PRIORITIES IN CHILD HEALTH

Easily digestible information for health workers on managing the young child

BOOKLET 5
PROMOTING HEALTHY GROWTH

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BOOKLET 5

PROMOTING HEALTHY GROWTH

FOREWORD

This series of booklets is a course of self-based learning on the comprehensive management of the sick infant and young child. It is intended for use by first level health workers who, in South Africa, are generally nurses. The principles used are based on the World Health Organisation strategy "Integrated Management of Childhood Illness (IMCI)". For those who have not yet benefitted from full IMCI training, the booklets provide specific information on important elements of child health care that each nurse should know and use. As her knowledge and experience expands, she will increasingly approach each child in the comprehensive manner promoted in this series. The booklets are not intended as a substitute for existing training programmes, but rather as an adjunct to such learning.

Short case studies are employed to illustrate problems to be discussed in each section.

Introduction to comprehensive management

Booklet 1	*Underlying principles*
	The Road to Health Chart
	Nutrition
	Maternal well-being
Booklet 2	*Immunisation*

Management of the sick child under 5 years

Booklet 3	*Acute respiratory infection*
Booklet 4	*Diarrhoeal disease*
Booklet 5	*Promoting healthy growth*

CONTENTS

After reading this booklet the learner should :

- be able to advise mothers on what to feed babies
- be able to implement growth promotion for all children
- be able to recognise growth faltering and the different categories of malnutrition and manage and refer appropriately
- recognise and be able to manage the common micronutrient deficiencies

Before you start, why not test your knowledge by answering the following questions!

QUESTIONS ON BOOKLET 5

Are the following statements true or false? If false, correct them!

I. It is recommended that a baby's growth should be monitored at least 12 times in the first year.
2. Underweight is defined as weight less than 60% of expected weight.
3. Babies with kwashiorkor are always below the 3rd centile for weight.
4. Low blood sugar is a common cause of death in kwashiorkor.
5. At nine months a baby should be eating family foods four or five times a day.
6. Premature infants are especially liable to anaemia because they cannot absorb iron.
7. Anaemia may be caused by hookworm, whipworm and malaria.
8. Lentils are a good source of iron.
9. A healthy child needs 20mg/kgm of elemental iron per day.
10. Vitamin A deficiency may be prevented by sunlight.
II. Valuable sources of Vitamin A are butter and spinach.
12. Vitamin A helps fight infection.
13. Fluoridation of water supplies has harmful effects.
14. Iodine is required for normal thyroid function.
15. Piperazine is effective against all intestinal worms.

Answers on page 35

PROMOTING HEALTHY GROWTH

Children grow and develop, and their normal growth and development are dependent on four cornerstones: nutrition, protection from the environment, essential health care and love. In healthy, well-nourished children lies the future well-being of the nation.

> *A growing child is a healthy child. Conversely, a child not growing is a cause for concern.*

As child health workers, our first and most important objective should be to promote good growth, not only in individual children, but in all children.

HOW CAN WE PROMOTE GOOD GROWTH IN ALL CHILDREN?

Regular growth monitoring shows the health worker **and** the mother that the child is growing well. The purpose of growth monitoring is to be able to see growth and to take action to assure that proper growth is occurring every month; on the other hand, if there is faltering in growth this will be detected at an early stage before undernutrition becomes serious.

Monitoring growth without action is a useless or even counterproductive activity. That is why growth monitoring programmes are increasingly referred to as growth promotion programmes.

The children most at risk for malnutrition are often 'the least visible', because they are not regular attenders at clinics.

As health workers we should promote good nutrition:

- ☑ In the community with good feeding practises
- ☑ At the clinic, with growth monitoring and promotion. Recognising the various grades of undernutrition and taking timely action to intervene

CAN YOU NAME SIX INTERVENTIONS WHICH SHOULD BE PROMOTED FOR OPTIMAL GROWTH AND NUTRITION OF CHILDREN?

- Exclusive breast feeding for about six months.
- Adequate complementary feeding from six months, with continued breast feeding.
- Adequate nutritional care of sick and malnourished children.
- Adequate Vitamin A intake.
- Adequate iron intake.
- Adequate iodine intake.

WHAT ELSE?

Health workers should be acquainted with resources in the community which might be able to help undernourished children or families - such as women's groups and voluntary agencies. These groups should be educated on the principles of good nutrition just mentioned.

You should:

- **Involve mother or carer in measuring and seeing growth of her child.** A useful technique is to pair mothers together looking at the growth charts of each other's children. They should discuss how they achieve growth and what problems they have in those months where growth falters, that is, where the growth line does not rise as expected. The mother whose child grows well has many ideas to share with the mother of the faltering child.
- **Praise positive growth and learn from success**. This is the time to learn what factors make growth successful, by asking the mother, "your child has grown very well in the last month, what have you been doing?" This idea is to praise her when she is doing something right - to compliment good growth. Ask mothers how they did it and you will learn useful household tips to use in advising other mothers when their child does not grow as expected.
- **Identify feasible actions mothers can take if growth falters**. Often faltering growth is related to illness, when a child is fussy, loses her appetite and doesn't want to eat. But most children, as they recover from illness, have a recovery of appetite, often wishing to eat more than even the normal amount. This is why we suggest that the child receive extra food for at least as many days after recovery as the child was sick.

GROWTH MONITORING AND PROMOTION IN THE COMMUNITY OR CLINIC

Every child should have a 'Road to Health Chart" and be weighed every time she is seen by a health worker. The pattern of growth, the line on the RTH chart connecting the weights of each child, is the best indicator or a child's health. Check the growth every time you see a child.

WEIGHING A CHILD

WE DISCUSSED HOW TO WEIGH A CHILD IN BOOKLET 1, BUT LET'S GO OVER WEIGHING AGAIN.

