cervix, cervical polyp or erosion, vaginal varicosities and severe vaginal infection.

COMPLICATIONS:

- Placenta previa
 - ✧ Up to 15% of patients with a placenta previa will also have a placenta accreta. There is a high risk of mortality, and in most cases a hysterectomy is the only way to save the mother's life.
- Abruptio placentae
 - ✧ When the clinical diagnosis is clearly abruptio placenta, or in the presence of acute fetal distress, do not waste valuable time obtaining an ultrasound examination.
 - ✧ Ultrasound is neither a sensitive nor a specific diagnostic modality in abruptio placenta.

- ↘ The principal cause of maternal death is renal failure due to prolonged hypotension. Do not underestimate the amount of internal hemorrhage; a central venous or Swan-Gantz catheter is essential, as is the strict monitoring of urine output.
- ↘ A 50% abruptio is sufficient to cause fetal death. In the presence of a dead fetus, the average blood loss is 2500ml, and the possibility of coagulopathy is 30%.
- ↘ These patients need massive blood transfusions to save their lives. Coagulopathy may be severe enough to cause Disseminated Intravascular Coagulopathy which is seen almost exclusively when the fetus is dead. However, the coagulopathy resolves without treatment in a matter of days once delivery has taken place.
- ↘ Other complications are uterine atony due to blood in the myometrium (Couvelaire uterus) and amniotic fluid emboli. If there is blood in the myometrium but the uterus is well contracted, hysterectomy is not necessary.
- ↘ Intrauterine growth retardation is more frequent in fetuses of mothers with abruptio placentae. Determine the gestational age carefully before formulating a plan of management.

Note: Within the differential diagnosis of abruptio placentae, consider appendicitis, pyelonephritis, or rupture of the uterus and spleen.

1.3 ADMISSION ORDERS – BLEEDING AFTER 20 WEEKS

ADMIT TO LABOR AND DELIVERY WARD:

- Diet:
 - ◀ Nothing by mouth
- Absolute bedrest:
 - ◀ Left lateral or semifowler position.
- Record orthostatic vital signs, then vital signs every hour:
 - ◀ Blood pressure
 - ◀ Pulse
 - ◀ Fetal heart rate
 - ◀ Central venous pressure (if case merits this)
 - ◀ Respiration
 - ◀ Uterine activity
- Observations:
 - ◀ Psychological attitude
 - ◀ Hydration
 - ◀ Changes in conduct
 - ◀ Hypo-hyperthermia
 - ◀ Hypo-hypertension
 - ◀ Tachypnea-tachycardia
 - ◀ Vaginal bleeding
 - ◀ Abdominal distension
- Laboratory examinations:
 - ◀ Complete blood count (hemoglobin, hematocrit, differential, sedimentation rate)
 - ◀ Blood type and Rh
 - ◀ Blood chemistry and hepatic function tests:
 - Creatinine, BUN
 - Sodium, potassium
 - ◀ Coagulation profile (in cases of abruptio placentae):
 - Prothrombin time and partial thromboplastin time
 - Platelet count
 - Fibrinogen

- Clot retraction time

- Medications:
 - According to the patient's condition.
- Treatment:
 - I.V. fluids – saline or Hartmann's at 125 ml/hour (evaluate according to patient's requirements).
 - Whole blood or packed red blood cells; according to patient's loss, urinary output and central venous pressure – keep HT Above 30%.
 - Record intake and output every hour.
 - Foley's catheter.
 - Intravenous angiocatheter No. 16-18.
 - Placement of central line and notation of central venous pressure every 30 minutes.
 - Oxygen via nasal cannula 4.8 liters/min.
 - Obstetrical ultrasound.
- Present patient to chief on call and then to chief of service.
- Report any changes immediately.

2. PRE-ECLAMPSIA / ECLAMPSIA

PROBLEM IN EGYPT:

- MMR due to Hypertensive Diseases of Pregnancy = 26/100,000 (with convulsions - 15/100,000; without convulsions - 11/100,000). 114 of all maternal deaths were due to hypertensive diseases, 67 with convulsions (59%), 47 without (41%). 13% & 9% of all direct obstetric deaths, respectively, and 9% & 7% of all maternal deaths, respectively were due to hypertensive diseases. 99% of deaths due to hypertension were avoidable.

(NMMS 1992-1993, MOHP/CSP, 1994)

DEFINITION:

- A rise in blood pressure in a pregnant woman accompanied by proteinuria, edema or both. The edema may manifest itself as an abnormal weight gain. A rise in blood pressure is defined as 30 mm.Hg systolic or 15 mm.Hg diastolic above the patient's baseline, demonstrated on two different occasions at least 6 hours apart. If the patient's baseline blood pressure is unknown, a blood pressure of 140/90 mm Hg after the 20th week of gestation is considered abnormal.

RISK FACTORS:

- First pregnancy
- Diabetes
- Chronic hypertension
- Multiple pregnancy
- Molar pregnancy
- Family hypertension history
- Pre-eclampsia in a previous pregnancy
- Renal disease

2.1 MILD PRE-ECLAMPSIA

DIAGNOSTIC PARAMETERS FOR MILD PRE-ECLAMPSIA:

- Weight gain of more than 4 pounds per month (or one pound per week).
- Blood pressure of 140/90 or a rise in systolic blood pressure of 30 mm Hg and a rise in diastolic blood pressure of 15 mm Hg compared to previous recordings.
- Proteinuria not greater than 2 grams/24 hours.

MANAGEMENT:

- Ambulatory
- Weekly clinical visits (urinalysis, physical examination, BP, weight)
- Modified bedrest in semifowler or left lateral position
- Normal diet
- Laboratory examinations:
 - ◊ Complete blood count with differential, type and Rh
 - ◊ Urinalysis: If there is proteinuria get:
 - 24 hour urine sample for total protein quantification
 - Platelet count
 - ◊ Blood urea nitrogen
 - ◊ Creatinine
 - ◊ Uric acid
- Medications:
 - ◊ Tranquilizer – Phenobarbitol 50 mg p.o. every 12 hours. Re-evaluate weekly.
- Funduscopic examination

PATIENTS NOT IN LABOR:

- If the patient presents to the outpatient clinic, monitor her with weekly visits, including urinalysis, weight, BP and symptoms. Admit at 37 weeks gestation.

- If the patient presents at labor and delivery with mild pre-eclampsia and a pregnancy more than 37 weeks, draw all laboratory examinations and admit her. If the cervix is favorable (Bishop \geq 6), induce labor. If not, re-evaluate the cervix weekly and evaluate fetal well-being twice weekly. Induce labor when the cervix is favorable, or if her condition worsens, or at 40 weeks gestation. Cesarean sections for obstetrical indications.
- Begin inductions at 6:00am, following protocol for the induction of labor.
- If the induction fails, repeat it in 24 hours. The patient may eat upon terminating the failed induction.
- If the second induction fails, perform a cesarean section the following day in order to take advantage of the availability of epidural anesthesia. If there is another obstetric indication for performing the cesarean prior to this, obviously it should be headed.

PATIENTS IN LABOR:

- Complete all laboratory examinations and allow labor to progress if pregnancy is more than 34 weeks.
- If the patient is stable, inhibit labor with steroids until 34 weeks gestation in order to induce pulmonary maturity (see above).
- Do not use tocolytics for more than 48 hours and do not repeat their use.

WARNING: Delaying delivery in a patient with pre-eclampsia may worsen her condition. These patients must be evaluated very carefully before initiating tocolysis, and must be monitored closely while they are receiving utero inhibition. If a patient's condition worsens, stop the tocolytic medication and allow her labor to progress.

- Vaginal birth if there is no obstetrical contraindication.

PATIENT WITH FETAL DEATH IN LABOR:

- Complete all laboratory examinations following protocols for pre-eclampsia and fetal death.

- Vaginal birth if there is no obstetrical contraindication and labor progresses satisfactorily
- If labor does not progress satisfactorily, augment with oxytocin according to protocol. If the augmentation fails, perform a cesarean section under epidural anesthesia.

PATIENT WITH FETAL DEATH NOT IN LABOR:

- Conduct all laboratory examinations following protocols for pre-eclampsia and fetal death.
- Admit to labor and delivery and initiate first induction.
- If the first induction fails and the cervix is favorable, repeat the induction in 24 hours. The patient may eat upon terminating the failed induction. If the cervix is not favorable, transfer patient to the postpartum service and follow fibrinogen and coagulation factors every 48 hours for one week.
- Depending on the coagulation profile and cervical changes, initiate the second induction one week after the first induction. Always remember to support and provide explanations to these patients emotionally (explaining the situation to them) in the meantime.
- If the second induction fails, induce for a third time 24 hours later using prostaglandins:
 - Place one 3 mg tablet of postaglandin E2 (dinoprostone) in the posterior fornix. Keep the patient lying down for at least one hour after placement of the tablet. Repeat in 6 hours if necessary. Oxytocin may be initiated 4 hours after the placement of the last prostaglandin tablet if necessary. Never use oxytocin and prostaglandins simultaneously.
- If the third induction fails, perform a cesarean section.

2.2 MODERATE PRE-ECLAMPSIA

DIAGNOSTIC PARAMETERS FOR MODERATE PRE-ECLAMPSIA:

- Greater tendency to gain weight (more than 4 pounds/month)
- Diastolic blood pressure 90-100 mm Hg
- Proteinuria of 2-5 grams/24 hours
- Edema

MANAGEMENT:

- Hospitalization:
 - ✧ NO DIURETIC USE
 - ✧ Complete history and physical examination
 - ✧ Admit to labor and delivery or to antepartum ward
 - ✧ Absolute bedrest in semi-fowler or left lateral position
 - ✧ Low sodium diet (2 grams)
 - ✧ Record vital signs including fetal heart rate every 2 hours for 6 hours; if stable, go to every 4 hours
 - ✧ Weigh daily
 - ✧ Record input and output every 24 hours
- Observations:
 - ✧ Rise in blood pressure
 - ✧ Convulsions
 - ✧ Epigastric pain
 - ✧ Headache
 - ✧ Change in conduct
 - ✧ Contractions
- Laboratory examinations:
 - ✧ Complete blood count with differential and platelet count
 - ✧ Blood type and Rh
 - ✧ 24 hour urine sample for total protein quantification
 - ✧ BUN, Creatinine
 - ✧ Uric acid

- ↘ Blood glucose
 - ↘ Prothrombin time
 - ↘ Partial thromboplastin time
 - ↘ Coagulation time
 - ↘ Fibrinogen
 - ↘ Transaminases
 - ↘ Bilirubins
 - ↘ Urinary sediment
- Electrocardiogram
- Funduscopy examination by ophthalmologist
- Intravenous solutions according to case:
 - ↘ Dextrose 5% with three way valve to keep vein open, depending on case
- Present patient to chief of service
- Report changes in state

PATIENTS NOT IN LABOR:

- Hospitalize patient and perform all examinations. Admit to antenatal ward.
- If the patient is stable, induce labor at 38 weeks gestation.
- If the pregnancy is between 28-34 weeks gestation, hospitalize patient and administer steroids weekly until 34 completed weeks (Dexamethasone 12 mg I. M. every 12 hours for 2 doses, repeated weekly). If the patient stabilizes, she should remain in the hospital and should have her labor induced at 38 weeks gestation. If the induction fails, perform a cesarean section.

PATIENTS IN LABOR:

- Perform all examinations and allow labor to progress if pregnancy is more than 34 weeks.
- If the patient is stable, inhibit labor prior to 34 weeks gestation in order to induce pulmonary maturity with steroids (see above). Do not use tocolytics for more than 48 hours and do not repeat their use.

WARNING: Delaying delivery in a patient with pre-eclampsia may worsen her condition. These patients must be evaluated very carefully before initiating tocolysis, and must be monitored closely while they are receiving utero inhibition. If a patient's condition worsens, stop the tocolytic medication and allow her labor to progress.

- Record vital signs (including fetal heart rate) and obstetric evaluation every 15 minutes on a special sheet.
- Vaginal birth if labor progresses well. Cesarean for obstetric indications.
- If labor is irregular and there is no other contraindication, augmentation with oxytocin may be used according to protocol.
- If satisfactory progress has not been made with oxytocin augmentation (< 1cm/hour for 6 hours), perform cesarean section with epidural anesthesia.

PATIENT WITH FETAL DEATH NOT IN LABOR:

- Conduct all laboratory examinations following protocols for pre-eclampsia and fetal death.
- Admit to labor and delivery and initiate first induction.
- If the first induction fails, repeat the induction E2 (dinoprostone) in the posterior fornix. Keep the patient lying down for at least one hour after placement of the tablet. Repeat in 6 hours if necessary. Oxytocin may be initiated 4 hours after the placement of the last prostaglandin tablet if necessary. Never use oxytocin and prostaglandins simultaneously.
- If the second induction fails, individualize management in consultation with the chief of service.

PATIENT WITH FETAL DEATH IN LABOR:

- Draw all laboratory examinations following protocols for pre-eclampsia and fetal death.
- Vaginal birth if there is no obstetrical contraindication and labor progresses satisfactorily.

- If labor does not progress satisfactorily, augment with oxytocin according to protocol, waiting a maximum of 8 hours before performing a cesarean section under epidural anesthesia.

2.3 SEVERE PRE-ECLAMPSIA

DIAGNOSTIC PARAMETERS FOR SEVERE PRE-ECLAMPSIA:

- If the patient has any of the following symptoms not attributable to another cause (except edema alone), she is classified as a severe pre-eclamptic:
 - ✧ Diastolic blood pressure above 100 mm Hg
 - ✧ Proteinuria greater than 5 grams/24 hours
 - ✧ Edema
 - ✧ Oliguria (≤ 500 ml/24 hours)
 - ✧ Central nervous system symptoms
 - ✧ Thrombocytopenia
 - ✧ Epigastric pain/liver tenderness

MANAGEMENT:

- NO DIURETIC USE
- Complete history and physical examination
- Admit to labor and delivery ward
- Absolute bedrest in semi-fowler or left lateral positions
- Diet: nothing by mouth
- Record vital signs including fetal heart rate hourly
- Place central venous line and record central venous pressure hourly
- Observations:
 - ✧ Rise in blood pressure
 - ✧ Convulsions
 - ✧ Epigastric pain
 - ✧ Headache
 - ✧ Change in conduct
 - ✧ Contractions

- Laboratory examinations:
 - ↘ Complete blood count with differential and platelet count
 - ↘ Blood type and Rh
 - ↘ 24 hour urine for total protein
 - ↘ BUN, Creatinine
 - ↘ Uric acid
 - ↘ Blood glucose
 - ↘ Prothromboplastin time
 - ↘ Bleeding time
 - ↘ Coagulation time
 - ↘ Fibrinogen
 - ↘ Transaminases
 - ↘ Bilirubins
 - ↘ Urinary sediment
- Electrocardiogram
- Chest x-ray
- Funduscopic examination by ophthalmologist
- Medication:
 - ↘ Apresoline (Hydralazine) 5 mg. I. V. Increase dose to 10 mg, 15 mg, or 20 mg every 15 minutes if a drop in blood pressure is not seen.
 - ↘ Magnesium sulfate 4 grams in 250 ml Dextrose 5%, I. V. over 20 minutes. Follow this with a maintenance dose of 10 grams magnesium sulfate in 500 ml Dextrose 5% at 33 drops/minute (2 grams/hour).
 - ↘ Magnesium sulfate should continue for 24 hours postpartum. Monitor vital signs, urinary output and reflexes closely. In cases of intoxication, utilize calcium gluconate 10 ml of a 10% solution I. V. over 3 minutes.
 - ↘ Diazepam 10 mg I. V. single dose if patient convulses (stops convulsions).
- In cases of continuous convulsions, consult with anesthetist for intubation and assisted respiration. Perform cesarean section if delivery is not imminent.
- Solutions: Intravenous fluids should be ideally managed at 120 ml/hour (40 drops/minute) of Lactated Ringers. If oxytocin is used, a concentrated solution in Dextrose 5% is preferable.
- Present the patient to chief of service.
- Report any changes immediately.

PATIENTS NOT IN LABOR:

- Perform all examinations.
- If the patient stabilizes, deliver the baby vaginally if there is no other obstetric contraindication.
- If the patient does not stabilize within 4 hours, perform a cesarean section.

PATIENTS IN LABOR:

- Perform all examinations.
- Perform cesarean section in 4 hours maximum if labor does not progress well or if the patient continues to be unstable. Epidural anesthesia is preferred.
- If the patient is admitted with complete dilation, deliver vaginally applying prophylactic forceps in the second stage.

PATIENTS WITH FETAL DEATH NOT IN LABOR:

- Perform all examinations according to protocols for pre-eclampsia and fetal death.
- Stabilize the patient and induce her labor. If the induction fails, perform a cesarean section.
- If the patient does not stabilize within 4 hours, perform a cesarean section.

PATIENTS WITH FETAL DEATH IN LABOR:

- Perform all examinations according to protocols for pre-eclampsia and fetal death.
- Stabilize the patient.
- If labor is not progressing well, perform a cesarean section within 4-6 hours.
- If labor is irregular, augment with oxytocin.

- If the patient is admitted with complete dilation, deliver vaginally if there is no obstetric contraindication.
- Apply prophylactic forceps in the second stage.

2.4 ECLAMPSIA

DIAGNOSTIC PARAMETERS FOR ECLAMPSIA:

- A patient with pre-eclampsia who has had a convulsion, without another explanation for the convulsion (i.e, history of seizure disorder) is eclamptic.

MANAGEMENT:

- NO DIURETIC USE
- Complete history and physical examination
- Admit to labor and delivery
- Patient in separate room with intensive care
- Absolute bedrest in semi-fowler or left lateral positions
- Diet: nothing by mouth
- Three catheters:
 - ◀ Central line with central venous pressure recorded every hour
 - ◀ Bladder catheter
 - ◀ Nasogastric tube
- Record vital signs every 30 minutes:
 - ◀ Blood pressure, pulse, respirations, fetal heart rate
 - ◀ Record rectal temperature every 4 hours
- Record intake and output hourly
- Observations:
 - ◀ Rise in blood pressure
 - ◀ Convulsions
 - ◀ Epigastric pain
 - ◀ Headache
 - ◀ Change in conduct
 - ◀ Contractions

- Laboratory examinations:
 - ↘ Complete blood count with differential and platelet count
 - ↘ Blood type and Rh
 - ↘ 24 hour urine for total protein
 - ↘ BUN, Creatinine
 - ↘ Uric acid
 - ↘ Blood glucose
 - ↘ Prothrombin time
 - ↘ Partial thromboplastin time
 - ↘ Bleeding time
 - ↘ Coagulation time
 - ↘ Fibrinogen
 - ↘ Transaminases
 - ↘ Bilirubins
 - ↘ Urinary sediment

- Electrocardiogram

- Funduscopic examination by ophthalmologist

- Medication:
 - ↘ Hydralazine (Apresoline) 5 mg I. V. Increase dose to 10 mg, 15 mg, or 20 mg every 15 minutes if a drop in blood pressure is not seen,
 -OR-
 Nifedipine 5 mg sublingual. Evaluate every 15 minutes and repeat the dose if necessary. Strict monitoring of blood pressure and fetal heart rate.
 - ↘ Diazepam (Valium) 10 mg I.V. during a convulsion.
 - ↘ Magnesium sulfate, 4 grams in 250 ml Dextrose 5%, I. V. over 20 minutes. Follow this with a maintenance dose of 10 grams magnesium sulfate in 500 ml Dextrose 5% at 33 drops/minute (2 grams/hour).

Note: Magnesium sulfate should continue for 24 hours postpartum. Monitor vital signs, urinary output and reflexes closely. In case of magnesium intoxication, utilize calcium gluconate 10 ml of a 10% solution I. V. over 3 minutes.

- In cases of continuous convulsions, consult with anesthetist for intubation and assisted respiration. Perform a cesarean section if delivery is not imminent.

- Intravenous fluids should ideally be managed at 120 ml/hour (40 drops/minute) of Lactated Ringers. If oxytocin is used, a concentrated solution in Dextrose 5% is preferable.

- Present patient to chief of service.

- Report any changes in state.

PATIENTS NOT IN LABOR:

- Perform all examinations, according to protocol.
- Try to stabilize the patient. If she stabilizes and there is no obstetric contraindication, induce labor with oxytocin. If the induction fails, perform a cesarean section.
- If the patient continues convulsing in spite of treatment, perform a cesarean section immediately under general anesthesia.

PATIENTS IN LABOR:

- Perform all examinations, according to protocol.
- If the patient stabilizes and labor progresses well, deliver vaginally. If she stabilizes but labor does not progress well, carefully augment labor with oxytocin.
- If the patient continues convulsing, perform a cesarean section immediately under general anesthesia.
- If the patient is admitted with complete dilation, deliver vaginally if there is no obstetric contraindication.
- Apply prophylactic forceps in the second stage.

PATIENTS WITH FETAL DEATH NOT IN LABOR:

- Perform all examinations according to protocols for eclampsia and fetal death.
- Stabilize the patient and induce labor. If the induction fails, perform cesarean section.
- Apply prophylactic forceps in the second stage if there is no obstetrical contraindication.
- If the patient continues convulsing 2 hours after the initiation of treatment, or in the case of status epilepticus prior to 2 hours, perform a cesarean section immediately under general anesthesia.

PATIENTS WITH FETAL DEATH IN LABOR:

- Perform all examinations according to protocols for eclampsia and fetal death.
- Stabilize the patient. If labor is not progressing well, augment oxytocin.
- If the patient is admitted with complete dilation, deliver vaginally if there is no obstetric contraindication.
- If the patient continues convulsing 2 hours after the initiation of treatment, or in the case of status epilepticus prior to 2 hours, perform a cesarean section immediately under general anesthesia.

3. PRE-EXISTING PROBLEMS IN PREGNANCY

3.1 RHEUMATIC HEART DISEASE IN PREGNANCY

INCIDENCE:

Worldwide the incidence of heart disease with pregnancy is between 0.2 and 3.7%. Worldwide maternal mortality in pregnant cardiac patients is 10%, and in Egypt these numbers may be as high as 85%.

(NMMS 1992-1993, MOHP/CSP, 1994)

HEMODYNAMIC CHANGES DURING PREGNANCY:

- Profound changes occur due to pregnancy in the cardiovascular system to the extent that:
 - ↘ Cardiac Out-put (COP) increases by as much as 40%. This starts as early as the 10th week and reaches its peak by the 28th week and remains elevated until the end of pregnancy.
 - ↘ Blood volume increases by as much as 50%.
 - ↘ Heart work increases by about 30-40%.
 - ↘ Peripheral resistance decreases.

- In healthy pregnant women the functional capacity of the heart can deal effectively with these physiological demands. However, patients with cardiac diseases have a limited cardiac functional capacity and their hearts may fail to compensate for these changes and serious consequences may arise like:
 - ↘ Congestive heart failure
 - ↘ Acute pulmonary edema
 - ↘ Sudden death

- Maternal mortality in pregnant cardiac patients may be as high as 10%.

COMMON RHEUMATIC HEART DISEASES INCLUDE:

- Rheumatic mitral stenosis (by far the most common)
- Mitral regurge
- Aortic valve lesions

POSSIBLE EFFECTS OF RHEUMATIC HEART DISEASES UPON PREGNANCY:

- There may be an increased incidence of maternal mortality particularly in cyanotic heart diseases
- Increased incidence of preterm labor
- Increased incidence of IUGR, IUFD and fetuses that are small for their gestational age

DIAGNOSIS:

- Most pregnant patients with rheumatic heart disease know that they have this problem beforehand.
- A minority of cases are discovered for the first time during their pregnancies. Extreme caution should be paid to these cases as the diagnosis may be difficult to make because:
 - ◀ The cardinal signs and symptoms of heart diseases, like easy fatigability, shortness of breath, orthopnea...etc, may be present with normal pregnancy.
 - ◀ Auscultatory findings, like murmurs, are commonly heard during pregnancy without having an organic cause.
 - ◀ ECG changes seen can result from normal pregnancy, making even this diagnostic tool not adequately sensitive to investigate a cardiac problem.

POSSIBLE CLINICAL PICTURE:

- Symptoms like dyspnea, orthopnea, paroxysmal nocturnal dyspnea, palpitation, easy fatigability.
- Signs like cyanosis, clubbing of fingers, marked parasternal pulsation, marked congestion of neck veins....etc.

- Adequate history taking will provide invaluable information that may be the first clue towards finding the accurate diagnosis.

GRADES OF DYSPNEA:

- Grade I: No limitation of activity
- Grade II: Shortness of breath on extra-ordinary activity
- Grade III: Dyspnea with ordinary efforts
- Grade IV: Dyspnea at rest

Note: Pregnancy usually deteriorates dyspnea by one grade so that about 50% of women who develop heart failure during 28-32 weeks of gestation were really starting pregnancy at Grades I & II

PROGNOSTIC CRITERIA:

- The degree of organic lesion, its type, and whatever the degree of dyspnea at the start of pregnancy
- Performance in previous pregnancies
- The presence of cardiac enlargement
- A.F. (Auricular Fibrillation)
- Any associated problem

ANTENATAL CARE:

- It should be a combination of cardiac and obstetric care
- More frequent antenatal visits
- Adequate rest and sleep for not less than 8 hours/day
- Avoid excessive weight gain
- Observe salt restrictions in the diet
- Diet rich in proteins and low in fats and carbohydrates (CHO)

- Treatment of any anemia
- Emergency treatment of any chest infection
- Avoid factors that cause tachycardia
- At the start of pregnancy patients should be examined and any septic focus should be discovered and adequately eradicated

INDICATIONS FOR HOSPITALIZATION DURING THE ANTENATAL PERIOD:

- Patients with Grade II dyspnea should be admitted a week before their expected date of delivery
- Grade III should not leave the hospital until they reached grade I to II
- Grade IV should not leave the hospital at any time until after delivery
- Anemics should remain until their condition is corrected
- Respiratory tract infection patients should remain until they are adequately treated
- Hypertension patient should stay until their condition is adequately controlled
- Edematous patients should stay until the cause is investigated and treated

DIGITALIZATION:

- Grade II or more
- Cardiac enlargement
- A.F. with rheumatic heart disease
- Heart failure

Note: Start digoxin with a loading dose of 1-1.5 mg in 24 hours. Maintenance dose is usually 0.25 mg/day.

Note: If there is any need for diuretics in a cardiac pregnant patient, the safest approach is to start with chlorothiazide.

Note: Frusemide should not be used unless it is necessary (for life threatening conditions).

OBSTETRIC MANAGEMENT:

- Avoid prolonged exhaustion
- There is no indication for induction of labor for cardiac diseases only
- Adequate analgesia and adequate oxygenation during labor
- Delivery in the semi-seated position
- Antibiotic cover during labor
- Avoid straining in the second stage and cut it short
- Restrict fluid intake to not more than 75 ml/hour
- Avoid the use of ecbolics

Note: There is no contraindication to breastfeeding for mothers with a rheumatic heart if they are not in failure.

Note: Early ambulation is very important to avoid the possibility of postpartum embolization.

3.2 DIABETES IN PREGNANCY

DEFINITION:

- Carbohydrate intolerance onset or a first diagnosis of diabetes during pregnancy (gestational diabetes; its incidence is about 2% to 5% of all pregnancies) or pregnancy in a patient with known diabetes before pregnancy. Diabetes not only affects carbohydrate (Chtes) but also protein and fat metabolism due to a relative or absolute insulin deficiency

RISK FACTORS:

- Family history of diabetes (D.M.)
- Previous gestational diabetes
- Poor obstetric history:
 - ◀ Unexplained fetal deaths
 - ◀ Traumatic and operative delivery
 - ◀ Fetal and neonatal macrosomia (↑ 4 kgm)
 - ◀ Neonatal metabolic changes (jaundice, hypoglycemia and hypocalcemia)
 - ◀ Maternal obesity, advanced maternal age and multiparity

PRINCIPAL CLINICAL PICTURE:

- Fetal macrosomia, polyhydramnios, glycosuria
- Polydipsia, polyhagia, polyuria and weight loss
- Repeated infections in pregnancy

LABORATORY EXAMINATIONS:

- Urine analysis: complete urine analysis (test urine for sugar in each antenatal visit)
- Fasting blood glucose
- Three hour glucose tolerance test (OGTT) (oral glucose tolerance test): (50gm glucose in 300ml of water 15 minutes after FBS sample)
 - ◀ Normal: Test after 1 hour, 2 hours and then 3 hours.
 - ◀ In high-risk pregnancy, a negative test should be repeated at 24 – 28 weeks.

↖ When values are borderline, the test should be repeated more frequently.

- Glycosylated Hb (HBA1C)

Ultrasound(Very important), Its values:

- ↖ Before 12 weeks: To detect maturity (by crown – rump length), congenital fetal malformations and missed abortion

- ↖ From 18 – 20 weeks: The same as above

- ↖ From 24 weeks and onwards: Should be done every 2 weeks until delivery to detect:

- Fetal macrosomia
- Polyhydramnios
- IUGR, if available color pulse doppler
- Biophysical profile (fetal well being)
- Placenta: size, site

MANAGEMENT:

- The aim is to prevent or reduce the risk of maternal morbidity and perinatal morbidity and mortality.

- Medical care:

- ↖ Dietary recommendations (Diet):

- The total caloric intake – 30 calories /kg for normal weight, 24 calories/kg for obese. Chtes between 35 – 55%, 25% protein, 20% fat. Divide meals into six meals (daily), 3 main and 3 snacks in between meals.

- ↖ Exercise: involving upper limb should be encouraged.

- ↖ Ophthalmoscopic examination: should be done routinely starting at 1st antenatal care visit and repeated every month or when required.

- ↖ Insulin: No indication for changing established insulin regime to another species. Insulin allergy or resistance cases are extremely rare. The majority of women require insulin injection at least twice daily. Mixture of short acting (soluble) and medium acting (isophane or insulin zinc suspension) given 20-30 minutes before breakfast and dinner. Starting dose is 20 units NPH mixed with 10 units of regular insulin S.C (subcutaneous) each morning before breakfast.

- In the 3rd trimester: Insulin dosage should be increased if glucose profiles show hyperglycemia despite 30 IU/day)

OBSTETRIC MANAGEMENT:

- Antenatal care:

- ↖ Exercise: involving upper limb should be encouraged.

- ◀ Clinical evaluations should be completed by both a diabetic physician and obstetrician, working together in a combined diabetic – antenatal clinic. Evaluations should be given every 2 weeks until 34 weeks and weekly thereafter. Early diagnosis and management will decrease the incidence of abortions, IUFD and congenital malformations.
- ◀ U.S. & evaluation of fetal well-being starting from 28 – 32 weeks.
- ◀ Fetoprotein tests should be done on maternal blood & amniotic fluid to detect neural tube defects only when suspected.
- ◀ Others: maternal weight gain, urine biochemical tests.
- ◀ Fetal monitoring: Non-stress + biophysical profile weekly from 34 weeks and continuously in labor.
- ◀ Hospitalization: From 32 weeks for patients with microangiopathy due to increased risk of hypertension, pre-eclampsia and IUGR.

CARE DURING LABOR:

- Others: maternal weight gain, urine biochemical tests.
- The incidence of premature labor is high, especially in cases involving uncontrolled diabetes, and decreased fetal lung maturity with increased incidence of R.D.S.
- When the insulin requirement is down, blood glucose and insulin infusions should be frequently monitored (every ½ - 1 hour) to keep blood glucose levels between 80 – 110 mg/dl.
- Soluble insulin is diluted in normal saline (1 unit of insulin per/ml of saline), and delivered initially at 1U/hour.
- Along with the I.V. saline, an I.V infusion of 10% glucose is maintained at 1 liter /8 hours.
- The same regimen is employed when delivering by elective C.S.

MODE OF DELIVERY:

- Neonatal Intensive Care: Intensive care management of neonates should be available for all cases and the ICU should be closed off from the labor ward.

AFTER LABOR AND POSTPARTUM:

- Lactation is encouraged.
- Dietary CHtes should be increased by 50 gm and insulin dosage should be adjusted.

INDICATIONS FOR CESARIAN SECTION DELIVERY IN DIABETIC PREGNANCY:

- Macrosomic fetus (shoulder dystocia)
- Certain cases of IUGR
- Associated: Hypertension – polyhydramnios
- Severe vaginal infections especially with primigravidas
- Others: - Elderly primigravida
- Placenta Previa
- Bad obstetric history

4. ESTABLISHED PRETERM LABOR

DEFINITION:

- Labor that initiates after 20 weeks and before completing 37 weeks gestation.

RISK FACTORS:

- History of preterm delivery
- Uterine anomalies
- History of renal disease or pyelonephritis
- Multiple pregnancy
- Very young gravidas < 20 years
- Type of work
- Bleeding in the first trimester
- Polyhydramnios
- Placenta previa, etc.

PRINCIPAL CLINICAL SIGNS:

- Regular uterine contractions plus:
 - ◀ Cervical changes
 - ◀ Dilatation
 - ◀ Effacement

MANAGEMENT:

- Admit to labor ward.
- The first step is to confirm the diagnosis by adequate history taking, clinical examination (both general and local) to assess the condition of the mother as well as the fetus and to evaluate perceived real uterine contractions. In addition, a pelvic examination should be done to detect the cervical changes and the stage of labor.

- Ultrasonography when available will be very helpful to estimate the duration of pregnancy, assess fetal condition, number of fetuses, diagnose congenital anomalies, fetal life, amniotic fluid, placental site and grade, etc.
- Laboratory investigations:
 - ◁ Blood group & Rh factor
 - ◁ Hemoglobin concentration
 - ◁ Leucocytic count: total and differential (a count > 12000/dl is critical).
 - ◁ Urine analysis and culture
 - ◁ Blood sugar whenever indicated
- Management will depend upon:
 - ◁ The stage of labor
 - ◁ The duration of pregnancy
 - ◁ The condition of the fetus
 - ◁ The condition of the mother
 - ◁ Any associated obstetric &/or medical conditions
- Accordingly the management will be either:
 - ◁ Allowing delivery to proceed
 - ◁ Inhibition of preterm labor and initiation of long term tocolysis.
 - ◁ Short term tocolysis and acceleration of lung maturity by steroids.

CASES IN WHICH PRETERM DELIVERY IS ALLOWED TO PROCEED:

- Cases where the cervix is 5 cms or more
- Cases where membranes are ruptured
- IUFD
- Fetal congenital anomalies incompatible with life
- Cases with evident amnionitis
- Cases with severe fetal distress, and cases with severe IUGR
- Cases with severe bleeding like placenta previa
- Severe PET
- Mothers with chronic infection and/or chronic diseases: thyrotoxicosis, heart disease, SLE, etc.
- Adequate lung maturity

THE SECOND GROUP WHO ARE IN NEED FOR TOCOLYSIS: _____

- Gestational age before 34 weeks
- No overt maternal or fetal infection
- Intact membranes
- Cervix less than 4 cms

- No evidence of placental insufficiency or maternal diseases justifying ending of pregnancy

Note: Those cases will be admitted to the labor ward where they are put to absolute bed rest and started on tocolysis.

TOCOLYTIC AGENTS:

◀ B-sympathomimetics:

Ritodrine (Yutopar)
Terbutaline (Bricanyl)
Sulbutoamol (Salbovent)
Hexoprenaline
Isoxuprine

- ◀ Mg sulfate
- ◀ Endomethacin

Note: The most commonly used agents in this respect are B-sympathomimetics, particularly ritodrine.

HOW TO USE RITODRINE?

- The patient is put in complete bed rest
- Nothing is given by mouth at least for the first 4-6 hours
- Start intravenous tocolysis as follows:
 - ◀ Dissolve 3 ampoules of yutopar (150mg) in 500 ml dextrose or ringers lactate solution
 - ◀ Start I.V. infusion at a rate of 10 drops per minute and increase the rate by 10 drops each 10 minutes until:
 - Contractions stop
 - Reach a maximum of 70 drops/minute
 - Pulse rate reaches or exceeds 120/minute
 - Toxicity appears
- Once an adequate dose is reached it should be continued for 12 hours after the contraction stops.

- 30 minutes before stopping the intravenous infusion give a 10 mg tablet of ritodrine then one tablet /2 hours for the first 24 hours as long as the pulse rate does not exceed 120/minute. Then the dose can be adjusted to 10-20 mg each 4-6 hours or as necessary.

DURING TOCOLYSIS THE PATIENT SHOULD BE OBSERVED FOR THE FOLLOWING:

- Psychological attitude
- Pulse rate, should not exceed 120/minute
- Temperature to guard against pyrexia
- Tenderness of the abdomen in absence of contractions
- Blood pressure should not be less than 100/60
- Fetal heart rate 120-160/minute and notice the preservation of the beat to beat variations.
- Excessive vaginal discharges
- Fetal movements
- Vaginal bleeding
- Nausea and vomiting
- Urinary output
- Total fluid intake, should not exceed 3000 ml a day of mixed fluids

CONTRAINDICATIONS TO B-SYMPATHOMIMETICS:

- Symptomatic maternal cardiac disease, especially outflow obstruction
- Arrhythmia
- Hyperthyroidism
- Uncontrolled Insulin Dependent Diabetes
- Eclampsia and severe PET
- Severe bleeding
- Severe anemia
- Monoaminooxidase inhibitors
- Asthmatics already taking B-sympathomimetics

Note: In such situations it is highly recommended to refer the case to a higher level.

MEDICATIONS OTHER THAN TOCOLYSIS:

- Antibiotics to guard against infection (Ampicillin 500 mg/6 hours)
- Phenobarbital 10 mg/kg in an infusion with a maximum of 700 mg when labor is impending

- Dexamethazone 4 mg /6 hours for 4 doses for pregnancies less than 34 weeks provided that labor is not expected to be completed within less than 24 hours or more than 7 days. If labor is postponed for more than 7 days another course of dexamethazone should be given.

IF TOCOLYSIS IS SUCCESSFUL:

- Transfer to antenatal ward
- Absolute bedrest
- Normal diet
- Vital signs every 30 minutes for 2 hours; if normal then per routine
- Observations:
 - ◁ Blood pressure less than 90/55 mmHg.
 - ◁ Maternal pulse or equal to 120/min or more.
 - ◁ Vaginal discharge or bleeding
 - ◁ Uterine contractions for more than one every 10 minutes
 - ◁ Record urinary output every 12 hours
 - ◁ Transfer patient with laboratory examinations noted in record
 - ◁ Ultrasound, Non Stress Test (NST) twice weekly and amniocentesis (according to case)
 - ◁ Consultations according to associated problems.
 - ◁ Medications

***IF TOCOLYSIS IS NOT SUCCESSFUL AFTER 6 HOURS
(CONTRACTION, DILATION AND OR EFFACEMENT CONTINUE):***

- Stop tocolytic medication and allow patient to progress. Remember to notify the neonatal service to prepare for a premature newborn.
- If the patient presents with cervical dilation of 5 cm or more, transfer to labor and delivery and allow her to progress with a vaginal delivery if there is no contraindication to this. The delivery should be attended by the obstetric resident, and the pediatric resident should be advised and present for the delivery. An ample episiotomy should be performed.
- If there is any contraindication to a vaginal birth and tocolysis has failed, perform a cesarean section.

CONDITIONS FOR DISCHARGE:

- Disappearance of the signs and symptoms that motivated the admission for a minimum time period of 48 hours after tocolysis was achieved. General examination should be normal.
- No associated pathology, or under treatment (eg. Antibiotics)
- Patient is to continue oral tocolysis according to directions until she has been evaluated in one week in the outpatient clinic, where she should be seen by a 2nd year obstetric resident. Tocolytics can be discontinued and the patient should be seen weekly. If she cannot attend the hospital outpatient clinic, refer her with a referral sheet to the health center/ nearest to her home.
- Educate patient about:
 - ◀ Monitoring uterine activity
 - ◀ Fetal movement counting
 - ◀ No sexual activity
 - ◀ Vaginal discharges
 - ◀ Vaginal bleeding
 - ◀ Decreased fetal movements
 - ◀ Importance of correctly complying with medical treatment and prenatal care
 - ◀ Decreasing physical activity
 - ◀ Delivery in the hospital

5. RECOGNIZE AND MANAGE LABOR

5.1 LABOR MANAGEMENT

STANDARD ADMISSION ORDERS FOR THE LABOR WARD:

- Admit to labor ward, request and review prenatal chart, and take the history of the present labor. (Full history if not booked).

DIET:

- Clear fluids
- No routine enema

ACTIVITY:

- Ambulatory if membranes are intact or with ruptured membranes if the presenting part is well engaged.
- Bedrest if membranes are ruptured and the presenting part is not well engaged.

OBSERVATIONS:

- General condition of woman:
 - ✧ Psychological attitude, hydration, hemorrhage, nausea, vomiting.
- Vital signs:
 - ✧ Chart hourly on partograph (pulse, blood pressure, respirations, temperature).
 - ✧ Urinary output: (encourage the woman to pass urine every 2 – 4 hours; measure output and record) - (test urine for proteins, sugar, acetone).

- Fetal condition:
 - ↖ Strict monitoring and recording of fetal heart rate before, during and after a contraction every 30 minutes.
 - ↖ Observation of color of liquid.
 - ↖ Moulding of the fetal skull.
- Progress of labor:
 - ↖ Timing and recording of uterine contractions every 30 minutes. Uterine contractions should be observed the last 10 minutes of every half an hour for frequency, duration and strength.
 - ↖ Descent of presenting part using rule of fifths.
 - ↖ Cervical dilation. Most important indicator of progress of labour.

Note: Complete the partograph for every patient in labor.

LABORATORY EXAMINATIONS:

- Hemoglobin, hematocrit, blood type (including Rh), and urinalysis. (obtain minimum laboratory examinations and others necessary according to the case).

MANAGEMENT:

- Evaluate according to the case.
- Decide on a management plan for the patient.
- Always present the woman to resident on duty.
- Record and report all abnormal changes immediately.

Note: Analgesia should be offered during labor according to each case.

5.2 CEPHALIC PRESENTATION

DEFINITION:

- Labor → Termination of pregnancy after fetal viability (28 weeks).
- Normal Labor → Labor and delivery of one fetus, at term (≥ 37 weeks) in the cephalic, vertex presentation (occipito anterior position) O.A., without evidence of other obstetric or medical problems (cephalopelvic disproportion, maternal or cardiac disease etc.) within a reasonable time, and without interference and ends through the vagina.
- True labor pains → Regular uterine contractions that produce cervical effacement and dilatation.

LABORATORY EXAMINATIONS:

- According to standard admission orders.

MANAGEMENT OF FIRST STAGE:

- Make the diagnosis of labor (true labor pains, bulging membranes, and progress in cervical dilatation). If the diagnosis is not firm, if the patient lives far away from a hospital or if it is night time, the patient may be invited to stay in the hospital for 12 hours of observation.
- Take a full history.
- Complete physical and abdominal examination. Vaginal examinations should be done by a resident.
- Admit patient to labor ward. Reassure the woman and explain all procedures to her. Keep the family informed of the progress.
- Monitor labor carefully.

FETAL CONDITIONS:

- Assess fetal size.
- Monitor and record fetal heart rate before, during and after every contraction or every 30 minutes.
- Evaluate fetal well-being and detect abnormalities in the fetal heart rate (type I & II decelerations or marked variable decelerations, bradycardia or tachycardia).
- Observe the color of the amniotic fluid.
- Assess degree of molding of fetal skull.
- Recognize position of occiput.

PROGRESS OF LABOR:

- Monitor and record uterine activity (last 10 minutes of every 30 minutes of observation). Contractions should increase in frequency, length and strength.
- Vaginal examination every four hours (if there is no other indication) under strict conditions of asepsis and hygiene. Assessment should include:
 - ◁ The consistency, length and dilatation of the cervix
 - ◁ The descent, caput, molding and degree of flexion of the vertex presentation
 - ◁ The state of the membranes and the color of the amniotic fluid
 - ◁ Evidence of cephalo-pelvic disproportion
- After the third examination, further examinations are to be at the discretion of the resident. The findings of each examination and the exact number of examinations must be recorded. The total number of examinations should never be more than eight.
- Partograph for every patient. If labor does not progress well according to the partograph criteria, consult the resident or attending obstetrician about oxytocin augmentation. Normal progress is a minimum of 1 cm/hour cervical dilatation in the active phase.

MATERNAL CONDITIONS:

- Monitor and record vital signs every hour (blood pressure, pulse, temperature, respiration).

- Monitor hydration, psychological attitude and reaction to pain.
- Encourage the woman to pass urine every 2 – 4 hours.
- Record intake and output every 2 hours.

Note: All abnormalities in fetal heart rate, progress in labor, vital signs or vaginal bleeding must be communicated immediately to the senior resident or specialist on duty.

IMPORTANT CONSIDERATIONS:

- Always respect the modesty of all patients. Keep them covered during examinations and when transferring them from one room to another. Always speak to them with respect and dignity.
- The duration of labor should be recorded from the time she is admitted with a diagnosis of labor to the time she gave birth. In the great majority of cases this should not be more than 12 hours.
- The maximum number of personnel in the delivery room is six (and preferably fewer than six).
- Episiotomy according to the case.
- A resident must be present at every delivery.
- A resident must be present for the suturing of all episiotomies and/or lacerations.
- The mother must be given the opportunity to hold her baby and initiate breastfeeding immediately (if her medical condition permits it).
- Analgesics should always be offered during labor:
 - < Non- pharmaceutical
 - Reassurance
 - Explanation
 - Sympathy
 - Companionship
 - < Pharmaceutical
 - Inhalation
 - Drugs (sedatole/ tranquilizer)
 - Epidural analgesia (only in secondary level by a trained Anesthesiologist)

5.3 THE PARTOGRAPH

"An Early Warning System"

OVERVIEW:

It is essential to note that the partograph can only be used by health workers with adequate training in midwifery who are able to:

- Observe and conduct normal labor and delivery
- Perform vaginal examination in labor and assess cervical dilatation accurately
- Plot cervical dilatation accurately on a graph against time

It has no place, therefore, in deliveries at home conducted by attendants other than those trained in midwifery. Whether used in health centres or "maternities" or in hospitals, the introduction of the partograph must be accompanied by a programme of training in its use and by appropriate supervision and follow-up.

DEFINITION:

A graphic recording of progress of labor and salient conditions of the mother and fetus

OBJECIVES:

- ◀ Early detection of abnormal progress of labor
- ◀ Prevention of prolonged labor
- ◀ Recognize cephalopelvic disproportion long before obstructed labor
- ◀ Assisting in early decision on transfer, augmentation and termination of labor
- ◀ Increasing the quality and regularity of all observations of mother and fetus
- ◀ Early recognition of problems either maternal or fetal

COMPONENTS OF THE PARTOGRAPH

- PART I: The fetal condition
- PART II: The progress of labor
- PART III: The maternal condition

PART I

THE FETAL CONDITION

1. Fetal heart rate:

- a. > 160 beats/min. = Tachycardia
- b. ≤ 120 beats/min. = Bradycardia
- c. ≤ 100 beats/min. = Severe bradycardia (severe fetal distress)

2. Membranes and liquor:

- a. Intact membranes \longrightarrow I
- b. Ruptured membranes + Clear liquor \longrightarrow C
- c. Ruptured membranes + Meconium stained liquor \longrightarrow M
- d. Ruptured membranes + Blood stained liquor \longrightarrow B
- e. Ruptured membranes + Absent liquor \longrightarrow A

3. Molding of fetal skull bones:

Molding is an important indication of how adequately the pelvis can accommodate the fetal head. Increasing molding with the head high in the pelvis is an ominous sign of cephalopelvic disproportion.

- a. Separated bones "sutures felt easily" \longrightarrow 0
- b. Bones just touching each other \longrightarrow +
- c. Overlapping bones \longrightarrow ++
- d. Severely overlapping bones \longrightarrow +++

PART II

THE PROGRESS OF LABOR

This part of the graph has as its central feature a graph of cervical dilatation against time. It is divided into a latent phase and an active phase.

1. Latent and active phases of labor

Latent phase:

- < Starts from onset of labor until the cervix reaches 3 cm dilatation
- < Lasts of 8 hours or less
- < Contractions at least 2/10min. each lasting > 20 seconds.

Active phase:

- < Once 3 cm dilatation is reached, labor enters the active phase
- < The cervix should dilate at a rate of 1 cm/hour or faster

Alert line (Health facility line):

The alert line drawn from 3cm – 10 cm dilatation and represents the rate of dilatation of 1cm/hour. Moving to the right of alert line means referral to hospital for extra vigilance

Action line (Hospital line):

A line drawn 4 hours to the right of alert line and parallel to it. It is the critical line at which specific management decisions must be made at hospital.

2. Cervical dilatation

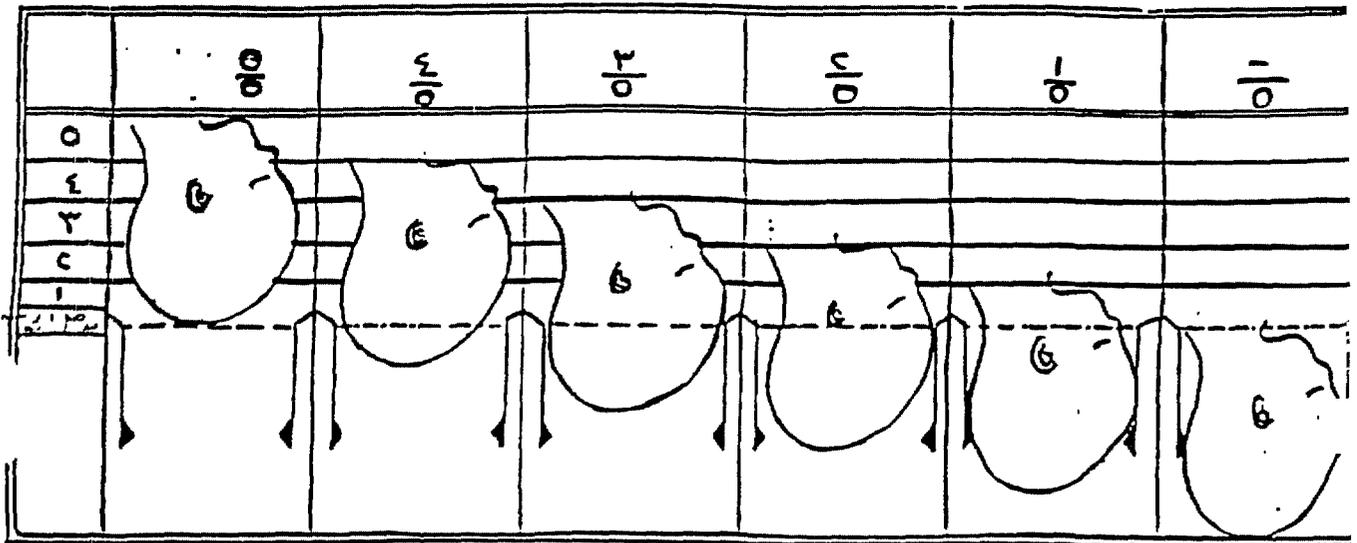
It is the most important information and the surest way to assess progress of labor, even though other findings discovered on vaginal examination are also important. When progress of labor is normal and satisfactory, plotting of cervical dilatation remains on the alert line or to left of it.

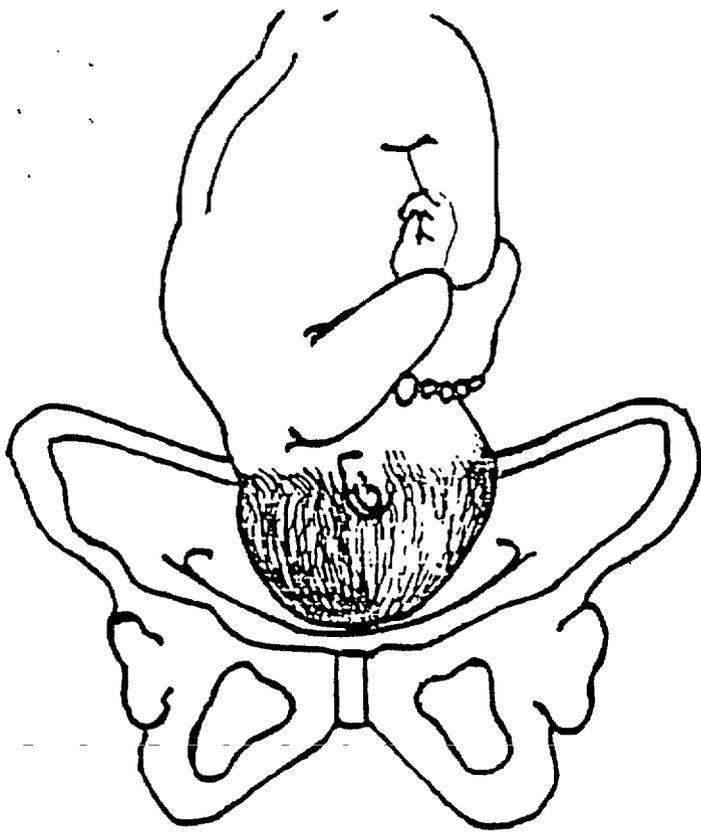
It should be borne in mind that, if the woman comes in the active phase of labor, recording of cervical dilatation starts on the alert line

Therefore, when the active phase of labor begins, all recordings are transferred and start by plotting the cervical dilatation on the alert line.

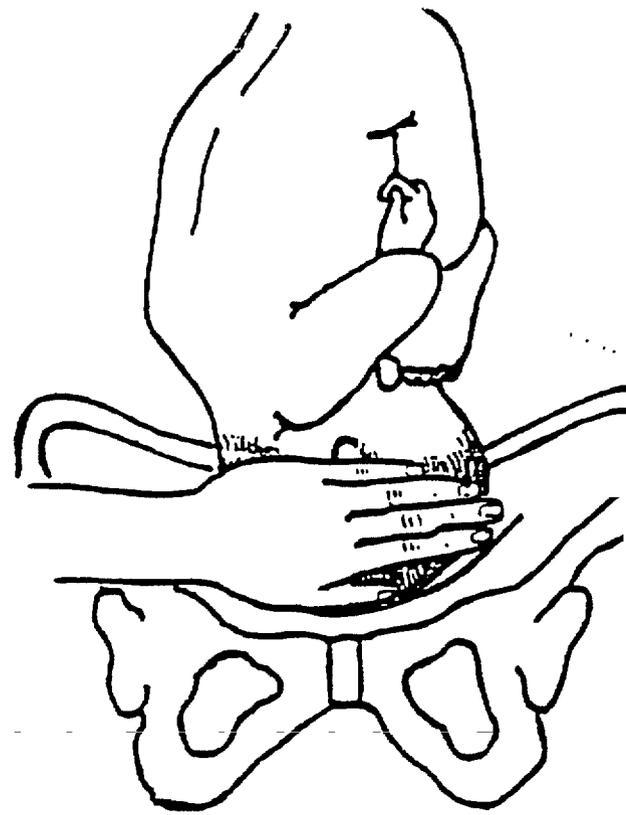
3. Descent of the fetal head

Descent of the fetal head should be assessed by abdominal examination immediately before doing a vaginal examination, using of "Rule of Fifths" to assess engagement of fetal head. Rule of Fifths means the palpable fifths of fetal head above the level of symphysis pubis by abdominal examination when 2/5 or less of the fetal head are felt above the level of symphysis pubis, this means that the head is engaged, and by vaginal examination, the lower most part of vertex had passed or at the level of ischial spines.

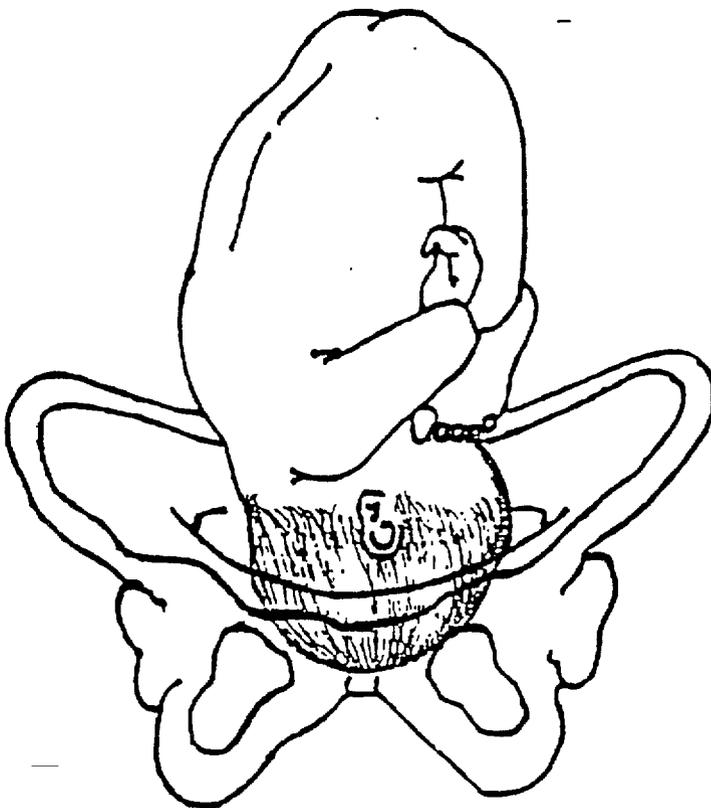




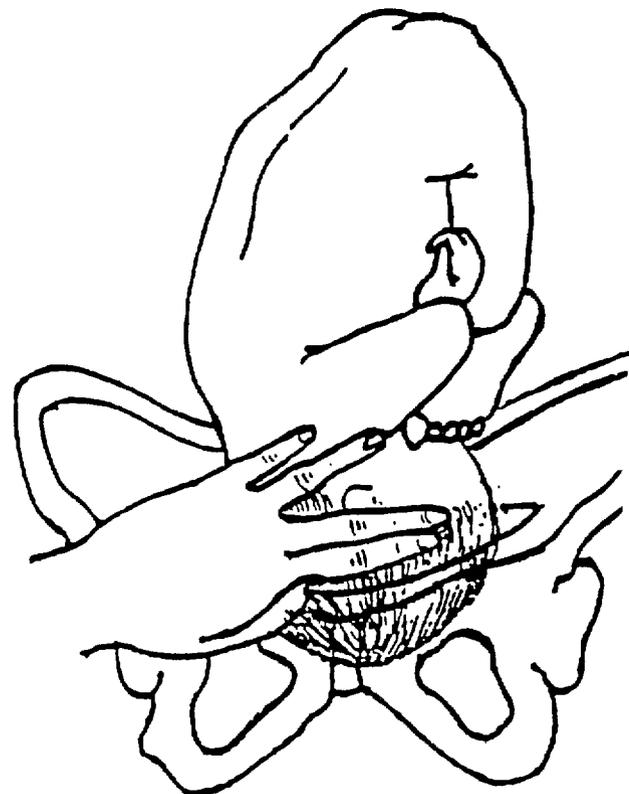
Non-engaged head



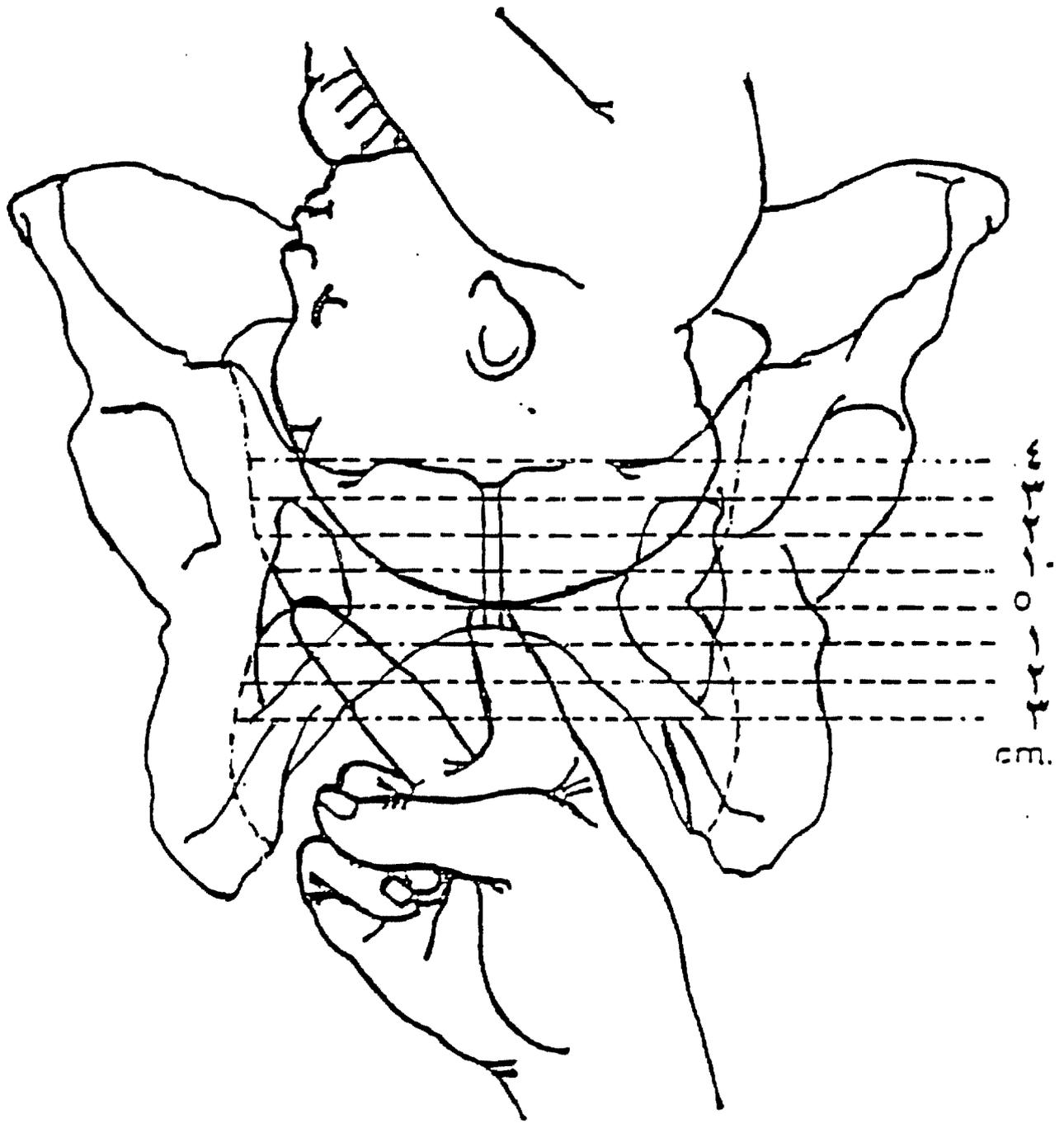
5/5 of the fetal head
above the pelvic brim



Engaged head



2/5 of the fetal head
above the pelvic brim 143



valuation of engagement of fetal head by vaginal examinati-

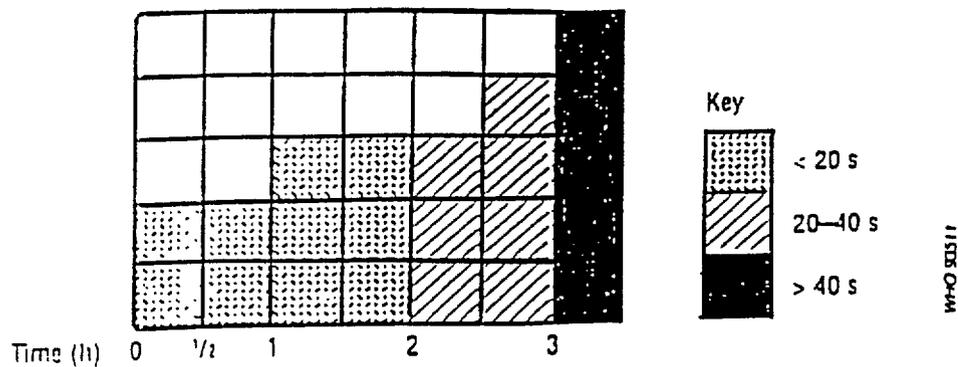
4. Uterine contractions

Observations of the contractions are made every hour in the latent phase and every half-hour in the active phase

- The frequency: How often are they felt?
- The duration: how long do they last?

The **frequency** is assessed by the number of contractions in a 10 minutes period. The **duration** of the contractions is from the time the contraction is first felt abdominally, to the time when the contraction phases off, measured in seconds.

- Key < 20 sec → Dotts
 - 20 – 40 sec → Parallel lines
 - > 40 sec. → Complete filling in
- Each square in the 5 blank squares represents 1 contraction



PART III

THE MATERNAL CONDITION

Regular assessment of maternal condition is achieved by

- ^ Drugs, I.V. fluids given and oxytocin if labor is augmented
- ^ Pulse, blood pressure
- ^ Temperature charting
- ^ Urine: Volume, protein and acetone

PARTOGRAPH FUNCTION:

- The partograph is designed for use in all maternity settings, but has a different level of function at different levels of health care.
 - ^ In the health center, the partograph's critical function is to give early warning if labor is likely to be prolonged and that the woman should be transferred to a hospital (alert line function).
 - ^ In the hospital setting, moving to the right of the alert line serves as a warning for extra-vigilance, but the (action line) is the critical point at which specific management decisions must be made.
 - ^ Other observations on the progress of labor are also recorded on the partograph and are essential features in the management of labor.

MANAGEMENT OF LABOR USING PARTOGRAPH:

- Normal latent and active phases:
 - ^ Latent phase is less than 8 hours
 - ^ Progress in active phase remains on or left to the alert line
 - ^ Do not augment with oxytocin if latent and active phases go normally
 - ^ Do not intervene unless complications develop
 - ^ Artificial rupture of membranes (ARM):
 - No ARM in latent phase
 - ARM at any time in the active phase
 - Between alert and action lines
 - ^ In a health center the woman must be transferred to a hospital with facilities for cesarean section, unless the cervix is almost fully dilated.
 - ^ ARM may be performed if the membranes are still intact
 - ^ Observe labor progress for a short period of time before transfer.
-

- ✓ In hospital perform A&M if membranes are intact
- ✓ Continue routine observations

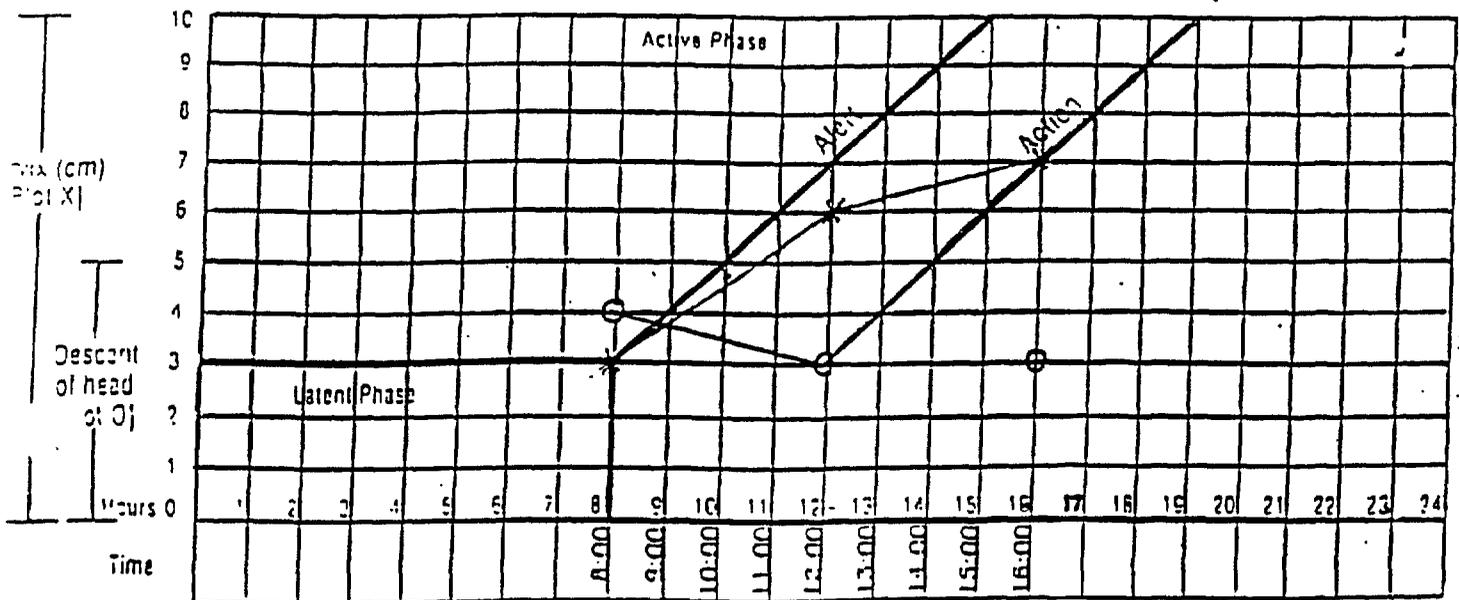
- At or beyond action line.

- ✓ Full medical assessment
- ✓ Consider intravenous infusion/bladder catheterisation/analgesia
- ✓ Options:
 - Delivery (normally cesarean delivery) if there is fetal distress or Obstructed labor
 - Oxytocin augmentation by intravenous infusion if there are no Contraindications
 - Supportive therapy only (if satisfactory progress now established and dilatation could be anticipated at 1 cm/hour or faster)
- ✓ Further review (in the case of continuing labor):
 - Vaginal examination after 3 hours: then in 2 more hours: then in 2 more hours
 - Failure to make satisfactory progress, measured as a cervical dilatation rate of less than 1 cm/hour between any of these examinations, means delivery as indicatedFetal heart while on oxytocin infusion must be checked at least every half-hour

2. Prolonged Active Phase

In the active phase of labor, plotting of cervical dilatation will normally remain on, or to the left of the alert line. But some will move to the right of the alert line and this warns that labor may be prolonged. Of course this will happen only if you do not follow the golden rule that cervical dilatation in the active phase of labor should be at a rate of 1cm/hour or faster

- All woman whose cervicograph moves to the right of the alert line must be transferred and managed in an institution with adequate facilities for obstetric interventions, unless delivery is near.
- At the action line, the woman must be carefully reassessed for the reason for lack of progress and a decision made on further management.



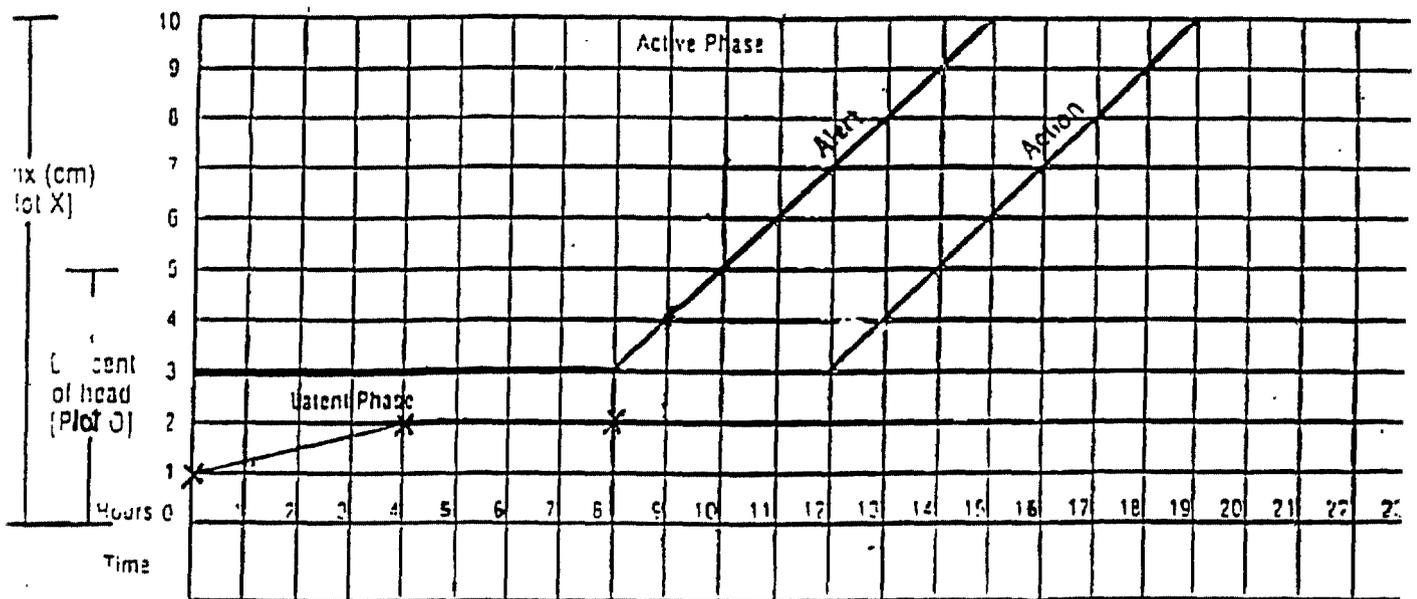
One of the main partograph's function is to detect early deviation from normal progress of labor when:

- Moving to the right of alert line which means **WARNING**, therefore transfer the woman from health center to hospital
- Reaching the action line which means **POSSIBLE DANGER**, therefore decision needed on further management (usually by obstetrician or resident).

1. Prolonged Latent Phase

If a woman is admitted in labor in the latent phase (less than 3 cm dilatation) and remains in the latent phase for the next 8 hours, progress is abnormal and she must be transferred to a hospital for a decision about further action.

This is why there is a heavy line drawn on the partograph at the end of 8 hours of the latent phase.



PARTOGRAM

Name	Gravida	Para	Hospital no.
Date of admission	Time of admission	Ruptured membranes	hours

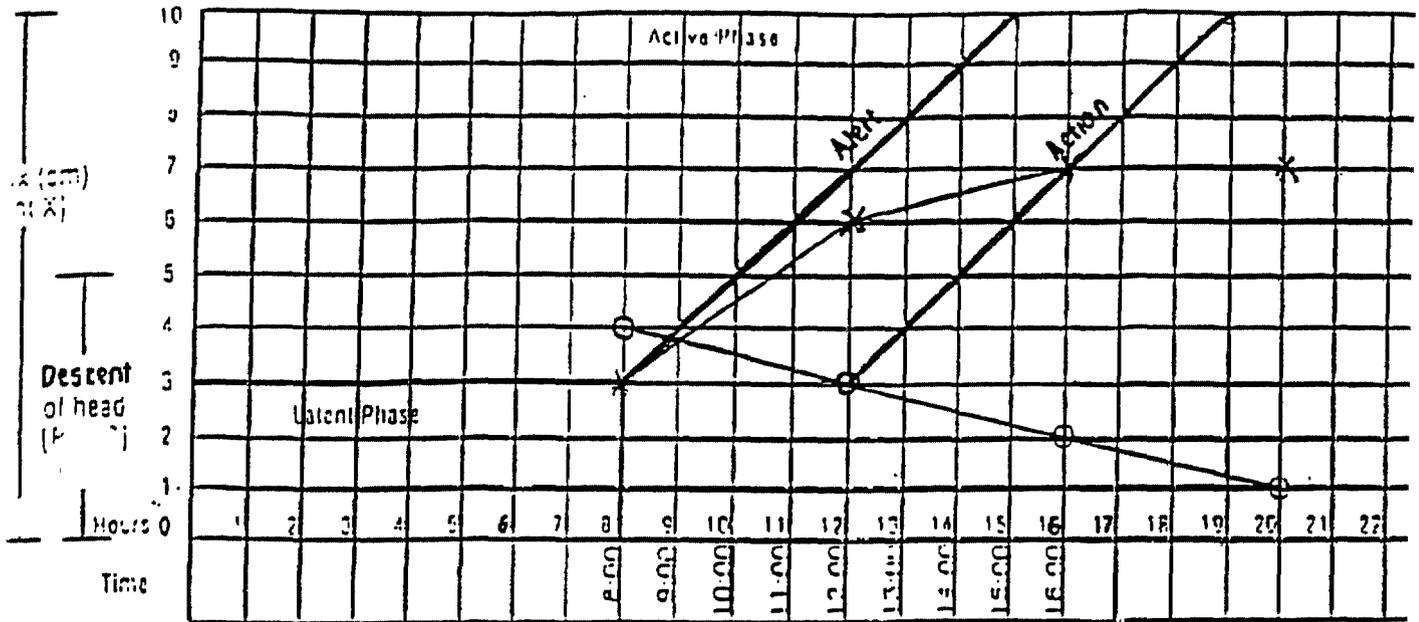
Fetal heart rate	180																									
	170																									
	160																									
	150																									
	140																									
	130																									
	120																									
	110																									
	100																									
Liquor Moulding																										
Cervix (cm) [Plot X]	10																									
	9	Active Phase																								
	8																									
	7																									
	6																									
	5																									
	4																									
	3	Latent Phase																								
	2																									
	1																									
Hours	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Time																										
Contractions per 10 mins	5																									
	4																									
	3																									
	2																									
	1																									
Oxytocin U/L drops/min																										
Drugs given and IV fluids																										
	Pulse and BP	180																								
		170																								
		160																								
		150																								
		140																								
130																										
120																										
110																										
100																										
90																										
80																										
70																										
60																										
Temp °C																										
Urine	protein																									
	specific gravity																									
	volume																									

Fig. II.1

150

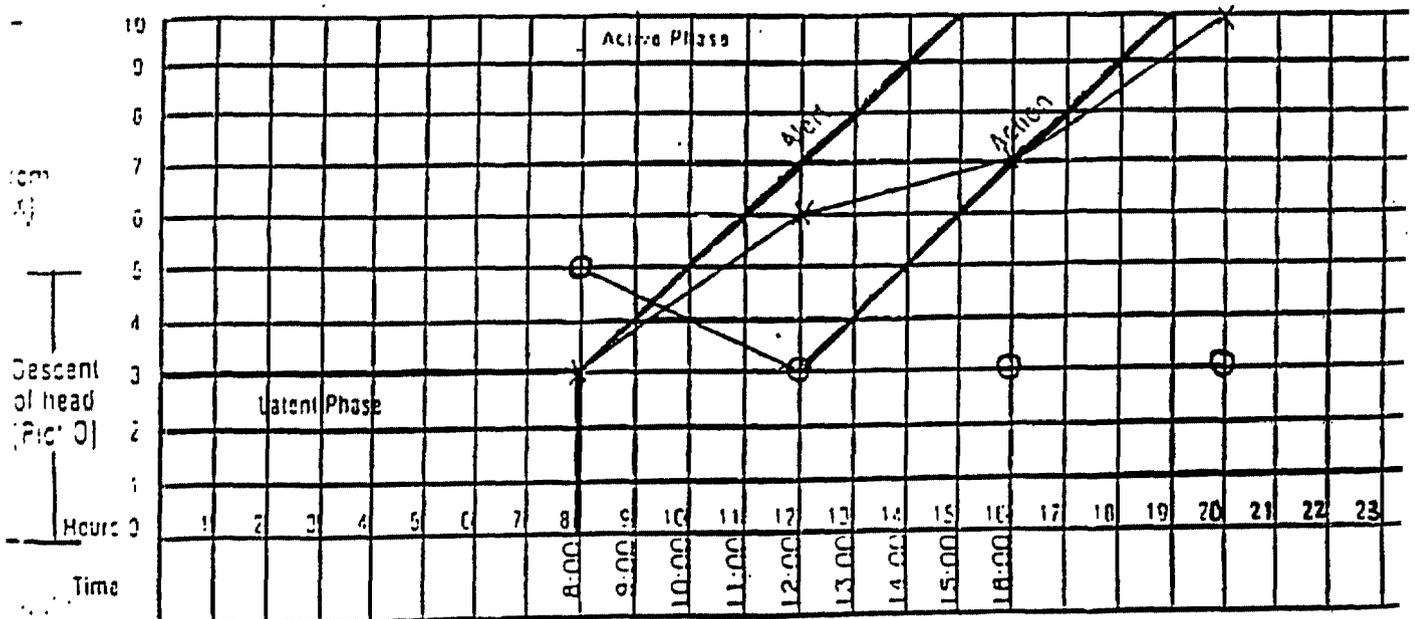
3. Secondary Arrest of Cervical Dilatation

Abnormal progress of labor may occur with normal progress cervical dilatation when followed by secondary arrest of dilatation



4. Secondary Arrest of Head Descent

Abnormal progress of labor may occur with normal progress in descent of the fetal head when followed by secondary arrest of descent of the fetal head.



- Time of admission is 0 time. when the woman comes in the latent phase.
- A 0 woman whose cervicograph moves to the right of the alert line must be transferred and managed in an institution with adequate facilities for obstetric interventions, unless delivery is near.
- At the action line the woman must be carefully reassessed for the reason for lack of progress and a decision made on further management (usually by obstetrician or resident).
- When a woman in labor passes the latent phase in less than 8 hours, i.e. transfer from latent to active phase. the most important feature is to transfer plotting of cervical dilatation to the alert line using the letters "TR", leaving the area between the transferred recording blank. The broken transfer line is not part of the process of labor.
- Do not forget to transfer all other findings vertically.

0 Time conversion

Time conversion from 12 hour clock to 24 hour clock.

AM											
0	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
0	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00

PM											
12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00

- **Oxytocin:**

- ◀ A local regime maybe used
- ◀ Oxytocin should be titrated against uterine contractions and increased every half-hour until contractions are 3 or 4 in 10 minutes, each lasting 40-50 seconds
- ◀ It may be maintained at that rate throughout the second stage labor
- ◀ Stop oxytocin infusion if there is evidence of uterine hyperactivity and/or fetal distress
- ◀ Oxytocin was used in women of all parities in the multicentre trial. However, it must be used with caution in multiparous women and rarely, if at all, in women of para 4 or more

- **Membranes:**

- ◀ If membranes have been ruptured for 12 hours or more, antibiotics should be given.

- **Fetal distress:**

- ◀ In a health center transfer to hospital with facilities for operative delivery
- ◀ In a hospital, immediate management:
 - Stop oxytocin
 - Turn woman on the left side
 - Vaginal examination to exclude cord prolapsed and observe amniotic fluid
 - Adequate hydration
 - Oxygen, if available

POINTS TO REMEMBER "PRINCIPLES"

- Before describing how to use the partograph which extensively tested by WHO, it is important to realise that it is a tool for managing labor only.
- Partograph does not help to identify other risk factors which may have been present before labor started.
- Only start a partograph when you have checked that there are no complications of the pregnancy that require immediate action.
- A partograph chart must only be started when a woman is in labor. You must be sure that she is contracting enough to start a partograph. How?
 - ✧ In latent phase: contractions $\geq 2/10$ min., each lasting ≥ 20 sec.
 - ✧ In active phase: contractions $\geq 1/10$ min., each lasting ≥ 20 sec.
- If progress of labor is satisfactory, the plotting of cervical dilatation will remain on or to the left of the alert line.
- When labor progresses well, the dilatation should not move to the right of the alert line.
- The latent phase is from 0 – 3 cm dilatation and is accompanied by gradual shortening of the cervix. It should not normally last longer than 8 hours.
- The active phase is from 3 - 10 cm and dilatation should be at the rate of at least 1 cm/hour.
- When admission takes place in the active phase, the admission dilatation is immediately plotted on the alert line.
- When labor goes from latent to active phase, plotting of the dilatation is immediately transferred from the latent phase area to the alert line.
- Dilatation of the cervix is plotted (recorded with and "X", while descend of the fetal head is plotted with and "O", on the other hand uterine contractions are plotted with differential shading.
- Descent of the head should always be assessed by abdominal examination (by rule of fifths felt above the pelvic brim) immediately before doing a vaginal examination.
- Assessing descent of the head assists in detecting progress of labor.
- Increasing molding with a high head is a sign of disproportion.
- Vaginal examination should be performed infrequently as this is compatible with safe practice (once every 4 hours is recommended).

5.4 CARE DURING THE SECOND STAGE OF LABOR

DEFINITION:

- Stage of fetal expulsion. Lasts from full dilatation of the cervix until the fetus is being expelled.
- This process is serious, the utero-placental circulation is reduced due to the strong contractions with resulting retraction of the uterus which in turn results in decreasing the oxygenation of the fetus. The decrease in oxygenation is accompanied by acidosis. Therefore the caregiver should carefully monitor the condition of the fetus.

THE ONSET OF THE SECOND STAGE:

- The onset of the second stage starts when the cervix is fully dilated (10 cm). The following can accompany the beginning of this stage:
 - ◀ The woman feels the urge to bear down, (because the amniotic sac or the presenting part protrudes through the dilated cervix and presses against the bladder and rectum).
 - ◀ Involuntary urination & defecation.
 - ◀ Vulval separation.
 - ◀ The membranes rupture spontaneously.

THE ONSET OF PUSHING DURING THE SECOND STAGE:

- The physiological approach is to wait until the woman feels the urge to bear down herself. The expulsion phase may start spontaneously 10 or 20 minutes after full dilatation of the cervix, delayed pushing will not have any hazardous effect on fetal or neonatal outcomes.
 - ◀ Make sure that the cervix is fully dilated.
 - ◀ Wait until the woman feels the urge to bear down.
 - ◀ Encourage her to push down.
- The practice of urinary catheterisation to empty the bladder as a routine procedure is:
 - ◀ Unnecessary (the woman must be encouraged to urinate spontaneously during the first stage of labor).

- < May be difficult and traumatic when the head is firmly engaged.
- < Might cause infection of the urinary tract.

THE PROCEDURE OF PUSHING DURING THE SECOND STAGE

- Two practices are identified and compared in several trials.
 - < Exhalatory bearing down efforts
 - < Valsalva bearing down efforts

Note: When comparing the two practices the shorter spontaneous pushing effort seems to be superior.

- < Exhalatory bearing down efforts:
 - Woman's spontaneous pattern of expulsive efforts.
 - Result in three to five relatively brief (4 to 6 seconds) bearing down efforts with each contraction.
- < Valsalva bearing down efforts
 - Sustained, directed pattern of expulsive efforts accompanied by breath holding.
 - Result in 10-30 second duration of sustained bearing down efforts.
 - Result in shorter second stage.
 - May cause respiratory induced alterations in heart rate and stroke volume.
 - If the woman is lying flat on her back, it may be associated with compression of the aorta and reduced blood flow to the uterus.
 - The mean umbilical artery pH was found low and Apgar score tended to be depressed.
 - It seems to compromise maternal-fetal gas exchange.
- The practice of fundal pressure during the second stage of labor:
 - < It is meant to expedite delivery.
 - < Increase maternal discomfort.
 - < There is suspicion that it may be harmful for the uterus, the perineum and the fetus.
 - < It may increase the incidence of shoulder impaction at delivery
 - < No evidence for its usefulness.

DURATION OF THE SECOND STAGE:

- During the last decades the number of operative deliveries has increased sharply due to the rigid adherence to a stipulated duration of the second stage. If maternal and fetal conditions are good and there is progress of labor, there are no

grounds to interfere. Unnecessary interventions are harmful to women and infants.

- The duration of the second stage of labor should not be allowed to exceed:
 - ◀ 2 hrs. in Primipara
 - ◀ 1 hr. in Multipara:
- Curtailing the second stage should be based on:
 - ◀ Surveillance of the maternal condition
 - ◀ Surveillance of the fetal condition (fetal distress = hypoxia and acidosis)
 - ◀ Surveillance of the progress of labor (presenting part fails to descend or cervix fails to dilate)

MATERNAL POSITION DURING THE SECOND STAGE:

- The condition of the mother during the second stage of labor affects the condition of the fetus as it does in the first stage.
- Three positions may be adopted:
 - ◀ An upright position (vertical)
 - ◀ Lateral tilt position
 - ◀ Dorsal position
- Upright position (advantages and disadvantages):
 - ◀ Advantages:
 - Less discomfort
 - Less difficulty in bearing down
 - Less labor pain and less backache
 - Less perineal/vaginal trauma and wound infections
 - Shorter duration of second stage
 - Fewer Apgar scores below 7 are recorded.
 - ◀ Disadvantages:
 - Causes more labial tears
 - Increases the number of third degree perineal tears
 - Increases the percentage of postpartum hemorrhage (could be due to increase pressure on the pelvic and vulval veins)
 - Excessive edema and hemorrhoids
- The Dorsal position (Lithotomy position with the legs in stirrups) found to be:
 - ◀ Less comfortable for the woman
 - ◀ More painful
 - ◀ Restricting to movements

Note: In both the first and second stages, women can adopt any position they like, preferably avoiding long periods lying supine. Birth attendants need training in performing births in positions other than the supine in order not to be an inhibiting factor in the choice of position.

GUARDING AND MASSAGING OF THE PERINEUM:

- Supporting the perineum
 - ◁ Use the palm of one hand to support the perineum during contractions, while the second hand applies pressure to the fetal head to control the speed of extension and crowning, thus trying to reduce and prevent damage to the perineal tissues. This support is applied more easily if the woman is in the supine position.
- Massaging the perineum
 - ◁ During the last part of the second stage “ironing out” or massaging the perineum in an attempt to stretch the tissues, may be done sometimes with an emollient such as olive or paraffin oil. However, there are doubts about the benefits of sustained rubbing of tissues that are already highly vascularized and edematous.

PERINEAL TEARS AND THE EPISIOTOMY:

- Perineal tears occur frequently, known to be classified into three degrees:
 - ◁ First degree tear involves only the skin and vaginal musosa
 - ◁ Second degree tear involves the perineal body up to, but not involving, the anal sphincter with a corresponding tear in the vaginal mucosa
 - ◁ Third degree tear involves the anal sphincter and usually extends for 2 cm or more up the anal canal. Sometimes the tear cuts right through the sphincter to open up the mucosa of the anal canal and perhaps the rectum also.

Note: Extensive tears of the vaginal walls can occur without a tear in the perineum, and they should always be carefully inspected after delivery. Minor lacerations can also occur on the anterolateral vaginal wall.

Note: Cutting into the rectum is considered a fourth degree tear which needs immediate care

- It is important to repair all perineal lacerations immediately, to prevent any infection of the raw surface.

Note: Physicians who do an episiotomy should be able to suture it in layers under local anesthetic, taking proper precautions to prevent infection.

However liberal use of episiotomies is justified due to the following benefits:

- Prevention of damage to the anal sphincter and rectal mucosa.
- Easier repair and rapid healing than with spontaneous tear.
- Prevention of trauma to fetal head.
- Prevention of serious damage to the muscles of pelvic floor.
- Lower frequency of anterior vaginal and labial tears.
- More specific protective effect on the tissues around the bladder neck.

In a three-year follow-up of a comparison of liberal use with restricted use of episiotomy, rates and severity of incontinence were almost identical in the two trial groups.

5.5 CARE DURING THE THIRD STAGE OF LABOR

OVERVIEW:

- After the climactic experience of giving birth to a baby, the delivery of the placenta may seem tame and rather dull.

DEFINITION:

- This is the stage of placenta and membranes separation and expulsion. Lasts from the birth of the newborn until the placenta and membranes are delivered and the uterus has retracted firmly to compress the uterine blood sinuses. The main risks for the mother during that stage are:
 - < Postpartum hemorrhage.
 - < Retained placenta
 - < Inversion of the uterus

ACTIVE VERSUS EXPECTANT MANAGEMENT OF THE THIRD STAGE:

- In practice, caregivers have a number of choices to make in relation to the third stage. The first is whether or not to take active or an Expectant (physiological) approach. The second choice is to decide which of the components of that approach to use.
- Components of “active management of the third stage”: this term summarizes the combined effects of oxytocics (oxytocin and/or ergometrine), early clamping and division of the umbilical cord and controlled cord traction. In the literature active management is preferred because:
 - < Postpartum hemorrhage occurs less often
 - < Postpartum hemoglobin levels are higher
- Components of “expectant management of the third stage”: this term means physiological management which includes watchful waiting, no use of prophylactic drugs, cord traction or fundal pressure, maternal effort aided by gravity for delivery of the placenta, and clamping and division of the umbilical cord after delivery of the placenta. Trials in Bristol (Prendiville et al 1988) showed that:
 - < 18% had blood loss > 500ml

◀ 3% lost > 1000ml

- In practice the two approaches are not as separate as they appear at first; some commentators have suggested a third category, the “piecemeal” approach where a combination of both approaches is used by some caregivers.

MECHANISM OF PLACENTAL SEPARATION:

- Uterine contractions continue after the birth of the infant with a resultant reduction in the size of the upper segment. This reduces the area of the uterine surface to which the relatively incompressible placenta is attached, causing its separation. The consequent reduction in intra-uterine volume tends to force the placenta into the relaxed lower segment, thus further assisting in the separation process.

MANAGEMENT OF THIRD STAGE:

- Prophylactic use of Oxytocics:
 - ◀ The drugs usually used are oxytocin or ergot derivatives or a combination of both. They decrease the estimated postpartum blood loss but the effect of ergot seems to be less than the effect of oxytocin.
 - ◀ They are administered intramuscularly; (5 IU Syntocinon) (0.25 mg. Methergine):
 - Immediately with the delivery of the anterior shoulder
 - After delivery of the fetus
 - ◀ Side effects of oxytocics are:
 - Nausea
 - Vomiting
 - Headache
 - Postpartum hypertension (more often with ergot).
 - Intrauterine asphyxia of an undiagnosed second twin
 - Neonatal convulsions in a baby mistakenly injected with an oxytocic instead of prophylactic vitamin K
 - ◀ The available evidence suggests that the oxytocin is a better choice than ergot derivatives.
 - ◀ Rare but serious complications that may be associated with ergot derivatives:
 - Cardiac arrest
 - Intracerebral hemorrhage
 - Myocardial infarction
 - Postpartum eclampsia
 - Pulmonary edema.
 - ◀ Administration of oral tablets of ergometrine immediately after birth proved to have little effect on blood loss after childbirth.

TIMING OF CORD CLAMPING:

- **“Early clamping”**: means immediate clamping after the delivery of the baby.
- **“Late clamping”**: means clamping after pulsation of the cord ceases, 3-4 minutes after delivery of the baby. It is the physiological way of treating the cord. This results in a shift of about 80ml of blood from the placenta to the infant, providing about 50mg of iron to the infant’s reserve and reducing the frequency of iron deficiency anemia later in infancy.
- Observations and trials found that:
 - ◁ There is no evidence of a significant effect of the timing of cord clamping on the incidence of postpartum hemorrhage or on fetomaternal transfusion.
 - ◁ Theoretically the transfusion of 80ml of blood from the placenta to the babies born after “late clamping” might cause:
 - Hypervolaemia
 - Polycythemia
 - Hyperviscosity
 - Hyperbilirubinemia (due to destruction of the increased erythrocytes percentage by hemolysis)
 - ◁ Babies born after early cord clamping have:
 - Lower hemoglobin values
 - Lower hematocrit values
 - Lower neonatal bilirubin levels
 - No difference in neonatal morbidity.
 - ◁ Early clamping is an intervention that needs justification, used on special occasions as in:
 - Rhesus sensitization
 - Preterm birth
 - In controlled cord traction
 - Twin delivery
 - ◁ Research supports late clamping because it may prevent iron deficiency anemia in childhood which might be of special importance in developing countries.

CONTROLLED CORD TRACTION:

- Controlled cord traction involves traction on the cord, combined with counter-pressure upwards on the lower segment of the uterus using a hand placed above the symphysis pubis.
- When compared with entailing fundal pressure (less active approach) :
 - ◁ Lower mean blood loss and shorter third stages were found in the controlled traction group.

- Rare but serious complications associated with controlled cord traction:
 - ◁ Cord rupture (3%)
 - ◁ Inversion of the uterus (due to wrong application of the method).

EARLY INITIATION OF BREASTFEEDING:

- Early suckling/Breast feeding should be encouraged, within the first hour after birth (WHO/UNICEF). The nipple sucking stimulates uterine contractions that minimize postpartum hemorrhage. Early and frequent feedings may bring in the mother's milk more quickly and avoid breast engorgement.

IMMEDIATE CARE OF THE NEWBORN:

- There should be attention given to the condition of the newborn during and immediately after birth , which is considered an integral part of care in normal birth.
- The World Health Organization stresses the importance of a unified approach to care of the mother and the baby. Immediate care involves:
 - ◁ Ensuring that the airway is clear.
 - ◁ Taking measures to maintain body temperature.
 - ◁ Clamping and cutting the cord using sterile instruments for the prevention of infections.
 - ◁ Putting the baby to the breast as early as possible, within the first hour after birth.
 - ◁ Inspecting the baby for possible congenital abnormalities

CARE OF THE MOTHER IMMEDIATELY AFTER DELIVERY OF THE PLACENTA:

- The placenta should be examined carefully after its delivery, to detect any abnormalities, such as:
 - ◁ Infarcts
 - ◁ Hematomas
 - ◁ Abnormal insertion of the cord
 - ◁ To ensure that it is complete (Exploration of uterine cavity should be done if part of placenta is missing but not necessary if a part of a membrane is missing).

- The mother should be observed carefully during the first hour postpartum for the following:
 - < The amount of blood lost (estimated >500ml should be treated with oxytocics intramuscularly).
 - < The uterine fundal height (blood may accumulate in the uterine cavity).
 - < The uterus state of contraction (if poorly contracted, gentle abdominal massage of the uterus can be helpful).
 - < The general condition of the mother must be assessed (blood pressure, pulse and temperature).
 - < Ensure that uterine contraction is not inhibited by the presence of a full bladder.

COMPLICATIONS OF THE THIRD STAGE

- **Postpartum Hemorrhage**

One of the main causes of maternal mortality. It is the major killer of young pregnant women in Egypt. Postpartum hemorrhage is defined by WHO as blood loss \geq 500ml. The 500 ml limit should be considered an alert line. The action line is reached when the vital functions of the woman are endangered, usually occurring after the blood loss is >1000ml of blood in a healthy woman. The diagnosis is made by a clinical estimate of blood loss and such assessment, often cause a significant underestimation. The distinction is crucial to minimize the unnecessary blood transfusion and its risks including hepatitis infection. The appropriate management of the third stage influences the incidence of complications and the amount of blood loss. The care of a woman with postpartum hemorrhage depends on a rapid, careful assessment of the cause and prompt arrest of bleeding.

- **Retained placenta**

The conventional treatment is manual removal following digital separation of the placenta from the uterine wall. Waiting for 30 minutes before restoring to manual removal in absence of bleeding may be a more effective approach.

- **Inversion of the uterus**

It may occur as a result of excessive cord traction while the uterus is still relaxed, vigorous fundal pressure or exceptionally high intra-abdominal pressure as a result of vomiting or coughing. Treatment involves replacement of the inversion.

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5.6 CESAREAN DELIVERY

INDICATIONS:

- Maternal
 - ◁ Cephalopelvic disproportion
 - ◁ Failure of labor to progress
 - ◁ Previous cesarean delivery
 - ◁ Placenta previa
 - ◁ Soft-tissue obstruction/scarring
 - ◁ Diabetes
 - ◁ Bad obstetric history
 - ◁ Toxaemia
 - ◁ Abruptio placentae
 - ◁ Placental insufficiency
 - ◁ Failed induction
 - ◁ Old primigravidae

- Fetal
 - ◁ Fetal Distress
 - ◁ Malpresentation
 - ◁ Postmaturity
 - ◁ Habitual IUFD in last weeks of pregnancy
 - ◁ Malposition
 - ◁ Cord prolapse
 - ◁ Rh incompatibility

EXAMINATION:

- General examination:
 - ◁ Look for pallor
 - ◁ Edema
 - ◁ Vital signs, blood pressure, pulse and temperature

- Chest examination:
 - ◁ Examine the heart
 - ◁ Examine the chest

- Abdominal examination:
 - ◁ Determine fetal lie and presentation
 - ◁ Listen to the fetal heart sounds (Golden Rule before cesarean delivery)
- Vaginal examination:
 - ◁ Done according to needs
 - ◁ If elective cesarean, it is generally omitted

INVESTIGATIONS:

- Blood
 - ◁ Hb level
 - ◁ ABO-Rh
 - ◁ Sample for cross-matching
 - ◁ Bleeding time/clotting time
 - ◁ If diabetic, test for FBS and PPBS
- Urine
 - ◁ Test for sugar and protein

PREOPERATIVE MANAGEMENT:

- Elective operation:
 - ◁ Perform 1 week before the expected date of delivery
 - ◁ Admission: the day before the operation
 - ◁ Preparation: Soap and water enema on the morning of the operative day
 - ◁ Patient in labor should be given an antacid every 2 hrs to neutralize gastric acid. This aim to minimize the effects of any accidental gastric aspiration.
 - ◁ Set up an interavenous drip

TECHNIQUE:

- Empty the patient's bladder by catheterization
- Tilt her to her left by placing a pillow under her lower back on the right
- General or regional anaesthetic should be given

- Prepare and drape the abdomen followed by skin incision
- Midline/subumbilical incision:
 - ◀ Used in surgical emergencies (Hemorrhage-sepsis)
 - ◀ Provides good exposure
 - ◀ Easy and fast
 - ◀ High incidence of incisional hernias
- Pfannestiel incision
 - ◀ Used more
 - ◀ Very strong incision. Very low incidence of postoperative hernias
 - ◀ Excellent cosmetically
- Open the anterior abdominal wall in layers
- Incise the peritoneum of the abdominal cavity transversally
- Incise the loose visceral peritoneum covering the anterior surface of the lower uterine segment and push the lower peritoneal flap downwards with the bladder.
- Make a small, transverse incision in the lower segment of the uterus crossing the midline 2 cm below the site of the peritoneal incision.
- Widen the incision bluntly on either side.
- Rupture the membranes if they are still intact.
- Deliver the baby as quickly as possible:
 - ◀ Cephalic-presentation: carefully insinuate your finger between the lower uterine flap and the head and hook them round the head (OR use one blade of low forceps as a lever action). If the head is deeply engaged and difficult to extract, ask an assistant to dislodge it from the vagina by pushing it upwards (with gloved hands).
 - ◀ In breech presentation: Grasp the groins first to deliver the buttock, then deliver the arms and the head carefully so as not to enlarge the uterine wound unduly.
 - ◀ Transverse lie: deliver the breech first after internal podalic version.
- An undiagnosed constriction ring may prevent delivery of the head; in such cases the ring must be incised (inverted \perp incision) vertically during the course of the cesarean delivery, although this can result in a weak scar (ideally, this condition will have been suspected beforehand).

- Care of the newborn:
 - ◀ Clean and aspirate fluids from the mouth and nose.
 - ◀ Divide the cord between two clamps.
 - ◀ Handle the baby gently to the pediatrician
- Give the mother 0.25 mg of ergometrine intravenously.
- Deliver the placenta and membranes.
- Rub the uterus if it is flabby, and, if necessary, start the patient on a drip of 5 or 10 IU of oxytocin (the amount to be determined according to the patient's response) in 500 ml of 5% dextrose at a rate of 15 drops/minute.
- Grasp the edges of the uterine incision with haemostatic forceps (Green-Armytage).
- Suture the incision in three layers. First insert a continuous, muscle-layer sutures of No. 1 chromic catgut or vicryl on a half-circle, round-bodied needle; avoid the decidua and take the angles carefully. Then take up any unstitched muscle tissue and bury it in the inner layer of the sutures. Finally, close the visceral peritoneum with the chromic catgut.
- Complete abdominal toilet.
- Close the abdominal wall in layers.
- Apply a sterile dressing.

COMPLICATIONS:

- Possible complications include:
 - ◀ Primary hemorrhage that can lead to hypovolaemic shock
 - ◀ Wound infection and peritonitis
 - ◀ Secondary hemorrhage
 - ◀ Retrovesical haematoma formation
 - ◀ Pulmonary embolism
 - ◀ Injury to the bladder
 - ◀ Paralytic ileus
 - ◀ Fetal injuries (injury to scalp, fractures during extraction)
 - ◀ Gastric aspiration (Mendkson's Syndrome, common in emergency cases)

5.7 LOW FORCEPS DELIVERY

OVERVIEW:

- Although forceps delivery has largely been replaced by vacuum extraction, the procedure still undertaken in many developing countries where vacuum extraction is not yet in wide use.
- If a forceps delivery is necessary, application of the forceps must be directly supervised by the chief of service or a third year resident.
- Only low or outlet forceps should be used. Mid-cavity forceps should never be applied.
- Low or outlet forceps is understood to be forceps applied when the fetal head has reached the pelvic floor, is visible without separating the labia, and has the sagittal suture in the antero-posterior or oblique direction of the pelvis.

REQUIREMENTS FOR THE APPLICATION OF LOW FORCEPS:

- Complete dilatation of cervix
- Head must be engaged
- Sagittal suture in the antero-posterior or oblique direction of the pelvis
- Adequate pelvic outlet
- Membranes ruptured
- Bladder and rectum empty
- Adequate anesthesia
- Generous episiotomy
- Intravenous fluids with No. 18 angiocath
- Contracted uterus
- Attending pediatrician

Note: The indications for the application of low forceps must be clearly recorded in the patient's chart.

INDICATIONS FOR LOW FORCEPS DELIVERY ARE:

- Maternal indications:
 - ◀ maternal distress

< conditions associated with a threat of maternal distress:

- cardiac disease
- pulmonary tuberculosis
- thyroid disease
- eclampsia
- severe anemia.

• Fetal indications:

< Fetal distress as indicated by:

- A fetal heart rate of more than 160/min., or less than 120/min.
- The passage of meconium.

< Conditions that may give rise to fetal asphyxia:

- Cord prolapse at full cervical dilatation
- Eclamptic seizures in the mother
- An after-coming head in breech presentation
- A prolonged second stage of labor

Note: A prolonged second stage labor especially if the fetal head has not advanced for 20 min., or in a primigravida if active bearing down has continued for about 40 min.

ASSESSMENT:

- Carry out a general assessment following the progress of labor as for normal delivery.
- Examine the patient for signs of maternal distress:
 - < Dry tongue
 - < Rising pulse rate
 - < Pyrexia
 - < Dehydration.
- Provided that the fetal head is in low midcavity, obstetric forceps can be applied for delivery in cases of:
 - < occipito-anterior position (with complete rotation of the fetal head)
 - < persistent occipito-posterior position or face-to-pubis presentation
 - < after-coming head in breech presentation.

Note: If the sinciput is palpable, forceps should not be used.

INVESTIGATIONS:

- Measure the mother's haemoglobin level
- Test the urine for sugar and protein
- Send a sample of blood for grouping (including Rh factor)

EQUIPMENT:

- See tray for Episiotomy, Annex 1, page 188, and add a pair of low obstetric forceps.

TECHNIQUE:

- Once the second stage of labor has started, the patient should be given a regional anaesthesia by pudendal block or a general anaesthesia.
- Place her in the lithotomy position, clean and drape the area, and catheterize the bladder.
- Check for the following before proceeding:
 - < Full dilatation of the cervix
 - < Rupture of membranes
 - < Complete rotation of the fetal head
 - < Station of the head below the ischial spines.
- Check the forceps blades to ensure that they will lock correctly.
- Apply the left blade first, guiding it into the pelvic cavity along your right palm (Fig. 2.1A-D).
- Apply the right blade along the inserted left palm (Fig. 2.1E, F).
- Lock the forceps and apply traction during uterine contractions, first downwards and backwards (Fig. 2.1G, H), gradually levelling out, and finally upwards and forwards in the case of the occipito-anterior position (Fig.2.K-L).
- Perform an episiotomy with the crowning of the head.
- Once the head reaches the pelvic outlet, lift it out by delocking of blades.
- After delivery, inspect the cervix and vagina and repair any tears.
- Suture the episiotomy in layers and apply a sterile pad.

COMPLICATIONS:

Possible complications include:

- Fetal
 - < intracranial hemorrhage
 - < Facial palsy
 - < Cephalohematoma

- Maternal
 - < Maternal hypovolaemic shock
 - < Injuries such as cervical, vaginal and perineal tears or uterine rupture
 - < Postpartum hemorrhage
 - < Puerperal genital infection

FAILURE TO DELIVER WITH FORCEPS

- Causes:
 - < Cervix is not fully dilated
 - < The head is in a malposition usually with the occiput posterior
 - < The head not yet engaged
 - < Contracted pelvic outlet

- Any case of failed delivery with forceps must be immediately reassessed. In some cases cesarean delivery has to be performed.

5.8 VACUUM EXTRACTION

DEFINITION:

- The vacuum extractor is used in many parts of the world for assisting in deliveries and is considered a safer method than forceps. Sometimes the mother needs help in delivering her baby. The physician can use the vacuum extractor to assist the mother in her efforts to vaginally deliver her term baby.
- A vacuum (suction) inside the vacuum extractor cup pulls against the skin of the baby's head (see Figure 1). It pulls the skin of the scalp into the suction cup. This skin forms a caput succedaneum which fills up the inside of the suction cup. The caput succedaneum gives a grip or hold on the scalp without hurting the skull bones. The suction from the vacuum extractor may cause the periosteum to pull away from the skull bone a little, sometimes causing a very small amount of bleeding (sub-periosteal hemorrhage). The physician uses the vacuum extractor to guide the head of the baby while the mother pushes.

INDICATIONS FOR USING A VACUUM EXTRACTOR:

- The physician continues to monitor both the mother and the baby during second stage of labor. Sometimes the mother needs help in delivering her baby. The vacuum extractor can help a midwife when there is:
 - ◀ Delay in the second stage of labor. The mother must actively push without progress for 30 minutes in the primigravida, or 20 minutes in the multigravida.
 - ◀ Fetal distress in the second stage of labor. The baby is alive or newly dead (fetal heart stopped during labor).
 - ◀ Other indications that should be managed by a doctor if at all possible include:
 - Maternal distress, severe anemia, heart problems, hypertension (toxemia), diabetes, asthma, malnutrition, or tuberculosis.
 - Small or rigid pelvic outlet.
 - Transverse arrest of fetal head.
 - Large baby
 - Disproportion due to deflexion of the fetal head

CONDITIONS FOR USING A VACUUM EXTRACTOR:

- When deciding if a woman can be helped by using a vacuum extractor. The abdominal and vaginal findings must always include:
 - < Term baby
 - < Vertex presentation
 - < Ruptured membranes
 - < No cephalopelvic disproportion. Conditions necessary include
 - No fetal skull molding
 - No caput
 - 2/5, 1/5 or 0/5 on abdominal palpation
 - < Baby is alive or fetal heart stopped during labor (if the fetus is macerated due to long time IUFD, the vacuum will not work well)
 - < Contractions present
 - < Full dilatation of the cervix (anterior cervical lip may be an exception)

CONTRAINDICATIONS:

- Do not try to do a vacuum extraction if any one of the following is present:
 - < No contractions
 - < Cephalopelvic disproportion/fetal pelvic disproportion (large infant)
 - < Fetal skull molding ++ or more
 - < Large caput
 - < Non-vertex presentation (all types)
 - < Incomplete cervical dilatation
 - < Gestational age less than 37 weeks
 - < Unengaged presenting part
 - < Disengagement of the vacuum extractor (the cup pops off) 3 times
 - < Failure of the procedure after 15 minutes or 5 contractions, whichever comes first

SKILL: USE A VACUUM EXTRACTOR:

- The physician should use the vacuum extractor on 5 to 8 normal deliveries, to gain experience. Choose primiparas at the end of the first stage, when the cervix is fully dilated and the head is just visible at the perineum. This will help you learn the vacuum extraction skill well before you attempt more difficult deliveries.

EQUIPMENT:

- Delivery set up
- Vacuum extractor

PROCEDURE:

- Examine the woman abdominally and vaginally to make sure that all conditions (mentioned before) for using vacuum extractor are present.
- Explain to the mother and her family what you are going to do, why you are going to do it, and how it will help her. Help her to understand that you will use the vacuum extractor to help her baby's delivery more easily and/or quickly.
- Prepare equipment. In addition to routine delivery supplies, add the vacuum extractor. Connect pump, tubing, mucus trap, and cup. Use the largest cup you have available. Test vacuum on the palm of your hand by squeezing the pump handle to start the vacuum. Hold the cup on your hand, you should feel the suction on your hand. Release the pressure.
- If the mother is not able to urinate, catheterize her to make sure that a full bladder is not delaying the second stage.
- The mother should lie on her back with her legs bent. If a split delivery bed is not available, help the woman to move her buttocks to the edge of the bed/table. Her feet should be supported by assistants.
- Do a vaginal examination to determine the baby's head position. Find the posterior fontanelle. Place the cup on a well flexed head. If the head is not well flexed, apply the cup anyway. With correct direction of pulling, the head will flex.
- Wipe the baby's scalp and clean with dry gauze.
- Apply the cup. (See Figure 2).
 - ◀ Hold the extractor cup in your most skilled hand.
 - ◀ Separate the labia with the fingers of your other hand.
 - ◀ Gently pull down on the perineum to make space for the cup.
 - ◀ Hold the extractor cup with your fingers
 - ◀ Insert the cup gently into the vagina.
 - ◀ Remember the positions of the posterior fontanelle; press the cup downwards and inwards into the vagina until the cup touches the scalp.
 - ◀ Press the cup up against the part of the baby's scalp that is easiest to reach.
 - ◀ Pass a finger gently around the edge of the cup to be sure none of the mother's tissue has been caught under the cup.

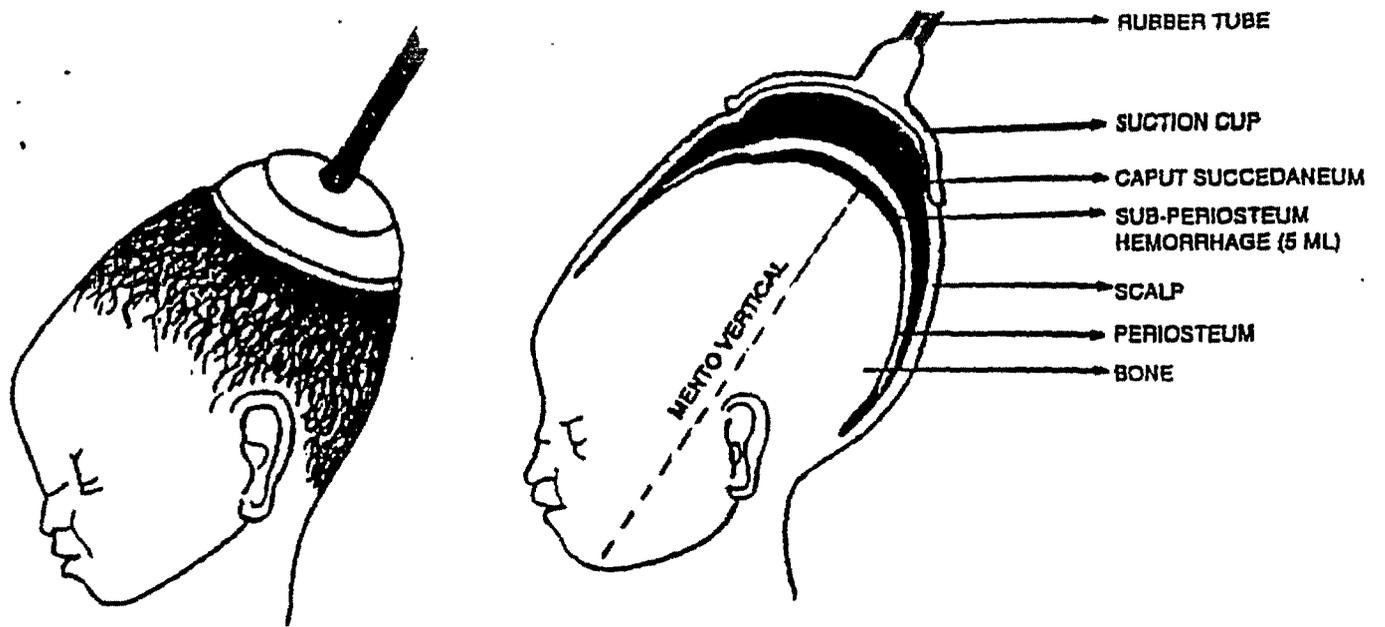


Figure 1. Effect of Vacuum Extractor Cup

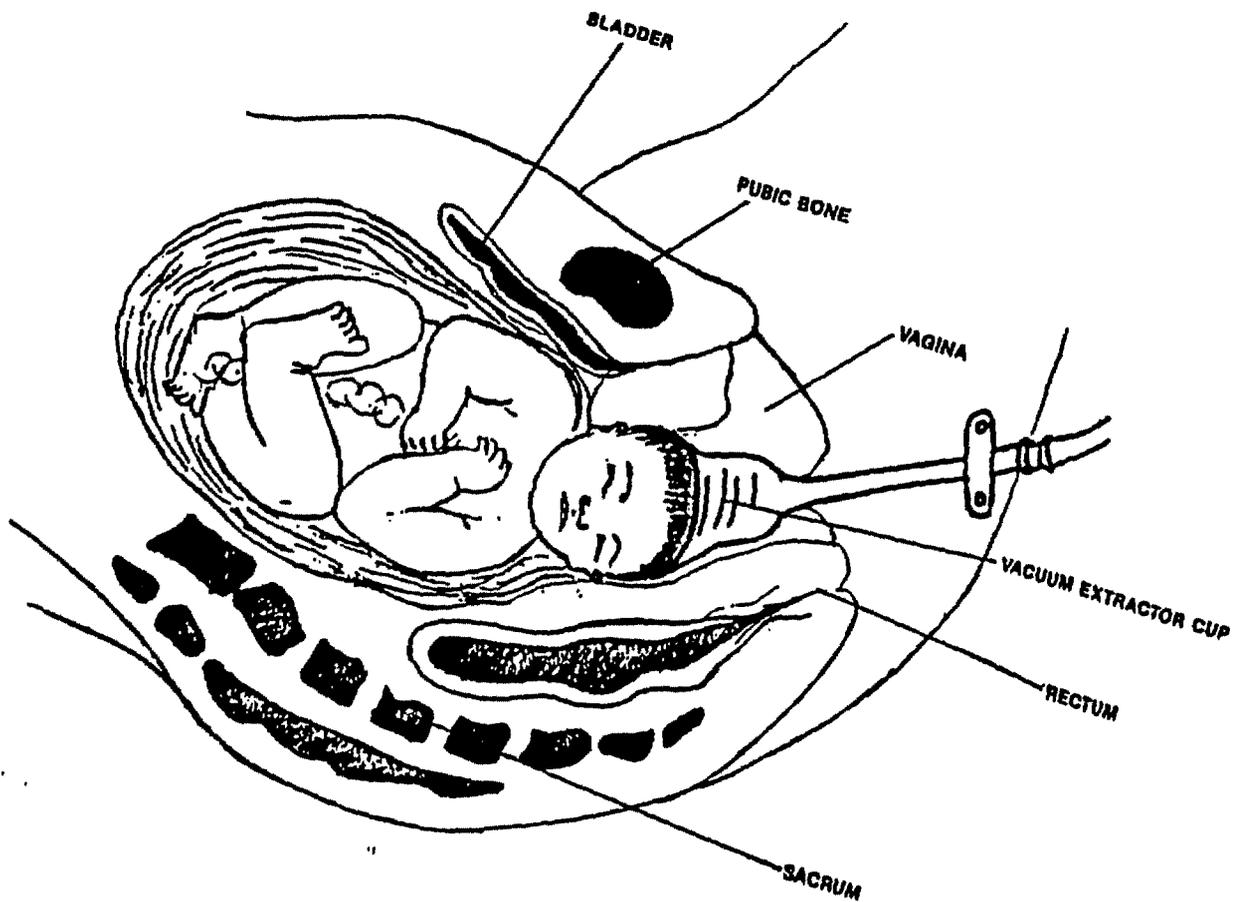


Figure 2. Apply the Cup

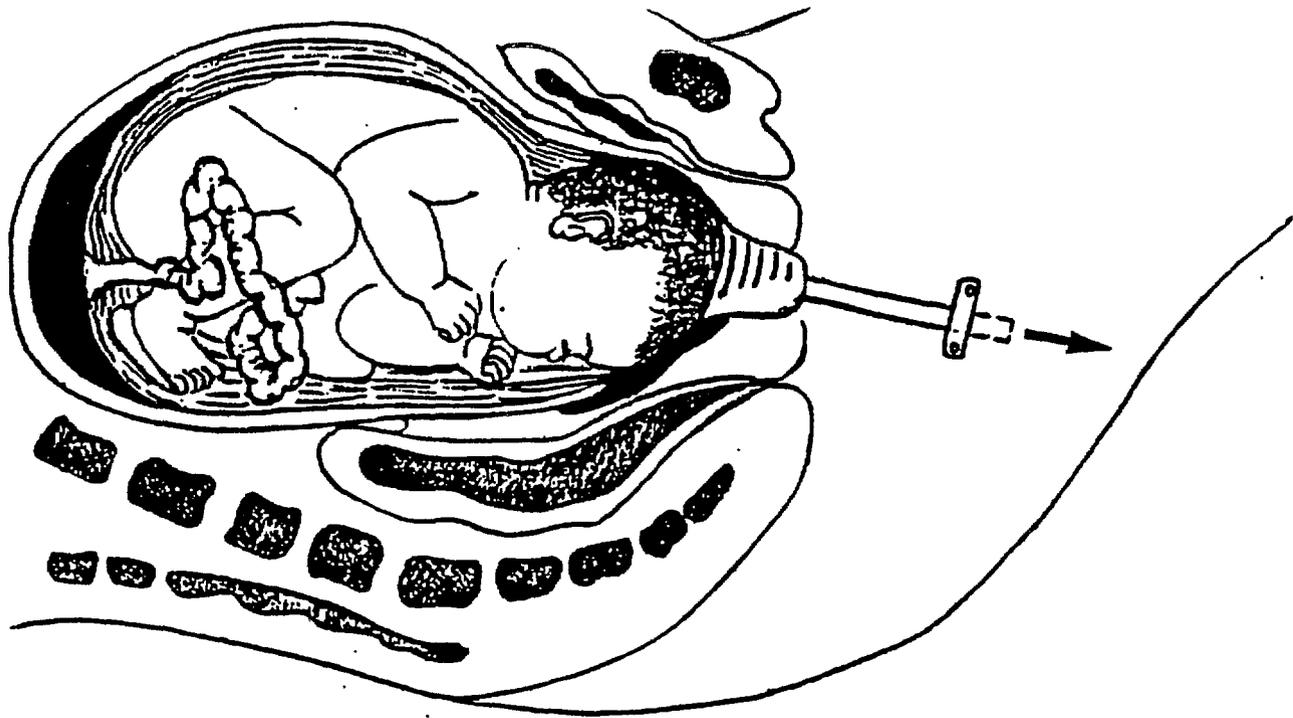


Figure 3. Correct Direction of Pull before the Vertex Clears the Symphysis Pubis : Pull Downwards

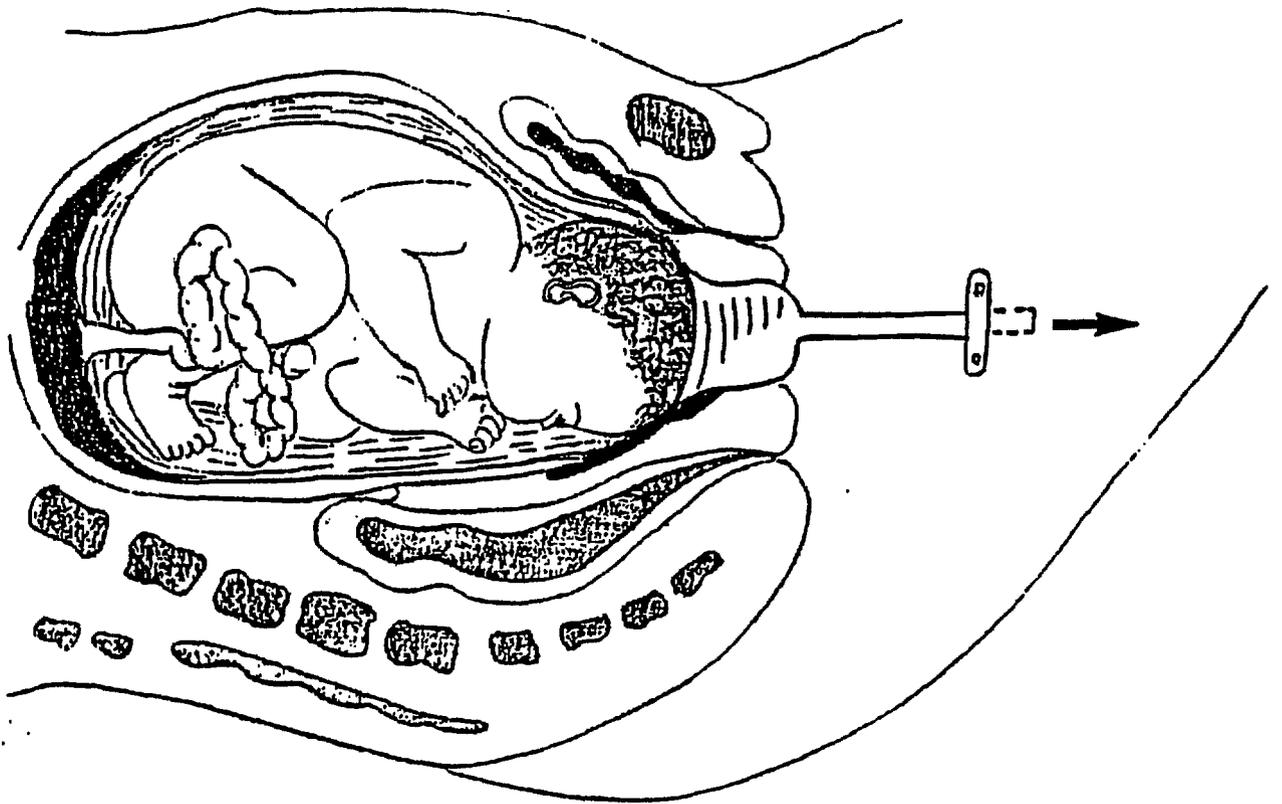


Figure 4. Correct Direction to Pull When the Vertex Clears the Symphysis Pubis : Pull Straight Out

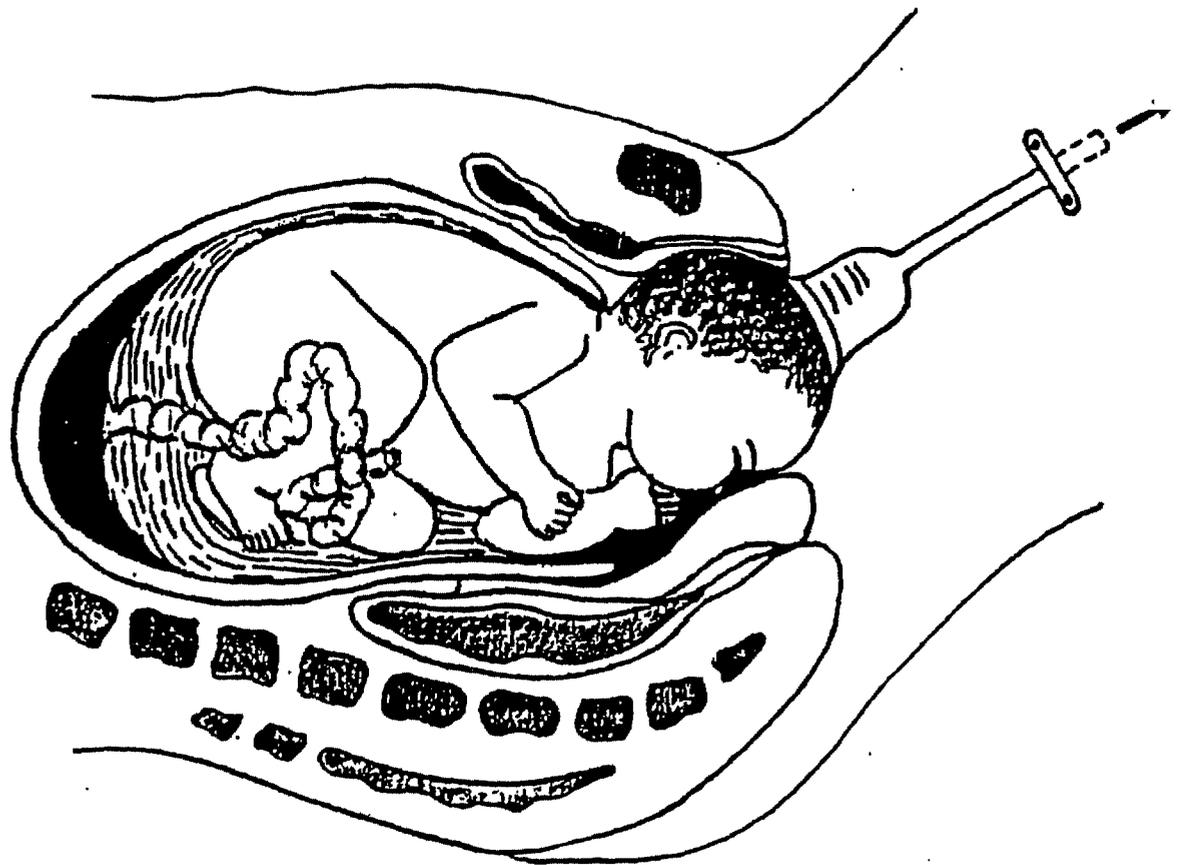


Figure 5. Pull Upward as the Head Crowns

- Raise the pressure:
 - ◀ Squeeze the pump handle to raise the pressure to 100 mm Hg (millimeters of mercury).
 - ◀ Recheck to make sure that no maternal tissues has been drawn under the edge of the cup, because this will cause the cup to slip off and damage to the mother's tissues.
 - ◀ Wait for the next contraction.
 - ◀ As the contraction begins, raise the vacuum pressure to 400 mm Hg (15 inches Hg).

Note: The maximum pressure of 600 mm Hg (22 inches Hg) should never be exceeded.

- Bring the fetal head down with a contraction:
 - ◀ Pull downwards toward your knees until the vertex clears under the symphysis pubis.
 - ◀ Encourage the mother to push long and steadily with a contraction.
 - ◀ As the mother pushes, pull downwards on the handle firmly and straight. (See Figure 3).
 - ◀ The baby's head will rotate at the speed and direction of a normal delivery.
 - ◀ Do not twist and turn the cup or the handle; this will cause the cup to pop off. The baby's scalp can be injured (bruising, bleeding, swelling) when the cup pops off.
- When a contraction stops:
 - ◀ Reduce the pressure 100mm Hg.
 - ◀ Do not pull.
 - ◀ Encourage the mother to breathe slowly and deeply to relax.
 - ◀ Have an assistant check the fetal heart rate.
- Repeat the above 2 steps until head clears the symphysis pubis. Usually 2 or 3 times are sufficient. Progress must be seen with each contraction. With each contraction, guide the head straight out. (See Figure 4). The head should progress over the perineum. Do not allow pressure to remain at maximum level (600 mm Hg) for more than 10 minutes total. Too much pressure can cause bleeding into the skull or serious scalp damage.
- Deliver the baby:
 - ◀ An episiotomy may be necessary in the primipara, to decrease resistance of the perineum before the baby's head has crowned.
 - ◀ When the head begins to crown, during the next contraction, with the pressure at 600 mm Hg, pull upwards. (See Figure 5).
 - ◀ After the head has delivered, release the pressure and continue with the delivery.

5.9 BREECH PRESENTATION

DEFINITION:

- Baby's breech or buttocks presenting in the birth canal, and the aftercoming in the uterine fundus. In simple words, breech is the opposite of vertex.

CLASSIFICATION:

1. Frank: hips flexed and legs extended over the anterior surface of the body
2. Complete: hips and legs flexed (squatting position of the baby)
3. Footling: foot or knee presenting

PREDISPOSING FACTORS:

1. Multiparity and uterine relaxation
2. Polyhydramnios and oligohydramnios
3. Hydrocephaly and anencephaly
4. Multiple gestation
5. Pelvic tumours
6. Uterine anomalies

DIAGNOSIS:

- Physical examination
 - ◀ Abdominal palpation reveals hard, round mass of fetal head in fundal grip and soft, irregular buttocks
 - ◀ Vaginal examination reveals small parts or lower pole of the fetus or the buttock itself
 - ◀ The anus and ischial tuberosities form a straight line distinguishing the breech from a face, in which the mouth and malar prominences form a triangle
- Ultrasound
 - ◀ To confirm and to rule out congenital anomalies

MANAGEMENT:

- Patient in labor, with or without prenatal care:
 - ◀ Admit to labor and delivery, only in facility capable of emergency cesarean delivery
 - ◀ Have evaluated by senior resident or by chief of service.
 - ◀ Estimate gestational age by 1st day of last menstrual period fundal height or ultrasound with or without ruptured membranes, always remember the high risk of cord prolapse in a breech delivery with ruptured membranes.
 - ◀ Evaluate fetal well-being, such as abnormalities in the fetal heart rate (type I & II decelerations or marked variable decelerations, bradycardia).
 - ◀ Ultrasound to estimate fetal weight, rule out congenital anomalies and assess fetal head flexion/ extension.
 - ◀ If an ultrasound examination is not possible, a plain abdominal X- ray is obligatory.
 - ◀ Clinical maternal pelvimetry.
 - The following are the minimum acceptable maternal pelvic measurements:
- | | PA (cm) | Transverse (cm) |
|---------------|----------|--------------------|
| Pelvic inlet | 11.5 | 12.5 |
| Mid - pelvis | 11.5 | 9.5 (interspinous) |
| Pelvic outlet | 12.5 | 11.5 |
- ◀ If there are signs of fetal compromise or cord compression, perform an emergency cesarean delivery, omitting the ultrasound or X-ray examination.
 - ◀ Breech delivery should be attended by most senior staff.
- Labor and vaginal birth of a fetus in the breech presentation is permitted if the following conditions are met:
 - ◀ Facility capable of emergency cesarean delivery.
 - ◀ Delivery should be conducted by a physician who is expert in vaginal breech delivery.
 - ◀ Estimated fetal weight between 2550-3500 grams, or fetus at term and clinically of average size.
 - ◀ Complete breech.
 - ◀ Flexion of fetal head is confirmed.
 - ◀ Exclusion of macrocephaly
 - ◀ Pelvic dimensions are clinically adequate.
- The major differences between labor and delivery in cephalic and breech presentations:
 - ◀ With a breech, successively larger and very much less compressible parts of the fetus are born first easily and smoothly. But when the aftercoming enters the pelvis, it either does or does not fit well with a resulting catastrophe.
 - ◀ With a cephalic presentation, molding of the head can occur over several hours, but no such opportunities exist with breech.

- Fetuses with major congenital anomalies incompatible with life (e.g., anencephaly) should be allowed to deliver vaginally.
- Contraindications to a vaginal breech birth:
 - ◁ Estimated fetal weight greater than 1000 grams but less than 2500 grams, or greater than 3500 grams, fetus clinically macrosomic; gestational age greater than 30 weeks but less than 37 weeks.
 - ◁ Abnormal maternal pelvis; non gynecoid, inlet or mid - pelvis less than average.
 - ◁ Frank breech footling, or pulsating cord prolapse or presentation.
 - ◁ Fetal distress.
 - ◁ Induction of labor and particularly, augmentation of labor
- Conditions that do not contraindicate a vaginal breech birth, but that require consultation and evaluation by the chief of service:
 - ◁ Breech presentation in primigravida.
- Conditions that require immediate cesarean delivery:
 - ◁ Significant abnormality of fetal heart rate.
 - ◁ Abnormal labor:
 - Dysfunctional contractions
 - Prolonged active phase
 - Lack of descent in active phase
 - Prolonged second stage: more than 1 hour in primigravidae and 1/2 hour in multiparae.
 - ◁ Pulsating cord prolapse
- Attending a vaginal breech birth:
 - ◁ Monitor vitals signs, fetal heart rate and uterine contractions.
 - ◁ Keep membranes intact as long as possible.
 - ◁ Avoid the use of oxytocin: if its use is considered, the chief on call must be consulted.
 - ◁ Have the woman to push down at the indicated moment, when the baby's buttocks are distending the perineum.
 - ◁ Perform mediolateral episiotomy will not create more room in the bony pelvis, of course, but it enables the operator to more easily perform various manipulation.
 - ◁ Residents or chiefs required at a breech birth: 2 obstetricians, 1 anesthesiologist, 1 pediatrician.
- Attending a cesarean breech birth:
 - ◁ Choose type of uterine incision according to gestational age, fetal weight, fetal position, surgeon's ability, signs of fetal compromise.

Note: Wherever possible, a transverse incision in the lower segment should be the incision of choice.

- Breech birth in patient presenting with advanced dilatation:
 - ◀ Incomplete cervical dilatation with signs of fetal compromise should be given an emergency cesarean delivery.
 - ◀ Incomplete or complete cervical dilatation without signs of fetal compromise should continue vaginal delivery.
 - ◀ Incomplete or complete cervical dilatation, without fetal parts in the vagina, should perform emergency cesarean delivery.

TECHNIQUE:

- If there are no abnormalities of mechanism or maternal or fetal complications, leave things strictly to nature and intervene only to assist the delivery when clearly necessary. Upon rupture of the membranes, carry out a vaginal examination to exclude cord prolapse. As soon as the buttocks reaches the pelvic floor, place the patient in the lithotomy position. Local infiltration or general anaesthesia should be provided.
 - ◀ Delivery should proceed spontaneously until the umbilicus appears at the introitus. Traction prior to delivery of the umbilicus may promote extension of the head or nuchal placements of the arms.
 - ◀ When the umbilicus delivered, several inches of the fetal cord should be gently pulled down to prevent compression on the cord and monitor the cord pulsation by palpation.
 - ◀ Of critical importance is keeping the fetal back up during the delivery to allow the head to enter the pelvis presenting its most favorable geometry.
 - ◀ It is not mandatory to deliver the legs, as the feet eventually will deliver spontaneously and the legs will “spring” free.
 - ◀ The operator should not place his/her hands too high on the baby’s abdomen which could injure fetal abdominal organs, such as the spleen and liver.
- “Iron out” (gently stretch) the perineum, and carry out an episiotomy. Deliver the legs one at a time. Press on the popliteal fossa, flex the knee, displacing it to the side of the trunk, move your fingers along the leg towards the ankle, and finally hold the ankle and deliver the foot and leg. Repeat the procedure to deliver the other leg. With the delivery of the buttocks (Fig. 2.4A), draw down a loop of the cord. Feel for the arms across the front of the chest and, if they can be found, deliver them one at a time (Fig. 2.4B). If the shoulders and arms are extended and cannot be delivered in this way, gently rotate the fetus to bring first the chest and then the posterior shoulder to the front. Lift out the arm that is now lying in the anterior position, the other arm can then be delivered easily.

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- For the delivery of the head, (the most difficult and hazardous part of the breech delivery), bring the patient to the edge of the table and allow the fetus to hang downwards over the perineum for 1-2 min. This will cause the fetal head to come into the cavity, at which point the suboccipital region or hairline over the nape of the neck will become visible beneath the pubic arch (Fig. 2.4C). The head is born by flexion through the pelvis. A very competent assistant should follow the head and apply suprapubic pressure to flex the head through the pelvis. Once the hairline is visible, accomplish delivery by grasping the ankles of the fetus with one hand, aligning the legs, trunk, and neck in a straight line by a gentle pull, and then exerting a mild, steady abduction force while slowly lifting the legs and trunk over the mother's abdomen (Fig. 2.4D). At the same time, control the escape of the head from the vulva and maintain flexion of the head and neck with the other hand.
- The application of piper forceps is ideal for the delivery of the after-coming head. They are indicated when other maneuver fails and may be applied prophylactically. As an assistant lifts the body of the child, apply the forceps from the ventral aspect to either side of the head and deliver it by slow intermittent traction. The forceps blades act as a protective cage for the head.
- The method of jaw flexion and shoulder traction may be helpful for delivery of the head when it is high in the pelvis. General anaesthesia is preferred for this procedure. After delivery of the shoulders, place the baby on your supinated left forearm with its limbs hanging on either side, put the middle and index fingers of your left hand over the malar bones on either flexion side to maintain flexion. Put the fourth and the little finger of your pronated right hand on the baby's right shoulder, the index finger over the left shoulder, and the middle finger on the suboccipital region. Now apply traction in a backward and downward direction until the nape of the neck is visible under the pubic arch. Ask an assistant to apply suprapubic pressure during this maneuver, to maintain flexion of the head and neck. Carry the baby upwards and forwards towards the mother's abdomen, releasing the face and brow. Finally, depress the trunk to release the vertex and occiput.
- Ligate and divide the cord. Administer 0.25 mg of ergometrine or, if this is not available, 2 IU of oxytocin. Then proceed with the third stage of labor and with episiotomy repair as for normal delivery.

Note:

- < During jaw flexion –shoulder traction maneuver, finger in mouth is not recommended because traction on the jaw can cause dislocation.
- < During delivery of the head the baby's body should be wrapped in a warm towel to avoid premature respiration.
- < Extraction of a breech at cesarean delivery requires maneuvers similar to those used in vaginal birth. During cesarean delivery, the incision can be extended if the baby is too large to deliver easily. This is not an option during vaginal birth.

◀ Spontaneous expulsion of the buttocks, rapid and minimally assisted delivery of the trunk and shoulders and slow forceps delivery of the head are the ideal.

COMPLICATIONS:

- Breech delivery is associated with a higher incidence of perinatal mortality, and/or morbidity such as intracranial haemorrhage, or fetal asphyxia from compression of the cord than in normal delivery. Possible trauma to the fetus includes dislocation of the cervical spine, rupture of the liver, and fracture or separation of the epiphyses of the humerus, femur, or the clavicle. Injury to the fifth and sixth cervical nerves can result in palsy.
- Other complications include nuchal position of the arms, or entrapment of the head by incompletely dilated cervix (common in premature or foaling breech).
- Cesarean delivery does not always assure a better outcome. Choosing the route of delivery may be difficult and controversial. The health provider who has learned to do a breech extraction is better prepared for the breech delivery which occurs suddenly or unexpectedly.

5.10 NEONATAL AND NEWBORN CARE RESUSCITATION

PROGRAM OF NEONATAL RESUSCITATION

INTRODUCTION

- Being prepared for resuscitation
 - a- Anticipation
 - b- Preparation
- Physiology of ashyxia – Apnea primary vs sec NDARY
- Apgar Score: is not a basis for decision making at the beginning of resuscitation. Why?

RESUSCITATION IN DELIVERY ROOM:

- Action/Evaluation/Decision cycle
- Initial steps
 - < ABCs
 - < Tactile stimulation
- Positive pressure ventilation (PPV)
- Chest compression
- Endo tracheal tube
- Medication: Indication, doses

1. Being Prepared for Resuscitation

ANTICIPATION:

Asphyxiation in a newborn at birth may come as a surprise. However, most newborn asphyxia can be anticipated. When unanticipated, resuscitation can be promptly and effectively initiated only if the proper equipment is readily available and a well-trained team is on hand.

This does not mean that asphyxia in a neonate will occur every time it is anticipated. Some infants, in spite of being at risk for asphyxia, will do well following delivery and will require no resuscitative assistance. If, however, every time asphyxia is anticipated the infant actually requires resuscitation, then it is clear that the cases are not being screened thoroughly. The delivery room staff should be prepared to handle more problems than they actually encounter.

• **Antepartum/Intrapartum History:**

Delivery of a depressed or asphyxiated infant can be anticipated in many cases on the basis of information found in both the antepartum and the intrapartum histories.

• **Antepartum Factors**

- | | |
|---|-----------------------------|
| < Maternal diabetes | Post-term gestation |
| < Pregnancy-induced hypertension | Multiple gestation |
| < Chronic hypertension | Size-dates discrepancy |
| < Previous Rh sensitization | Drug therapy, e.g. |
| < Previous stillbirth | Reserpine |
| < Bleeding in second or third trimester | Lithium carbonate |
| < Maternal infection | Magnesium |
| < Hydramnios | Adrenergic – blocking drugs |
| < Oligohydramnios | Maternal drug abuse |

• **Intrapartum Factors**

- | | |
|---|---|
| < Elective or emergency cesarean section | Non-reassuring fetal heart rate patterns |
| < Abnormal presentation | Use of general anesthesia |
| < Premature labor | Uterine tetany |
| < Rupture of membranes more than 24 hours prior to delivery | Narcotics administered to mother within 4 hours of delivery |
| < Foul-smelling amniotic fluid | Meconium-stained amniotic fluid |
| < Precipitous labor | |
| < Prolonged labor (greater than 24 hours) | |
| < Prolonged second stage of labor | Prolapsed cord |

(greater than 2 hours)

Abruptio placenta
Placenta previa

It should be obvious that some of these factors may present during a delivery. Thus, you must have the factors well in mind so that if they occur, you will recognize that asphyxia is a potential problem.

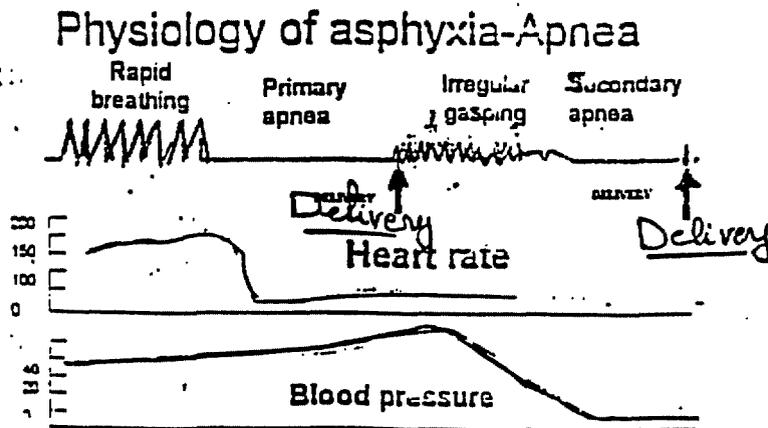
ADEQUATE PREPARATION:

In spite of the screening of cases through review of the antepartum and intrapartum histories, there will be occasions when the birth of an asphyxiated infant has not been anticipated. To allow for such situations, the minimum preparation for any delivery should include:

- < A radiant warmer, heated and ready for use.
- < All resuscitation equipment immediately available and in working order.
- < At least one person skilled in neonatal resuscitation should be present in the delivery room: one or two other persons should be available to assist with an emergency resuscitation.

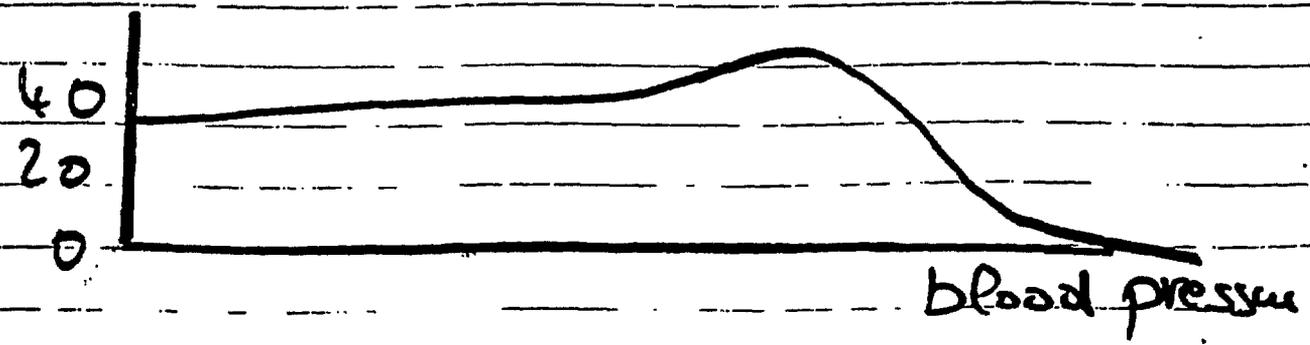
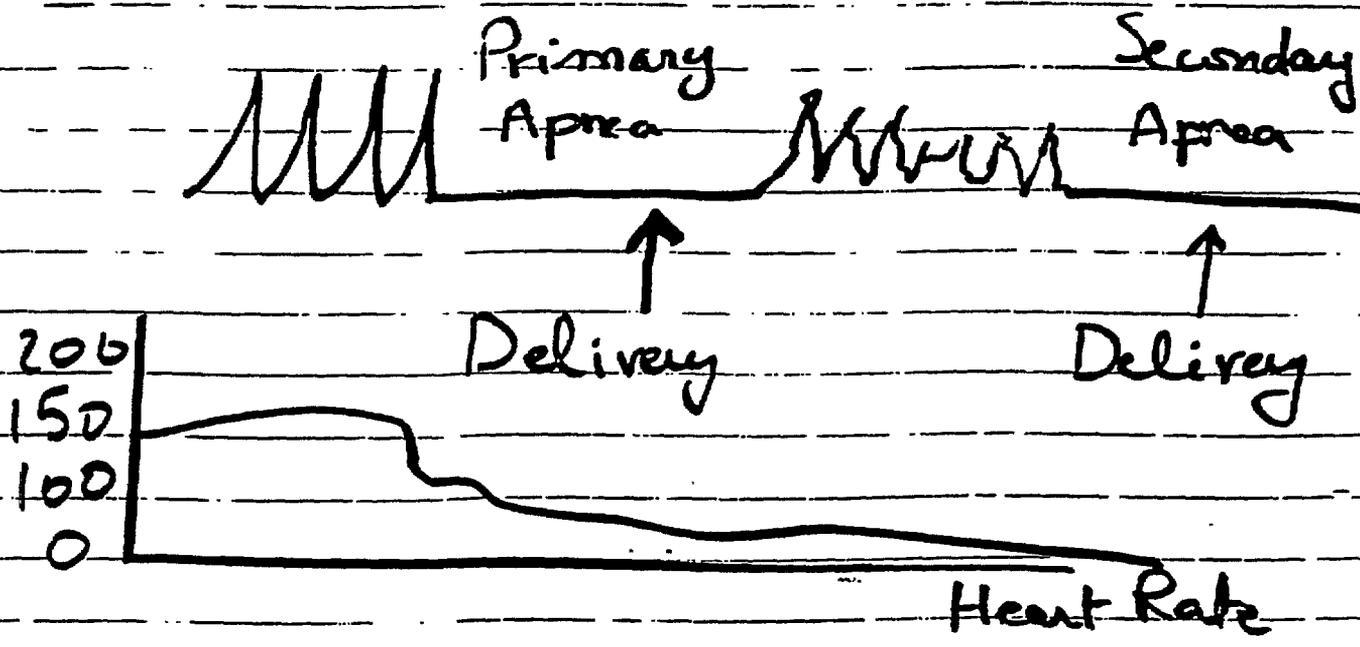
2. Physiology of asphyxia Pathophysiology of Asphyxia Apnea

- When infants become asphyxiated (either in utero or following delivery, they undergo a well-defined sequence of events. When a fetus or infant is deprived of oxygen, an initial period of rapid breathing occurs. If the asphyxia continues, the respiratory movements cease, the heart rate begins to fall, and the infant enters a period of apnea known as **primary apnea**. Exposure to oxygen and stimulation during the period of primary apnea in most instances will induce respiration.
- If the asphyxia continues, the infant develops deep gasping respiration, the heart rate continues to decrease, and the blood pressure begins to fall. The respiration becomes weaker and weaker until the infant takes a last gasp and enters a period of apnea call **secondary apnea**. During secondary apnea the heart rate, blood pressure, and oxygen in the blood (PaO₂) continue to fall farther and farther. The infant now is unresponsive to stimulation, and artificial ventilation with oxygen (PPV) must be initiated at once.



- When we are faced with an apneic infant at delivery, we must assume that we are dealing with secondary apnea, and resuscitation should begin immediately. To assume, incorrectly, that an infant has primary apnea and provide stimulation that is ineffective will only lead to delayed oxygenation and increased risk of brain damage.

RESOURCE (OHIT)



3. APGAR Scoring Chart

Apgar Score is not a basis for decision making at the beginning of resuscitation. Why?

Apgar Score: **is not used** in determining when to initiate a resuscitation or in making decisions about the course of resuscitation.

It is used for:

After 1" min.: evaluate effectiveness of resuscitation

After 5" min.: assess neurological sequelae

Resuscitation = seconds and not minute

The APGAR Scoring Chart is a simple test done by looking at the baby :

a. after 1 minute

b. after 5 minutes

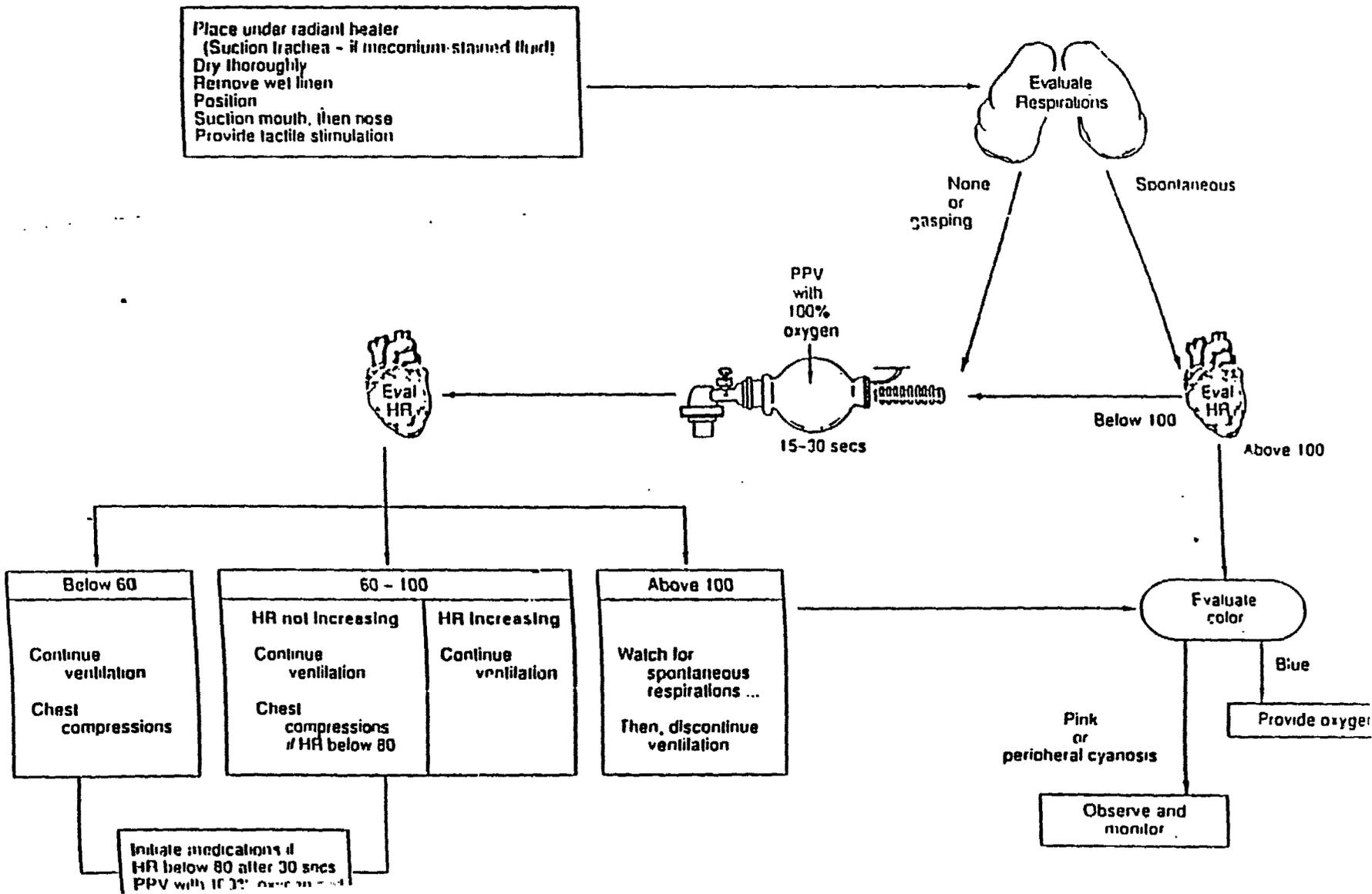
Score \ Item	2	1	0
Color	Completely pink body and face	Pink body, blue arms and legs, pale body and face	Pale or blue body and face
Heart beats	> 100 heart beats per/min. strong heart beat	< 100 heart beats/min. or less weak beats	No heart beats
Grimace	Crying, coughing and sneezing	Grimace or pucker of face	No response
Movement and tone	Active movement waving arms and legs	Some movements in response to stimulation	Limp arms and legs . No movement in response to stimulation
Cry and breathing	- Strong cry - Regular breathing	- Weak cry - Slow irregular breathing retraction of chest wall, grunting, weak cry	- No cry - No breathing

Normal signs score: 7 - 10

Abnormal signs score: 0 - 6



Overview of B - Resuscitation in the Delivery Room



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Initial steps of Neonatal Resuscitation

- This summary of the initial steps in resuscitation and some guidelines for practice are presented for your review and reference.

PREVENTING HEAT LOSS

The first step in caring for a newborn is to prevent heat loss. Heat loss is prevented by:

- < Placing the infant under a heated radiant warmer
- < Quickly drying the infant and removing the wet linen

Open Airway

- **Positioning**

Next, the infant should be positioned properly to ensure an open airway. For correct positioning

- < Neonate is placed on his or her back or side, with the neck slightly extended.

- **Suctioning:**

As soon as the infant is properly positioned, he or she should be suctioned:

- < Suction the mouth first
- < Then suction the nose

- **Evaluation:**

After you have dried, positioned, and suctioned the infant, you should monitor and evaluate the following three vital signs:

- < Respiratory effort
- < Heart rate
- < Color

You should follow these steps:

- **Respirations:**

Observe and evaluate the infant's respirations. If normal, go to the next sign. If not, begin PPV.

- **Heart Rate:**

Check the baby's heart rate. If above 100 beats per minute, go on. If not, initiate PPV

- **Color:**

Observe and evaluate infant's color. If central cyanosis is present, administer free-flow oxygen

Tactile Stimulation to stimulate Breathing

- If an infant doesn't breathe immediately, tactile stimulation may be used briefly in an attempt to initiate respirations. There are two correct methods of tactile stimulation:

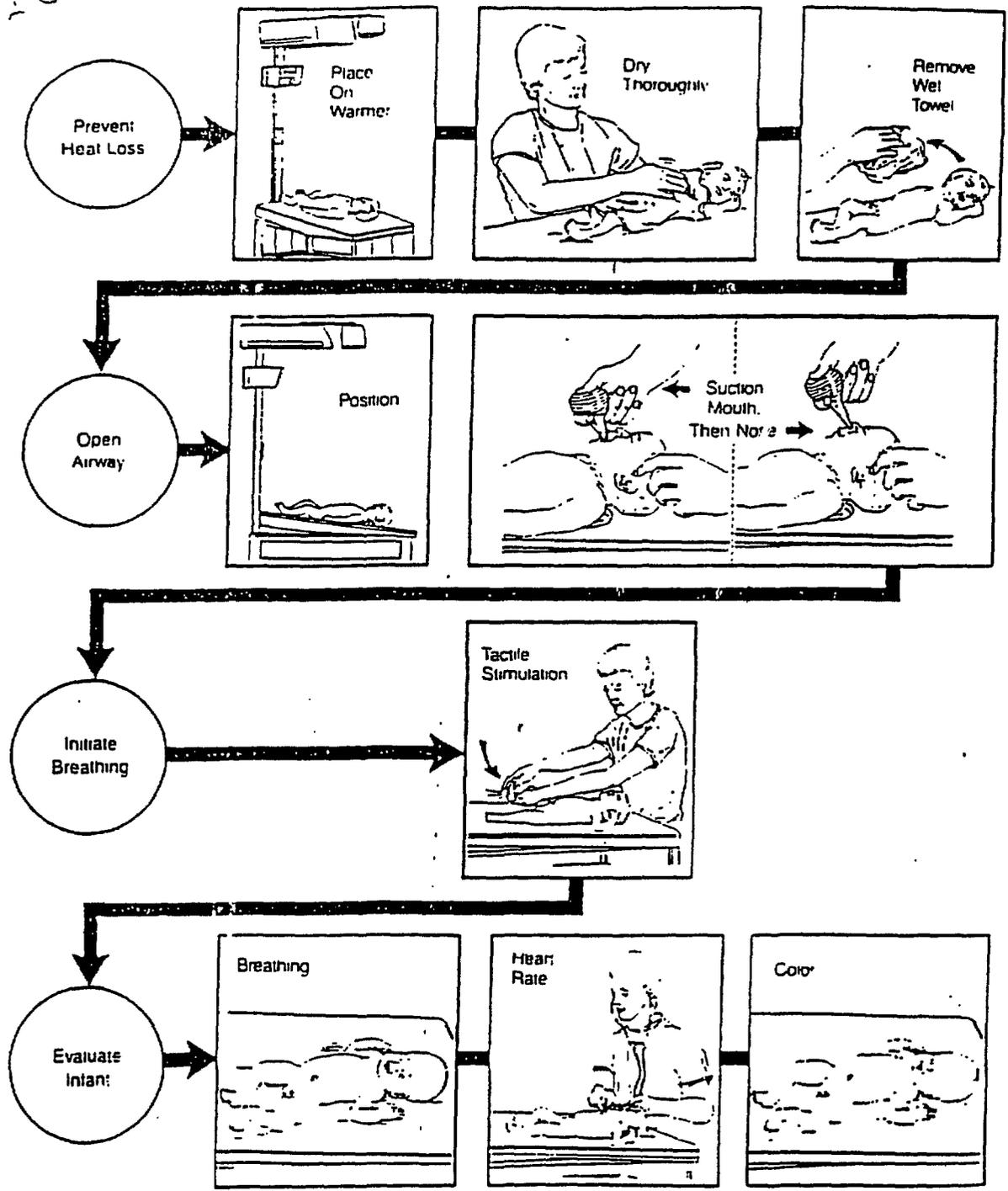
- ◀ Slapping or flicking the soles of the feet
- ◀ Rubbing the back

- Harmful actions such as the following should be avoided:

- ◀ Slapping the back
- ◀ Squeezing the rib cage
- ◀ Forcing the thighs onto the abdomen
- ◀ Dilating the anal sphincter
- ◀ Using hot or cold compresses or baths
- ◀ Blowing cold oxygen or air on the face or body

- Gentle rubbing of the trunk, extremities, or head can be used to increase respiratory effort in a baby who is breathing.

Now let's take a look at these steps.



Let's begin our discussion by looking at the prevention of heat loss in a newborn infant. Then we will go into the actual resuscitation

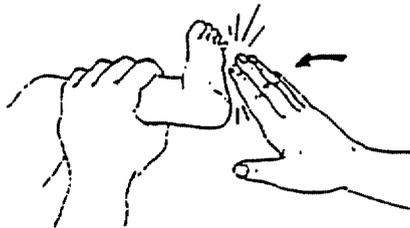
Providing Tactile Stimulation

- Both drying and suctioning the infant produce stimulation, which for many infants is enough to induce respiration. If, however, an infant doesn't immediately breathe, additional tactile stimulation can be provided in an attempt to initiate respirations. There are two safe and appropriate methods of doing this:
 - ◀ Slapping or flicking the soles of the feet, and
 - ◀ Rubbing the infant's back

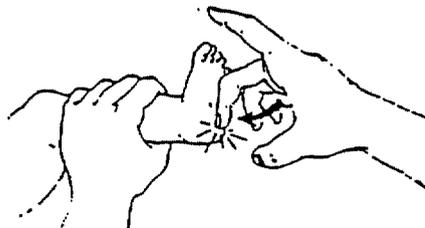
APPROPRIATE ACTIONS

- **Foot Slap or Flick**

Stimulating the soles of the feet, either by slapping or flicking the feet, often initiates respirations in the mildly depressed infant.



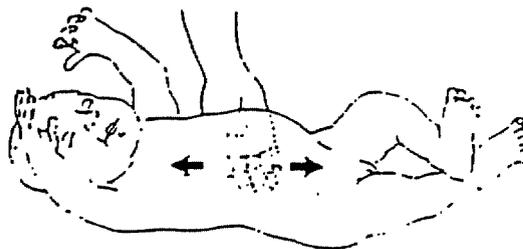
Slapping the Sole of the Foot



Flicking the Heel

- **Back Rub**

Quickly and firmly rubbing the infant's back is another safe method of attempting to initiate respirations.



Rubbing the Infant's Back

HARMFUL ACTIONS

There are certain actions, which have been used in the past to provide tactile stimulation to apneic neonates, that can harm a baby and should never be used.

Harmful Actions

- < Slapping the back
- < Squeezing the rib cage

- < Forcing thighs onto abdomen
- < Dilating anal sphincter
- < Using hot or cold compresses or baths
- < Blowing cold oxygen or air onto
face or body

Potential Consequences

Bruising
Fractures, pneumothorax, respiratory
distress, death
Rupture of liver or spleen , hemorrhage
Tearing of anal sphincter
Hypothermia, hyperthermia, burns
Hypothermia

P.P.V.

Ventilation Rate and Pressure

• Up to this point, you have learned how to select and assemble a resuscitation bag and mask and how to check to be sure they are functioning properly. In addition, you have learned how to position the mask on the infant's face and how to test for an effective seal. Here you will learn how rapidly to squeeze the bag and what pressures should be used with various infants. In order for positive-pressure ventilation to be effective, it must be delivered at a proper rate and a proper pressure.

• Ventilation Rate

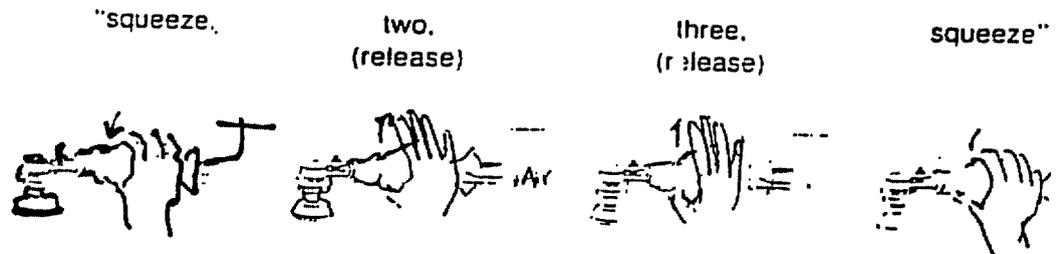
Ventilation of the infant should be performed at a rate of 40 – 60 per minute

• Practice

Practice squeezing the bag at a rate of 40 – 60. You can do this with or without a manikin. But you need a resuscitation bag and a clock with a second hand to time yourself.

Rate of 40 – 60 = 10 – 15 breaths in 15 seconds

If you had trouble maintaining a rate of 40 – 60, it may help for you to say to yourself as you ventilate an infant:



If you squeeze the bag on "squeeze", and release while you say "two, three", you will probably find you are ventilating at a proper rate.

• Ventilation pressure

The pressure needed to inflate the lungs will vary, depending on the infant's size, condition of the lungs, and whether the infant has previously taken a breath.

First breath
pressure

The initial lung inflation following delivery may require 30–40 cm H₂O

Succeeding breaths Pressure of 15-20 is often adequate after the first breath

Pulmonary disease* Infants with respiratory conditions that decrease lung compliance may require 20-40 cm H₂O pressure

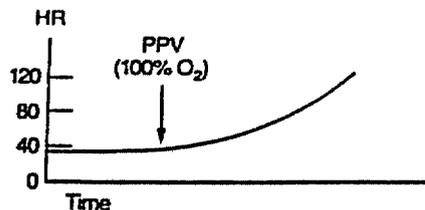
* The result of respiratory diseases in which some of the alveoli are collapsed making the lungs difficult to expand (e.g. hyaline membrane disease, meconium aspiration)

Indications for Chest Compressions

An adequate heart rate is necessary for effective cardiac output. Most of the time, ventilation alone with 100% oxygen will be sufficient to raise the infant's heart rate to an adequate level. If an infant fails to achieve an adequate heart rate despite being ventilated with 100% oxygen, chest compressions must be performed.

INITIAL PERIOD OF PPV

In a newborn, bradycardia usually results from a lack of proper oxygenation. In most infants with bradycardia, the heart rate (HR) begins to improve as soon as adequate ventilation with 100% oxygen is established.



Therefore, the decision to begin chest compressions should be based on the heart rate obtained after 15 to 30 seconds of PPV with 100% oxygen, not on a heart rate obtained at the time of delivery.

WHEN TO BEGIN

Current recommendations include two indications for initiating chest compressions.

Chest compressions are indicated if after 15 to 30 seconds of PPV with 100% oxygen the heart rate is

< Below 60 beats per minute

or

< Between 60 and 80 beats per minute and not increasing

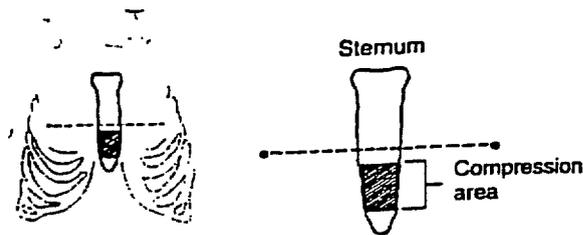
WHEN TO STOP

Once the heart rate is 80 beats per minute or more, chest compressions should be discontinued.

Note:

- Some experienced persons prefer to intubate an infant before or shortly after initiating chest compressions. However, chest compressions can be performed on an infant who is being ventilated with a bag and mask. A person who is inexperienced with intubation should not take the time to attempt to intubate an asphyxiated infant who is in need of chest compressions.

LOCATION OF COMPRESSION



Placing the Endotracheal Tube

Once the vocal cords and trachea are visualized, insert the endotracheal tube.

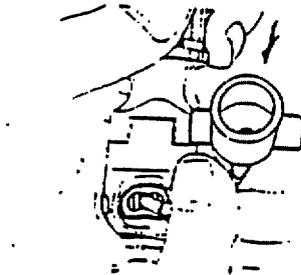
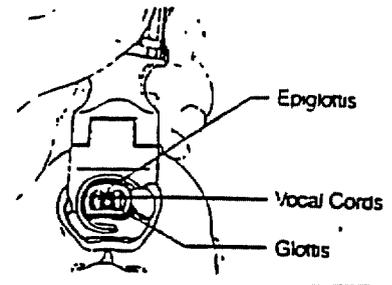
INSERTING TUBE

When you are able to visualize the glottis and vocal cords, follow these steps for inserting the endotracheal tube:

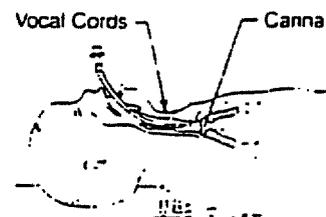
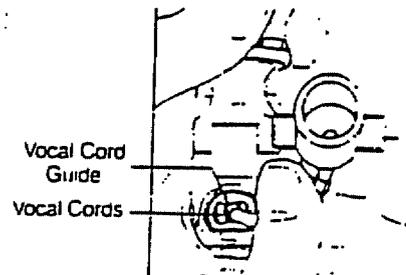
1. Holding the tube in your right hand, introduce it into the right side of the infant's mouth. This will prevent the tube from blocking your view of the glottis.
2. Keep the glottis in view, and when the vocal cords are apart, insert the tip of the ET tube until the vocal cord guide is at the level of the cords.

This will position the tube in the trachea – approximately half way between the vocal cords and canna.

(if the cords are together, wait for them to open. Do not touch the closed cords with the tip of the tube as it may cause spasm of the cords. If the cords do not open before the 20-second limit has expired, stop and ventilate with a bag and mask)



Insertion of ET Tube Between Cords



Endotracheal Suctioning Under Direct Vision

- When an infant shows signs of having aspirated meconium, the trachea must be suctioned under direct vision. This involves using a laryngoscope to view the trachea and one of the following for suctioning the trachea:
 - ◀ ET tube
 - ◀ Suction catheter, 10Fr. or larger
- The procedures for using each of these two pieces of equipment are given below.

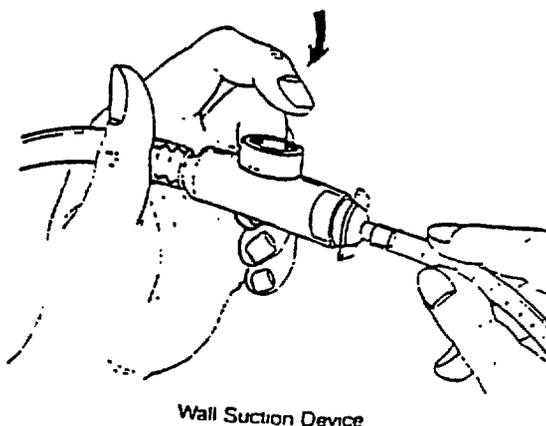
EQUIPMENT AND SUPPLIES

The equipment and supplies needed for tracheal suctioning are as follows:

- ◀ Laryngoscope with appropriate blade (fullterm or premature size)
- ◀ ET tube or 10-12 Fr. suction catheter
- ◀ Suction setup with tubing

SUCTIONING VIA ET TUBE

Suctioning the trachea under direct vision using the ET tube is the preferred method for suctioning meconium and may be used for suctioning other material from the trachea as well. This consists of inserting the tube approximately 3 cm below the vocal cords and then applying continuous suction as you withdraw the tube. Suction can be applied to the ET tube by use of an adaptor and a regulated wall suction device. Reintubation followed by suctioning may be repeated until the trachea is cleared. The suction pressure should not exceed 100 mm Hg or 4 in Hg.

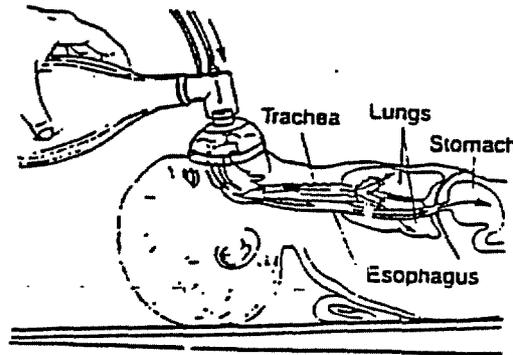


Orogastric Catheter

Infants requiring positive-pressure ventilation with a bag and mask for longer than 2 minutes should have an orogastric tube inserted and left in place during ventilation. Here you will learn the importance of an orogastric tube in preventing distention of the stomach and intestines and preventing aspiration of gastric contents.

EFFECT OF VENTILATION

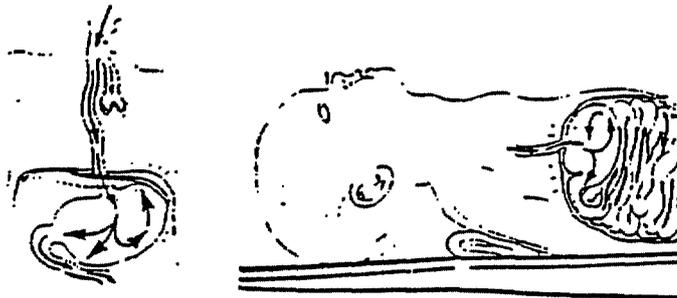
During bag-and-mask ventilation, air is forced into the oropharynx, where it is free to enter both the trachea and the esophagus. Proper positioning of the infant will force most of the air into the trachea and the lungs. However, some air may enter the esophagus and be forced into the stomach.



DISTENTION

Air forced into the stomach interferes with ventilation in the following ways:

- < Air in the stomach puts pressure on the diaphragm, preventing full expansion of the lungs.
- < Air in the stomach may cause regurgitation of gastric contents, which can then be aspirated during bag-and-mask resuscitation.
- < Air in the stomach travels into the bowel, producing abdominal distention for several hours. This puts pressure on the diaphragm and makes it more difficult for the infant to breathe.



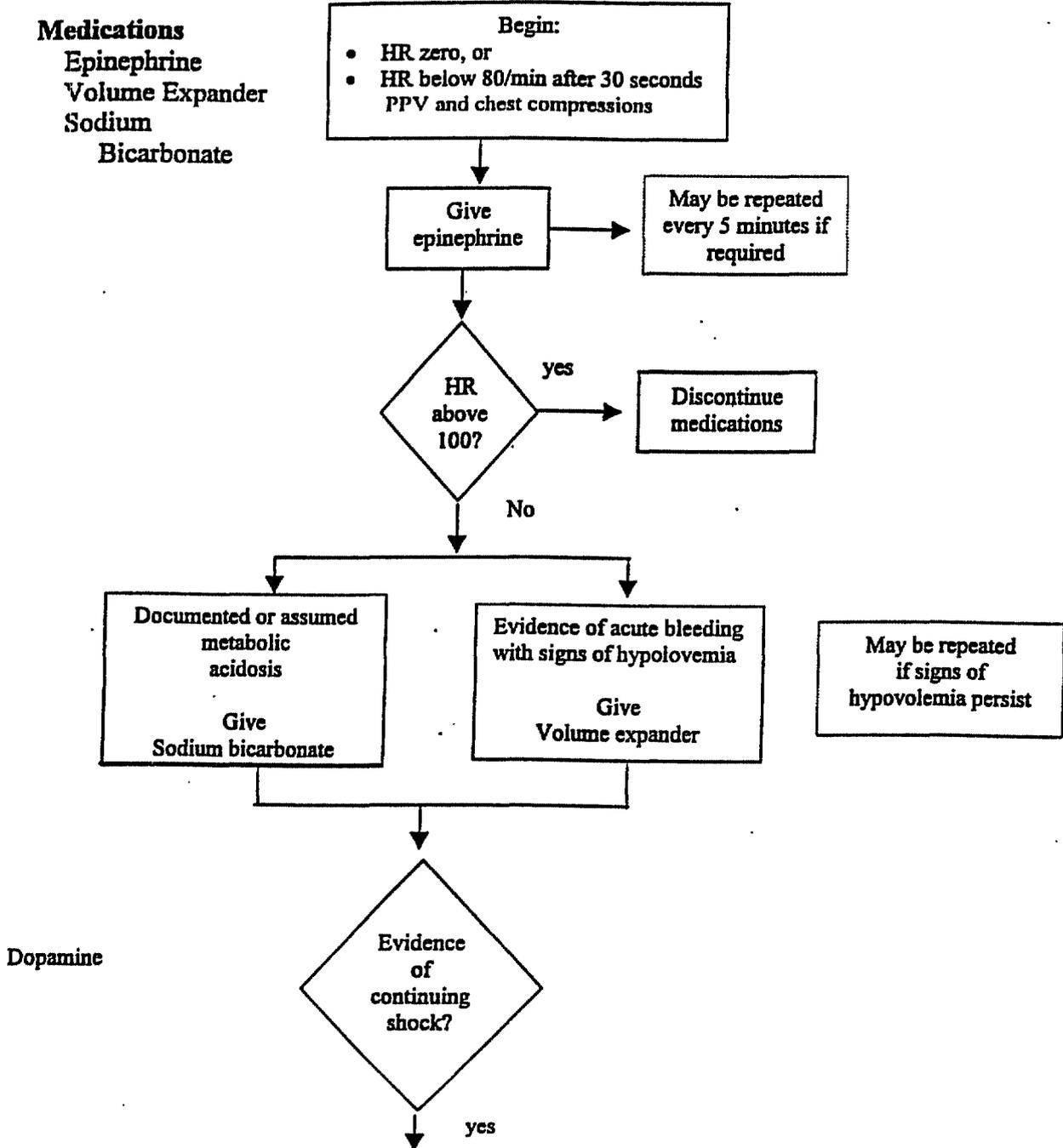
- The problems related to gastric/abdominal distention and aspiration of gastric contents can be prevented by inserting an orogastric tube, suctioning gastric contents, and leaving the gastric tube in place to act as a vent for air throughout the remainder of the resuscitation.

Medications

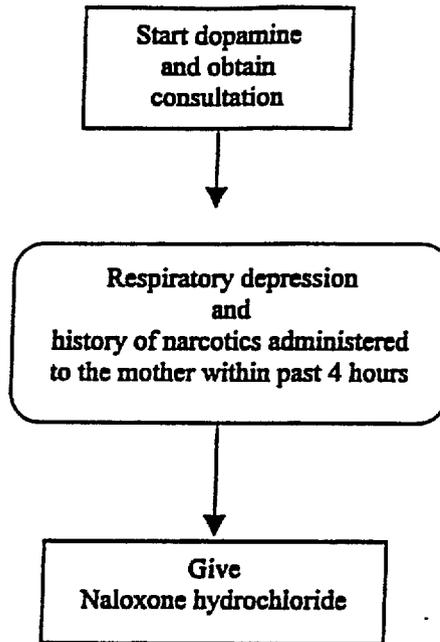
This summary contains key points related to the use of medications during neonatal resuscitation.

Medications

- Epinephrine
- Volume Expander
- Sodium Bicarbonate



**Naloxone
Hydrochloride**



6. POSTPARTUM HEMORRHAGE

PROBLEM IN EGYPT:

(MMR = 53/100,000, ante-partum MMR = 13/100,000; post-partum MMR = 40/100,000)

229 total number of maternal deaths were due to haemorrhage, with 58 antenatal and 178 post-partum (post-partum hemorrhage being the attributed cause for 32% of all maternal deaths, and 46% of all direct maternal deaths). 98% of antenatal haemorrhage deaths and 99% of all post-partum hemorrhage deaths were avoidable.*

(NMMS 1992-1993, MOHP/CSP, 1994)

DEFINITION:

- Postpartum hemorrhage (PPH) is excessive blood loss at delivery leading or likely to lead to a rising pulse rate, falling blood pressure and poor peripheral perfusion. Definition based on amount of haemorrhage (blood loss of 500 ml or more from or within the reproductive tract after birth within 24 hours of delivery) is notoriously impractical and unreliable.

CAUSES:

- Poor uterine contraction (hypotonic or atonic).
- Damage to genital tract (traumatic).

RISK FACTORS:

- Increasing parity
- Anemia and poor nutritional status
- Multiple pregnancy (uterine overdistension)
- Ante-partum hemorrhage
- Previous post-partum hemorrhage
- Prolonged labor
- Traumatic use of forceps (large baby, maternal obesity); Perinatal incisions or tears

- Coagulation disorders
- General anaesthetic
- Poly-hydramnios
- Uterine fibroids
- Retained parts of placenta

PRINCIPAL CLINICAL SIGNS:

- Loss of bright red blood before and after delivery of the placenta.
- Excessive and gushing blood from the vagina.
- Nausea, dizziness, vomiting and sweating.
- Tachycardia and/or hypotension (signs of shock).
- After C.S. those signs and symptoms may be masked.

LABORATORY EXAMINATIONS:

- Hematocrit (HCT) < 30%, hemoglobin, coagulation factors, blood grouping and Rh

MANAGEMENT:

- Prenatal period:
 - ◀ Patient with history of postpartum hemorrhage:
 - Routine laboratory examinations.
 - Iron and folic acid supplementation.
 - Education plan about:
 - Come to hospital early in labor;
 - The importance of iron supplementation.
- Labor and delivery:
 - ◀ Routine laboratory examination (see Standard Orders of Admission to Labor and Delivery).
 - ◀ Active management of 3rd stage of labor
- Hemorrhage immediately after birth of the baby, before birth of the placenta:
 - ◀ Management of the case will be continuously monitored by the pulse, blood pressure, urine output and blood coagulation.
 - ◀ Place a canulla #18 if not already in place, prepare for a blood transfusion.
 - ◀ Empty bladder with Foley's catheter.
 - ◀ Abdominal massage of uterine fundus.

- ↖ Ergotrate 0.2 mg (1 ampule) I.M. stat followed by controlled cord traction to deliver the placenta [maximum dose should not exceed 1 mg (5 amps)].
 - ↖ Rapid intravenous saline solution + 10 IU Syntocinon to be started.
 - ↖ If the bleeding persists without delivery of the placenta, rapidly explore the perineum, vagina and cervix looking for lacerations. Call the anesthesiologist.
 - ↖ Perform manual removal of the placenta with or without anesthesia.
 - ↖ If bleeding persists, after removal of the placenta, see below.

- Hemorrhage immediately after birth of the placenta:
 - ↖ Place canulla #18 if not already in place, prepare for blood transfusion.
 - ↖ Empty bladder with Foley's catheter.
 - ↖ Ergotrate 0.4 mg (2 amps) IV. stat.
 - ↖ Oxytocin (Syntocinon 50 IU) in 500 ml of Dextrose or mixed IV solution, rapid infusion rate until the uterus contracts and the hemorrhage stops.
 - ↖ Put the baby to the breast to suck, or stimulate nipples manually.
 - ↖ Massage uterine fundus.
 - ↖ If the bleeding persists, rapidly explore the perineum, vagina and cervix looking for lacerations. Explore the uterine cavity for retained placental fragments. Call the anesthesiologist.
 - ↖ If there are retained placental fragments: Removal (manual or ring forceps).
 - ↖ If there are lacerations: Suture them immediately if they are source of the hemorrhage (exclude uterine rupture) under anesthesia with good exploration.

- If the hemorrhage still persists:
 - ↖ Call the senior specialist on duty who should proceed or refer to a higher level; and continue massage bimanually.
 - ↖ Look for a blood donor and transfer whole blood
 - ↖ Perform an emergency laparotomy.
 - ↖ Give prostaglandin F2a 1mg IM. and infuse 5 mg in 500 ml saline "20 drops per minute".
 - ↖ In the laparotomy:
 - 1st step: Open uterine massage. Inspect uterus for lacerations.
 - 2nd step: Intramyometrial oxytocin, prostaglandin or methergin as follows:
 - Oxytocin 10 IU divided between the two cornuae.
 - Prostaglandin F2a 1mg divided between multiple sites.
 - Prostaglandin 15 methyl 0.25mg divided in multiple sites.
 - Methergin 0.2mg divided between the two cornuae.
 - 3rd step: Ligation of the hypogastric arteries if trained.
 - 4th step: Subtotal hysterectomy.

Note: 1gm ampicillin before and after the procedures.

- Late postpartum hemorrhage (after 24 hours):

◀ Follow the same steps as in D above.

IMPORTANT CONSIDERATIONS:

Remember that a patient can lose a large amount of blood in a very short time postpartum. You must act rapidly, and you must know what steps to follow before a postpartum hemorrhage actually occurs.

The best way to treat patients is with a team of medical personnel, as there are many actions that must be performed simultaneously.

A laparotomy for postpartum hemorrhage need not be delayed while awaiting blood for transfusion. This is an extremely urgent situation.

7. SEPTIC SHOCK

PROBLEM IN EGYPT:

(MMR = 13.5/100,000)

60 maternal deaths were associated with sepsis. These formed 12% of all direct obstetric deaths, and 8% of all maternal deaths. 97% of deaths due to sepsis were avoidable. Notable risk factor: home delivery & attendance by only a daya.

(NMMS 1992-1993, MOHP/CSP, 1994)

DEFINITION:

- A morbid condition caused by an infectious focus, in which the patient's functional intravascular volume is less than the capacity of the circulatory system of the body, resulting in low blood pressure and diminished tissue perfusion. Without treatment, the resulting cellular acidosis and hypoxia cause terminal organ tissue dysfunction and death.

RISK FACTORS:

- Septic abortion, chorio amnionitis, anemia, emergency surgery, immunosuppression.

DIAGNOSIS (PRINCIPAL CLINICAL SIGNS):

- Physical findings:
 - ◀ Initial phase
 - Chills
 - Hyperthermia

- Tachycardia and tachypnea
 - Warm extremities
 - Nausea, vomiting
 - Cardiac arrhythmias
 - Diarrhea
 - Sudden change in psychological attitude
- ◁ Late phase
 - Cold extremities
 - Oliguria – anuria
 - Hypothermia
 - Peripheral cyanosis
 - Hypotension
 - Tachypnea, dyspnea
 - Metabolic acidosis
 - Cardiac arrhythmias
 - Further deterioration in psychological attitude
- Laboratory findings:
 - ◁ Leucocytosis
 - ◁ Hyperglycemia
 - ◁ Changes in coagulation system:
 - Platelets
 - Fibrinogen
 - PT, PTT
 - ◁ Respiratory alkalosis, then metabolic acidosis.

MANAGEMENT:

- Initial treatment:
 - ◁ Resuscitation:
 - A – B – C
 - Airway – Breathing – Circulation
 - ◁ Intravenous line x 2:
 - 1 Central
 - 1 Peripheral
 - ◁ Laboratory examinations:
 - Transaminases and bilirubins (liver function tests)
 - Bacterial culture and gram stain of suspected focus of infection
 - Blood culture x 2
 - Complete blood count (hemoglobin, hematocrit, white blood cell count and differential, sedimentation rate)
 - PT, PTT, fibrinogen
 - Sodium, potassium

- Creatinine, BUN
- Blood glucose
- Urinalysis and urine culture
- Platelet count
- ↘ Chest X-ray
 - Abdominal X-ray supine and seated
- ↘ Electrocardiogram
- ↘ Foley catheter
- ↘ O₂ via nasal cannula at 3 liters/minute
- ↘ Intravenous fluids:
 - Crystalloids (Hartmann's, Ringer's lactate or saline)
 - ◇ One liter over 30 minutes while completing the above mentioned tasks.
 - ◇ Measure CVP
 - If CVP is greater than 12 cm H₂O, maintain fluids at 125 ml/hr, monitoring CVP every hour.
 - If CVP is less than 12 cm H₂O, give 200 ml crystalloid, wait 5 minutes and check CVP. Repeat 200 ml fluid bolus every 10 minutes until CVP = 12 cm H₂O.

-OR-

- Colloids (Hematocele, Rheomacrodex, Macrodex, Albumen)**
 - ◇ 500ml over 30 minutes while completing the above-mentioned tasks.
 - ◇ Measure CVP
 - ◇ If CVP is greater than 12 cm H₂O, maintain fluids at 125 ml/hr, monitoring CVP every hour.
 - ◇ If CVP is less than 12 cm H₂O, give 200 ml colloid, wait 5 minutes and check CVP. Repeat 200 ml fluid bolus every 10 minutes until CVP = 12 cm H₂O.
 - ◇ Do not use colloids in the presence of respiratory insufficiency (see below).

↙ Medications:

- Antibiotics (Begin immediately)
 - ◇ First Choice:
 - Ampicillin 1 gm I. V. every 4-6 hours
 - OR-
 - Penicillin G 4-5 million IU I.V. every 4-6 hours;
 - PLUS-
 - Clindamycin 900 mg. I. V. every 8 hours
 - OR-
 - Metronidazole 1 gm I. V. stat, then 500 mg I. V. every 6 hours (infuse over 20 minutes);
 - PLUS-
 - Gentamicin 3-5 mg/kg/day I. V. divided into three doses. First dose stat, then every 8 hours. (Readjust dose based on patient's creatinine level).

- ◇ Second Choice
 - Clindamycin 900 mg I. V. every 8 hours;
 - PLUS-
 - Gentamicin 3-5 mg/kg/day divided into 3 doses.
 - ◇ Other alternatives
 - Third generation cephalosporin PLUS Metronidazole.
- ◀ Vasopressor – utilized when there has been no response to fluids (patient is still hypotensive):

- Dopamine: Use only with microdrip and always with a cardiac monitor. Dose = 5 mcg/kg/min.

◇ Put 400 mg dopamine into 500 ml 5% Dextrose.

◇ To determine infusion rate:

$$\square \# \text{ drops/min} = \frac{\text{dose} \times (\text{weight in kg})}{13.3}$$

Example: 50 kg patient

$$\# \text{ drops/min} = \frac{5 \text{ mcg} \times (\text{kg weight})}{13.3}$$

$$\# \text{ drops/min} = \frac{5 \times 50}{13.3}$$

$$\# \text{ drops/min} = 18.79 \longrightarrow 19 \text{ drops/min.}$$

- ◇ Initiate at 5 mcg/kg/min and increased by 2 mcg/kg/min every 10 minutes to a maximum of 12 mcg/kg/min.
 - ◇ If there is no response at 12 mcg/kg/min (no increase in urinary output and/or no increase in blood pressure), check for:
 - Hypovolemia – especially if the patient has ventricular or supraventricular extrasystoles.
 - Metabolic acidosis – change in mental status plus tachycardia, cyanosis or peripheral hypoperfusion.
 - ◇ If there is no response to fluids plus dopamine, metabolic acidosis probably exists. Give sodium bicarbonate in bolus through a separate line from the dopamine as follows:
 - Sodium bicarbonate 88 meq (2 ampules of 44 meq)
- OR-
- Ten ampules of 7.5% sodium bicarbonate.
 - Continue dopamine at the same dose.

◀ Respiratory support:

- If respiratory insufficiency or ARDS exists, this is an indication for intubation and assisted ventilation in the intensive care unit.

◇ Signs of respiratory insufficiency:

◇ Dyspnea

- ◇ Use of accessory respiratory muscles
- ◇ Nasal flaring
- ◇ Peripheral cyanosis
- Chest X-ray shows:
 - ◇ Diffuse interstitial bilateral infiltrates.

IMPORTANT CONSIDERATIONS

- Patients with septic shock should be managed jointly with the department of medicine.
- Evaluate surgery as soon as the initial management steps have been completed:
 - ◀ Curettage to remove infected products of conception in postpartum patients and those with septic abortions.
 - ◀ Laparotomy in patients post cesarian section and in patients with evidence of uterine perforation, suspicion of *Clostridia welchii* infection, or an intra-abdominal foreign body. Evaluate hysterectomy and/or salpingo-ophorectomy.
- Patients with pregnancies greater than 20 weeks gestation should be managed in the left lateral position or with lateral uterine displacement.
- Monitor for DIC, and treat it with plasma together with the hematologist.
- Treat renal insufficiency early and vigorously. Signs of renal insufficiency: Anuria and a CVP \geq 12 mm H₂O in a patient who:
 - ◀ Has received fluids (crystalloids, colloids etc.)
 - ◀ Has received vasopressor
 - ◀ Does not have cardiac insufficiency
- Treatment of renal insufficiency:
 - ◀ Furosemide 100 mg. I. V. when there is anuria, to maintain urine output at a minimum of 30 ml/hr. (NOTE: If the furosemide does not produce results and the patient does not begin to urinate, look for another etiology for the anuria. Do not give more furosemide if it is not having any effect.)
 - ◀ Continue maintenance fluids only.
- Dopamine can be a dangerous drug. In high doses, dopamine has a vasoconstrictive effect which will worsen your patient's condition. Use it carefully (see table below).
- Consider early referral of the patient to higher level (General Hospital or specialized institute).

DOPAMINE

400 mg (2 vials)/500ml = 0.8 mg/ml

WEIGHT		DOSAGE (mg/kg/min)								
Lb	kg	1.0	2.5	5.0	7.5	10.0	12.5	15.0	20.0	
88	40	3	8	15	22	30	37	45	60	
99	45	4	9	17	25	34	42	50	67	
110	50	4	9	19	28	38	47	56	75	
121	55	5	10	21	31	42	51	62	82	
132	60	5	11	23	34	45	56	68	90	Flow rate
143	65	5	12	24	36	49	61	74	97	in
154	70	6	13	26	39	52	66	79	104	drops/min
165	75	6	14	28	42	56	70	84	112	
176	80	7	15	30	44	60	75	90	120	based on
187	85	7	16	32	47	64	80	96	128	microdrip
198	90	8	17	34	51	68	84	101	136	60 drops =
209	95	8	18	36	53	72	90	107	143	1 ml
220	100	8	19	37	56	75	94	113	150	

8. PUERPERAL SEPSIS

SIZE OF THE PROBLEM IN EGYPT:

(MMR= 13.5/100,000)

60 maternal deaths were associated with sepsis. These formed 12% of all direct obstetric deaths and 8% of all maternal deaths.*

(NMMS 1992-1993, MOHP/CSP, 1994)

DEFINITION:

- Infection of the reproductive tract (uterus, cervix, vagina, vulva and perineum) and the parametrial tissues that occur during the first 4-6 weeks following labor or abortion.

RISK FACTORS:

- Management of labor or delivery under unhygienic conditions
- Multiple vaginal examinations
- Prolonged rupture of membranes
- Operative delivery
- Anemia
- Manual removal of the placenta
- Immunosuppression
- Vaginal tears
- Pre-existing labor genital infection
- Thrombophlebitis

PRINCIPAL CLINICAL FEATURES:

- Elevation of body temperature to 38°C persisting for two consecutive days within the first 4-6 weeks postpartum.
- Abdominal, pelvic and or suprapubic pain
- Foul smelling colored lochia
- Uterine subinvolution
- General symptoms: malaise, fatigue and anemia

LABORATORY INVESTIGATIONS:

- CBC (complete blood picture)
- Cervical, uterine cultures
- Blood cultures particularly in severe cases presenting with septic shock

MANAGEMENT:

- Clinical examination to assess the general condition of the patient, and her hemodynamic stability.
- Inspection of the external genitalia and perineum to detect any tears or episiotomy as well as the amount, smell and color of the discharges.
- Assess the size of the uterus as well as the presence of any tenderness by both abdominal and bimanual examination.
- Use ultrasonography for the detection of any intrauterine contents at the start and again if the fever persists after the initiation of antibiotics, or if abdominopelvic masses start to appear.
- Start broad spectrum antibiotics until the result of the culture and sensitivity tests are known. Antibiotics can then be changed to a more specific alternative.
- Consider evacuation of the intrauterine contents if there are any.
- Monitor white blood count every 48 hours or according to the clinical course.
- Continue antibiotics

GLOSSARY

A

Abscess	A localized collection of pus in any part of the body due to infection.
Amnion	The innermost of the membranes enveloping the baby in the uterus and containing the amniotic fluid
Amniotic fluid	The liquid contained in the amnion. This liquid protects the baby from injury.
Amniotic fluid embolism	This rare but often fatal condition is caused by amniotic fluid which has been forced into the maternal circulation by rapid, strong contractions. This results in difficulty in breathing, heart failure and generalized bleeding.
Amniotomy	A procedure whereby the fetal membranes are ruptured to induce labor.
Anaemia	A reduction in the number of red blood cells or in the amount of haemoglobin present in them. Anaemia can be caused by excessive blood loss, or by not eating enough foods rich in iron or folic acid. Malaria can also cause anaemia by destroying red blood cells.
Anal cleft	The line of cleavage between the buttocks on which the anus opens.
Analgesic	A drug given to relieve pain.
Aneurysm	A sac formed by the dilatation of the wall of a vein.
Antepartum	Before delivery.
Antepartum haemorrhage	Vaginal bleeding occurring before delivery. Usually caused by placenta praevia or abruptio placentae.
Anterior	Situated in front or in the forward part of a structure.

Antero-posterior diameter (of pelvis)	From front to back. The measurement from the sacral promontory to the symphysis pubis.
Antibiotic	A drug given to treat infection.
Antibody	A protein produced by the body to fight germs or foreign substances entering into the body.
Antihypertensive	A drug given to reduce high blood pressure.
Antipyretic	A drug given to reduce fever.
Antiseptic	A substance that prevents infection by killing certain bacteria on skin or body tissues. Antiseptics include surgical spirits, chlorhexidine and iodine.
Anuria	No urine is produced by the kidneys.
Apex	The top or highest point.
Aseptic technique or asepsis	Method used during delivery or in surgical procedures to prevent contamination of the uterus or wound by bacteria. Instruments used are sterilized and personnel wear sterile gloves and masks.
Asphyxia	A condition due to lack of oxygen in breathed-in air.
Asymmetrical	Dissimilarity in corresponding parts on opposite sides of the body which are normally alike.
Atonic	That which lacks its normal tone or strength.
Atonic bleeding	Occurs from the placental site because the uterus is unable to contract adequately and thus the blood vessels are not compressed and bleeding is not controlled. Any condition that interferes with uterine contraction, such as a retained placenta, will predispose to atonic bleeding.
Avoidable factors	Factors causing or contributing to maternal death where there is departure from generally accepted standards of care.
Axilla	The small hollow underneath the arm, where it joins the body at the shoulder.

B

Bacteriuria	Presence of bacteria in the urine.
Bandl's ring	The area between upper and lower uterine segments when it becomes visible and/or palpable during obstructed labor.
Bartholin's glands	Two small mucous-producing glands, one on each side of the vaginal orifice.
Bolus	A dose of intravenous drug given quickly, all at once.
Broad ligament	Folds of peritoneum attached to the sides of the uterus which help to keep the uterus in its place. It consists of two leaves between which are found cellular tissues and the major blood vessels of the pelvis.
Broad spectrum antibiotic	An antibiotic which is effective against many kinds of bacteria.
Bulge (eyes)	The eyes seem to be coming out of their sockets.

C

Capsular decidua	The part of the decidua which lies over the developing embryo during the first 12 weeks of pregnancy.
Caput succedaneum	Swelling of the fetal scalp usually due to pressure from the cervix. The swelling may be exaggerated in obstructed labor.
Cavity	A hollow place or space in the body.
Cephalic presentation	When the baby comes out of the mother head first.
Cephalic prominence	The front of the head.
Cephalopelvic disproportion	When the fetal head is too big for the mother's pelvis.
Cerebral haemorrhage	Bleeding in the brain due to a ruptured blood vessel.
Cerebrospinal fluid	The liquid contained inside the brain and around the spinal cord.

Cervical os	The opening between the cervix and the uterus.
Chorioamnionitis	Infection of the membranes that envelop the baby, which could happen if membranes rupture many hours before labor starts.
Chorion	The outermost of the membranes enveloping the baby in the uterus.
Chronic iron deficiency anaemia	Long lasting anemia occurring as a result of not eating enough iron rich foods or due to parasitic infestation.
Circulatory overload	When too much intravenous fluid is given too fast. This may cause heart failure and an accumulation of fluid in the lungs.
Clenched	Closed tightly.
Clue	Fact that serves as guide, or suggests a line of inquiry in an investigation.
Coagulation	Clotting of blood.
Coccyx	The small bone at the end of the sacrum.
Coma	A state of unconsciousness from which the person cannot be aroused. The person is said to be in a coma or comatose.
Contraction (of pelvis)	Reduction in size.
Cortical necrosis	Death of the outer part of the substance of an organ (e.g. the kidney).
Crepitations	A sound like that made by throwing fine salt in a fire.
Cross-matching (of blood)	A test of the compatibility of donor and recipient blood performed before transfusion.
Cubital fossa	The depression in the part of the arm which is in front of the elbow.
Cyanosed	Having a bluish discoloration of skin and mucous membranes due to lack of tissue oxygenation.
Cyanosis	A bluish discoloration of skin and mucous membranes due to lack of tissue oxygenation.
Cystitis	Infection of the urinary bladder.

D

Decidua	The endometrium (innermost layer) of the pregnant uterus. The part of the decidua that is underneath the placenta is the decidua basalis. The part that lines the uterus elsewhere than at the site of placental attachment is the decidua vera or parietalis.
Deep vein thrombosis	The formation of a thrombus (clot) in a deep vein of the calf (lower leg), causing swelling and pain when walking.
Deficiency	A lack of.
Deflexed (head)	When the head is straight and not inclined forward.
Deformity	Distortion of any part of the body.
Dehydration	Condition caused by excessive loss of body fluid or by not drinking enough. Signs of dehydration include dry mouth, thirst, reduced urinary output.
Delirium	Disordered state of mind with incoherent speech, hallucinations and excitement.
Diameter	The distance between two specified opposite points on the periphery of a structure such as the pelvic inlet.
Differential diagnosis	Deciding which of two or more conditions may be the cause of signs and symptoms noted.
Direct obstetric death	A death resulting from obstetric complications of the pregnant state (i.e. pregnancy, labor and puerperium), from interventions, omissions, incorrect treatment, or a chain of events resulting from any of the above.
Disseminated intravascular coagulation	Disturbance of the coagulation system triggered by certain conditions (e.g. septic or haemorrhagic shock, eclampsia) and characterized by generalized bleeding.
Distended	Stretched.
Distortion	The state of being twisted out of normal shape.
Diuresis	Passing increased amounts of urine.
Diuretic	A drug that is given to increase the production of urine.
Dorsal position	The position where one is lying down on one's back.

Drowsy	Half asleep, dozing.
Dysentery	Infection in the intestines due to bacteria or parasites, causing pain in the abdomen and frequent stools containing blood and mucus.

E

Eclampsia	A condition peculiar to pregnancy or a newly delivered woman, characterized by fits followed by more or less prolonged coma. The woman usually has hypertension and proteinuria. The fits may occur in the antepartum, intrapartum or postpartum periods.
Empathy	Intellectual and emotional awareness and understanding of another person's thoughts, feelings and behavior, even those that are distressing and disturbing.
Endocarditis	Inflammation of the membrane lining the cavities of the heart.
Endometritis	Infection of the endometrium (inner lining of the uterus).
Endometrium	The innermost layer of the uterus.
Engorged breasts	When the breasts are so full of breastmilk that the breasts are painfully distended and hard.
Epigastric	The upper middle region of the abdomen.
Episiotomy	A cut made in the perineum when the baby's head is crowning, to facilitate delivery and to avoid spontaneous tearing of the perineum.
Essential hypertension	High blood pressure occurring without discoverable cause.
Expansile	Capable of stretching.
Extend the knee	To straighten the leg.
Extension (head)	When the head is bent backwards.
External	Situated on the outside.
External os	The opening at the lower end of the cervix, towards the outside of the body.

F

Fatal	Ending in death
Fetal sac	The bag of membranes which envelop the baby in the uterus.
Feto-maternal transfusion	Passage of fetal blood into the blood circulation of the mother, through the placenta.
Fibroids	A benign tumor of the myometrium (muscle of the uterus).
Fistula	An abnormal passage or communication between two organs such as, for example, the urinary bladder and the vagina.
Flexed	Bent forward.
Flexible	Bends easily without breaking.
Flexion (head)	When the head is bent forward.
Fluctuating	Giving the sensation of wavelike motion on palpation, due to a liquid content (e.g. pus in an abscess).
Foaming	Collection of small saliva bubbles
Fontanelle	The soft spots on the baby's head. The anterior fontanelle is the diamond-shaped membranous space on the front part of the head at the meeting of four suture lines. The posterior fontanelle is the small triangular membranous space on the back part of the head at the meeting of three suture lines.
Foul smelling	Very bad smelling.
Fundus	The rounded upper part of the uterus, above the insertion of the fallopian tubes.

G

Genital mutilation	The traditional surgical practice of cutting away part or all of the external genitalia of a woman. In the most extreme form, called "infibulation", the two sides of the vulva are also stitched together to leave a very small opening.
Genital tract	The pathway formed by the genital organs including the uterus, cervix, vagina, vulva.

“Gishiri” cut	A traditional practice among the Hausa people of Nigeria whereby the vagina is cut to facilitate delivery when labor is obstructed.
Glycosuria	The presence of glucose (sugar) in the urine.
Grand mal epilepsy	A condition characterized by episodes of sudden loss of consciousness and generalized convulsions.
Grand multiparity	Having borne six or more children
Groin	The junctional region between the abdomen and the thigh.
Grouping (of blood)	Determining blood type (A, B, O, AB).

H

Haematemesis	The vomiting of blood.
Haematocrit	The percentage volume of packed red cells in a blood specimen. This measurement is obtained by centrifugation (spinning very fast) of the specimen. It is a screening test for anaemia.
Haematoma	A localized collection of blood in an organ or tissue due to breaking of a blood vessel.
Haemoglobin	The substance in red blood cells which carries oxygen from the lungs to the tissues.
Haemoglobinopathies	Disorders of the blood caused by abnormal forms of haemoglobin (e.g. sickle cell anaemia).
Haemolytic anaemia	Anaemia caused by destruction of red blood cells as in malaria.
Haemorrhage	Excessive bleeding from torn blood vessels.
Hemiplegia	Paralysis of one side of the body.
HIV	Human immunodeficiency virus.
Hollow (of the sacrum)	The concave anterior surface of the sacrum.
Humerus	The bone that extends from the shoulder to the elbow.

Hydatidiform mole	An abnormal pregnancy resulting in a mass of cysts resembling a bunch of grapes.
Hydration	How much water is in a body.
Hydrocephalus	A condition characterized by accumulation of cerebrospinal fluid within the skull. The baby with hydrocephalus has an enlarged head and a prominent forehead.
Hyperemesis gravidarum	Excessive vomiting during pregnancy.
Hypertension	High blood pressure.
Hyponatraemia	When there is not enough sodium (salt) in the blood.
Hypovolaemia	Abnormally decreased volume of blood circulating in the body. This can happen when the body loses a lot of blood (e.g. in postpartum haemorrhage).
Hypoxia	When there is not enough oxygen supply to tissues.

I

Idiopathic	With no known cause.
Idiopathic thrombocytopenia purpura	Condition of unknown cause characterized by a decrease in the number of blood platelets resulting in inability of the blood to coagulate properly.
Imminent	Soon to happen.
Incision	A cut.
Indirect obstetric death	A death resulting from previous existing disease or disease which developed during pregnancy and which was not due to direct obstetric causes, but which was aggravated (or made worse) by the physiological effects of pregnancy.
Induced labor	A labor that is started artificially by intravenous oxytocin or by rupturing the membranes.
Infertility	The inability for a couple to produce children.

Infiltration (of local anaesthetic)	Method of injecting a local anaesthetic whereby the anaesthetic is injected at different angles from a central point so that the whole desired area is anaesthetized.
Intermediate	Placed between.
Internal	On the inside.
Internal os	The opening at the upper end of the cervix towards the inside of the uterus.
Intrapartum	During delivery
Intraperitoneally	Within the peritoneal cavity.
Intrauterine death	When the baby dies while still in the uterus.
Intrauterine growth retardation (IUGR)	When the baby does not grow normally while in the uterus as when the mother has malaria, tuberculosis, anaemia, or smokes.
Inventory	A detailed list.
Involuting uterus	Uterus returning to normal size after delivery.
Ischial spines	The two small protuberances of the pelvis that project into the pelvic cavity and can be felt laterally upon vaginal examination.
Isthmus	The narrow connection between the body of the uterus and the cervix.

K

Ketoacidosis	The accumulation of acid and ketone bodies in the blood and in the tissues.
Ketonuria	The presence of ketone bodies in the urine.
Kyphosis	Abnormally increased convexity in the curvature of the thoracic spine as viewed from the side.

L

Laparotomy	An operation in which the abdomen is opened.
Laterally	On one side.

Leukopenia	An abnormal decrease in the number of white blood cells which are the cells in the blood which fight infection.
Liquor	Another word for amniotic fluid.
Lithotomy poles	Special poles attached to either side of the bed, used in some hospitals to put the legs of the delivering woman on, so that the birth attendant can have easy access to the perineal area
Lithotomy position	The position in which the woman lies down on her back with knees bent and legs spread apart.
Lochia	The discharge of blood, mucous and tissue from the uterus during the postpartum.
Loin	The part of the back between the thorax and the pelvis.
Lumbar puncture	The procedure whereby a needle is inserted into the spinal column to get some of the spinal fluid for examination.

M

Malar bones	The cheek bones.
Malnutrition	Insufficient food intake.
Marginal	Borderline
Mastitis	Infection of the breast.
Mastoiditis	Infection of the bone behind the ear. This can be a complication of otitis media (middle ear infection).
Meconium	A dark green material present in the intestines of the full term fetus. This is the first stool passed by the baby.
Median	Situated in the midline of a body or structure.
Median cubital vein	The vein situated in the midline of the cubital fossa.
Medical audit	Official examination of medical records.
Meningitis	Infection of the membranes enveloping the brain.
Mental retardation	Delayed mental development.

Mento vertical diameter	The distance between the chin and the vertex of the head.
Mid-biceps	Halfway down the biceps (the muscle on the inside of the upper arm)
Monoplegia	Paralysis of one limb (arm or leg).
Moulding (of the fetal head)	Overlapping of fetal skull bones in adjustment to the size and shape of the birth canal. The overlapping may become excessive in obstructed labor.
Multipara	A woman who has borne two or more children.
Multiple pregnancy	A pregnancy of more than one fetus, such as in the case of twins.
Myometrium	The muscle layer of the uterus.

N

Nape	The back of the neck.
Necrosis	Death of tissues.
Normal saline	A solution of 0.9% sodium chloride (salt) that is used intravenously to replace blood loss.
Nullipara	A woman who has never borne children

O

Obese	Very fat.
Obesity	Being very fat.
Oblique	Slanting, inclined, diagonal.
Obstructed labor	A labor in which progress is arrested by mechanical factors and delivery is impossible without operative intervention.
Occipito frontal diameter	The distance between forehead and occiput of the head.
Occiput	The prominent back part of the head.

Oedema	Swelling due to accumulation of excessive fluid under the skin.
Offensive	Smelling very bad.
Oliguria	When little urine is produced by the kidney.
Os	An opening.
Osteomalacia	Softening of the bones with pain and tenderness due to vitamin D deficiency in childhood.
Otitis media	Infection of the middle ear. Usually happens as a complication of an upper respiratory tract infection. Symptoms include pain and irritability.
Oxygenated	Having oxygen in it.
Oxytocic	Term applied to any drug which stimulates contractions of the uterus in order to induce or accelerate labor, or to prevent or treat postpartum haemorrhage.

P

Parametritis	Infection of the parametrium.
Parametrium	Loose tissue around the uterus.
Parity	How many children a woman has borne.
Partograph	A record of all of the observations made on a woman in labor, the central feature of which is the graphic recording of the dilatation of the cervix as assessed by vaginal examination.
Patella	The bone situated at the front of the knee.
Pathogenic	Which causes disease, harmful (e.g. pathogenic bacteria).
Pelvic assessment	Assessing the size of the pelvis to see if it is big enough in comparison to the fetal head to allow normal vaginal delivery.
Pelvic brim (or inlet)	The upper opening of the pelvis which the baby enters first when it is born.
Pelvic inflammatory disease (PID)	An infection of the reproductive organs (uterus, fallopian tubes, ovaries), causing pain in the lower abdomen, pain during menstruation, fever and vaginal discharge. It can result from

	untreated puerperal sepsis and may become chronic (long-lasting) causing infertility.
Pelvic outlet	The lower opening of the pelvis which the baby comes out of during the delivery.
Pericarditis	Inflammation of the sac which surrounds the heart.
Perimetrium	The outermost layer of the uterus.
Perinatal	Occurring in the period shortly before and after birth.
Perineum	The area between the anus and the vagina.
Peritoneal cavity	The space containing the internal organs of the abdomen.
Peritoneum	Membrane covering the internal organs of the abdomen and lining the abdominal and pelvic cavity.
Peritoneum, parietal	Peritoneum that covers the abdominal organs, holding them into position.
Peritonitis	Infection of the peritoneum.
Persistent occiput posterior	A position of the fetal head whereby the occiput remains situated toward the back of the pelvis and does not rotate toward the symphysis pubis.
Photophobia	When light hurts the eyes.
Physical handicap	A defect of the body which limits a person's capacity to participate in normal life.
Pivot	To turn or swivel on a central point.
Placenta praevia	An abnormally situated placenta which completely or partly covers the os (the opening between the uterus and the cervix), causing painless bleeding in the last trimester of pregnancy.
Placental abruption	Premature separation of a normally-situated placenta occurring after the 28 th week of pregnancy. It may cause abdominal pain and bleeding.
Plasma expanders	Solutions that contain a plasma substitute which, when given intravenously, stay in the blood vessels and attract fluid from the tissues.

Pleurisy	Infection of the membrane covering the lungs and lining the walls of the chest.
Polyhydramnios	A condition characterized by an excess of amniotic fluid.
Polyuria	Excessive urination.
Posterior	Situated at the back of, or in the back part of a structure.
Postpartum	The 42 day period following delivery.
Postpartum haemorrhage	Blood loss of 500ml or more from the genital tract after delivery.
Potency	The power of a medicinal agent to produce its desired effect.
Pouch of Douglas	The pocket like space between the rectum and the uterus.
Pre-eclampsia	A condition specific to pregnancy, arising after the 20 th week of gestation, characterized by hypertension and proteinuria. Oedema may also be present.
Pre-term baby	A baby who is born before the 38 th week of pregnancy.
Precipitate labor	Labor which occurs unusually fast and characterized by strong painful contractions.
Primary postpartum haemorrhage	Includes all occurrences of bleeding within 24 hours after delivery.
Primigravida	A woman pregnant for the first time.
Primipara	A woman who has borne but one child
Prolonged labor	Active labor with regular uterine contractions for more than 12 hours.
Prolonged rupture of membranes	Ruptured membranes for more than 12 hours, regardless of whether labor has started or not.
Prophylactic	Which prevents disease.
Prophylactic antibiotic treatment	Giving antibiotics to prevent infection.
Proteinuria	Presence of protein in the urine.

Pubic arch	The curved bowllike bony structure which lies at the front of the pelvis.
Puerperal sepsis	An infection of the genital tract at any time between the onset of rupture of membranes or labor and the 42 nd day following delivery or abortion.
Puerperium	The 42-day period following delivery of the baby. Another word meaning the same is “postpartum period”.
Pulmonary embolism	The blood circulation in the lungs is blocked by an embolus (blood clot).
Pulmonary oedema	Accumulation of fluid in the lungs.
Purpura	Small haemorrhage in the skin.
Pyelonephritis	Infection of the kidneys due to bacteria that have come up from the bladder after entering through the urethra.

R

Rales	A rattling sound heard when listening to lungs that are diseased.
Recumbent position	Lying down.
Resistant bacteria	Bacteria which are not killed by a drug that usually kills that kind of bacteria.
Resuscitation	Bringing back to life or consciousness a person who is apparently dead.
Retained placenta	Describes the situation when the placenta has not been delivered within one hour after the birth of the baby.
Retracted	Drawn back.
Retroplacental	Behind or underneath the placenta.
Reversible	Which comes back to normal.
Rhesus factor	An antigen present on the red blood cells of most people. Those having this antigen are classified “rhesus positive”. Those that do not have it are “rhesus negative”. Rhesus incompatibility occurs when the mother is “rhesus negative” and the fetus is “rhesus positive”.

Rickets	Softening of bones due to vitamin D deficiency during childhood.
Risk factor	Factors which make a condition more likely to happen or more dangerous.
Rotation (of fetal head)	The movement of the fetal head as it descends through the birth canal.
Rupture	Tearing or bursting of a structure, e.g. rupture of uterus following obstructed labor.
Ruptured uterus	Tearing or bursting of the uterus due to obstructed labor

S

Sacral promontory	The part of the first sacral vertebra which projects into the pelvic inlet.
Sacrum	The lowest part of the spine. It is formed by five sacral vertebrae.
Sagittal suture	The membranous line between fetal skull bones running from the posterior fontanelle to the anterior fontanelle.
Sanitation	The safe disposal of faeces by the use of adequate latrines, to avoid the transmission of diseases.
Scoliosis	A lateral deviation in the normally straight vertical line of the spine.
Secondary postpartum haemorrhage	Includes all cases of PPH occurring between 24 hours after delivery of the baby and 6 weeks postpartum.
Segment	A section or a part of something.
Self-retaining catheter	A catheter that is left in the bladder and urethra.
Semiprone position	Lying down on the left side.
Semi-recumbent position	Lying down with head and shoulders up.
Septic abortion	An abortion (loss of pregnancy during the first 28 weeks) that is followed by infection of the uterus causing fever and chills, foul-smelling vaginal discharge, pelvic pain. Septic abortion happens

most commonly where facilities are unsanitary and an aseptic technique was not used.

Septic shock	A very serious infection of the blood stream causing high fever, low blood pressure, fast pulse and fast breathing. Untreated septic shock leads to coma and death.
Septicaemia	The presence and multiplication in the blood of harmful bacteria, causing high fever and chills. Untreated, septicaemia can lead to shock and death.
Shock	<p>A life-threatening condition characterized by failure of the circulatory system to maintain normal blood flow to vital organs (e.g. kidneys, heart brain).</p> <p>Haemorrhagic shock is shock due to low blood volume resulting from excessive blood loss.</p> <p>Septic shock is shock due to overwhelming infection and results from the action of the bacteria on the vascular system.</p>
Sinciput	The brow, or forehead.
Sinusitis	Infection in the sinuses (air cavities in the cranial bones on either side of the nose and above the eyes).
Sitz bath	Soaking of the genital area in a tub of clean warm water. This may be done in the postpartum to soothe pain from an episiotomy or perineal tear.
Sodium lactate	A solution of sodium lactate, sodium chloride, potassium chloride and calcium chloride which can be used instead of normal saline to replace blood loss.
Spasms	Sudden, strong, involuntary muscular contractions.
Specific gravity	Relative weight of any kind of matter (e.g. urine), expressed by the ratio of the weight of a certain volume of that matter to the weight of the same volume of water.
Specimen	A sample or part of a thing taken to determine the character of the whole e.g. specimen of urine.
Splint	A strip of rigid material such as wood, used to keep in place a movable body part.
Sputum	Matter ejected from the lungs, bronchi and trachea, through the mouth.
Stasis (of urine)	Standing still, not flowing properly.

Stat	A medical abbreviation meaning “at once”.
Statistics	A collection of numerical facts.
Status	Social position, relative importance of a person.
Stenosis (of vagina)	Narrowing of the vagina which is usually due to scarring caused by genital mutilation or unrepaired lacerations.
Stillbirth	The delivery of a dead baby (after the 28 th week of pregnancy).
Stillborn	A baby that is delivered dead.
Stunted growth	When a person is short because of insufficient food intake during childhood.
Subarachnoid haemorrhage	Bleeding within the membranes enveloping the brain due to a ruptured blood vessel.
Subinvolved (uterus)	The uterus is not reducing in size normally, during the postpartum period.
Submentobregmatic diameter (of head)	The distance from beneath the chin to the anterior fontanelle.
Suboccipito-bregmatic diameter (of head)	The distance from beneath the occiput to the anterior fontanelle.
Symphiotomy	A surgical incision of the symphysis pubis to widen the pelvic outlet when there is cephalopelvic disproportion. It is an alternative emergency procedure when facilities for safe cesarean section are not available.
Symphysis pubis	The cartilaginous area where the two pubic bones join at the front of the pelvis.

T

Tenderness	Painful when palpated.
Term baby	Baby born after the required number of weeks of pregnancy (between 38 and 42 weeks).

Tetanic contraction (of uterus)	Sustained muscular contraction of the uterus without periods of relaxation.
Thorax	The chest.
Thrombophlebitis	Infection in a vein due to blockage from a thrombus (clot).
Thrombosis	The formation of a blood clot.
Tocolytic agent	An agent that stops uterine contractions
Traditional birth attendant	Name given to trained and untrained birth attendants who traditionally assist women at community level.
Transient	Temporary, not lasting a long time.
Trauma	Injury.
Traumatic	Due to injury.
Traumatic bleeding	Occurs as a result of injury to the genital tract.
Tumour	A new growth of tissue which could be benign (harmless) or cancerous.
Twitch	Sudden, small, involuntary contractions.

U

Uraemia	An excess of urea in the blood. It is usually due to kidney failure.
Utero vesical pouch	The pocket-like space between the uterus and the bladder.
Uterus inversion	The fundus of the uterus is forced through the cervix and protrudes into or outside of the vagina.

V

Vacuum extraction	A procedure in which a metal or plastic cup is applied to the baby's head and attached to a vacuum. By pulling on the cup, the baby's head and body are gradually delivered from the birth canal.
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Vaginal fornix	The space formed between the vaginal wall and the vaginal portion of the cervix. The anterior vaginal fornix is in front of the cervix and the posterior vaginal fornix is at the back of the cervix.
Varicosities	Veins that are unnaturally distended.
Venepuncture	Piercing a vein to get a blood sample or to set up an intravenous infusion.
Vertex	The top or crown of the head.
Virulent	Causes severe illness.
Vitamin D	A vitamin that is necessary for normal development of bone.
Von Willebrand's disease	A rare disease characterized by abnormal platelet adhesion and resulting in inability of the blood to coagulate properly.

W

Waddling gait	Walking with an exaggerated elevation of the hips (like the way a duck walks).
Water intoxication	The condition caused by too much retention of water and not enough sodium (salt). The symptoms of water intoxication are nausea, vomiting, and in severe cases convulsions and coma.