- Use an appropriate scale for weighing (spring scale, beam balance or an electronic scale). Bathroom scales are not accurate.

WHATEVER TYPE OF SCALE IS AVAILABLE TO HEALTH WORKERS AND MOTHERS, CARE MUST BE TAKEN THAT THE USERS ARE PROPERLY TRAINED IN ITS USE, ITS PROPER POSITIONING, PLACEMENT OF THE CHILD, CORRECT BALANCING AND READING OF THE WEIGHT.

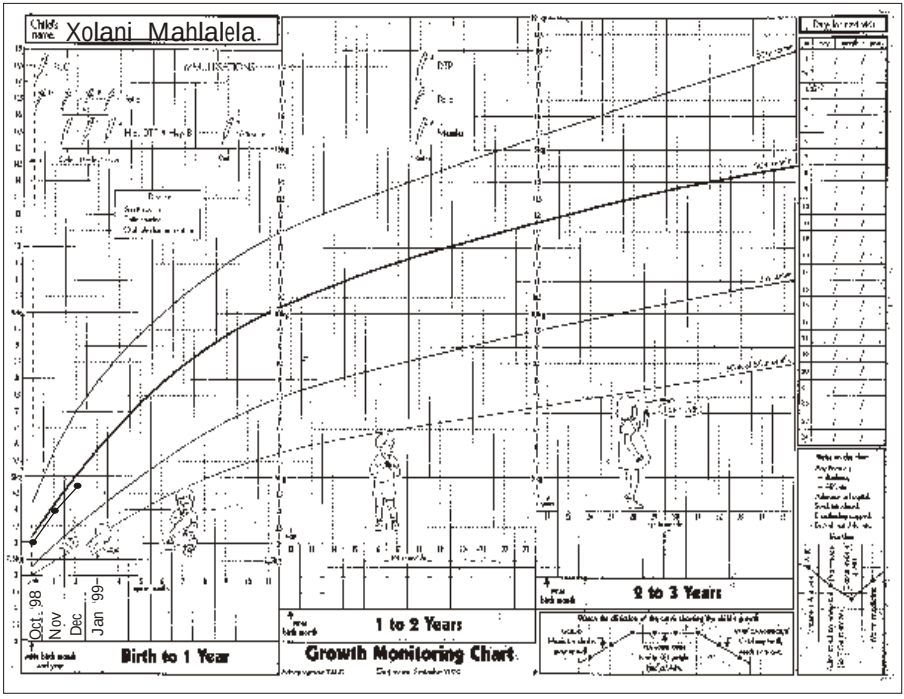
- Always zero the scale before weighing.
- Check scale against a known weight!
- Remove the child's clothes (including nappy) and shoes before weighing, but leave light clothing on (eg vest), especially in cool weather.
- Enlist the co-operation of the mother by getting her to undress the child and put him/her on the scale or in weighing pants if hanging scale used.
- Make sure that the child does not touch any person or surrounding objects while being weighed.
- Weigh the child to the nearest 0.1 kg.

GROWTH CHART

- Plot the weight on the growth chart
- Connect the dot showing the weight to the previous weight, making the growth line

Xolani is brought to your health facility by his mother. He has not been here since the age of three months, because she took him with her to the city when she went to look for work. She does not know how old he is, but he is still on the breast. She is worried that he does not seem to be growing well. She has his RTH Chart and this shows that he was born on Oct 3 1998. Today is May 26 1999. His weight is 5.7kg.

Plot his weight on the chart below.

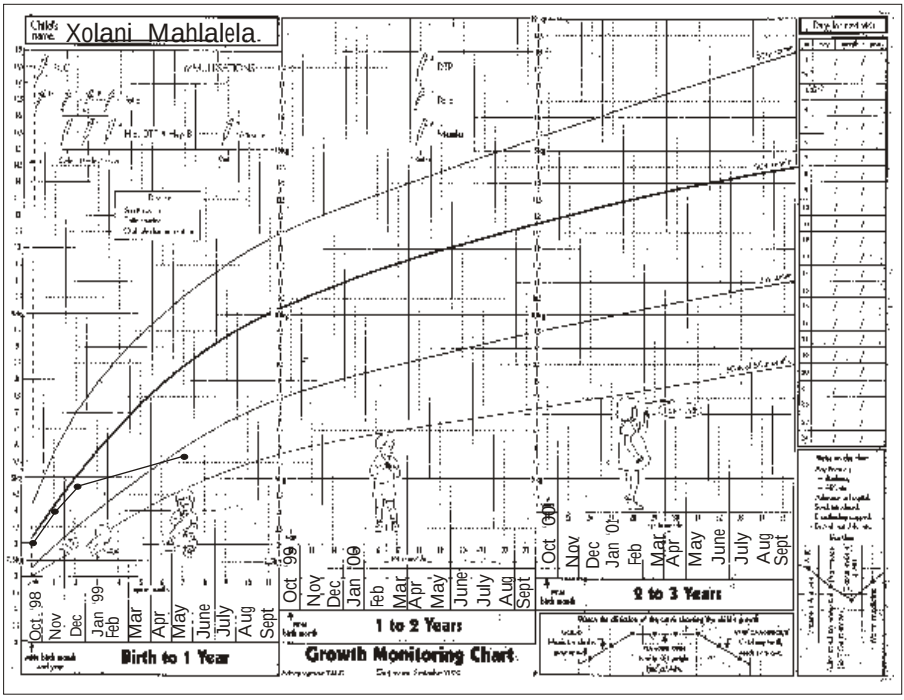


WHAT DO YOU SEE?

Did you remember to fill in the names of the months, the year? He is now seven

months of age. He has hardly gained since age three months and his weight is now just below the 3rd percentile for his age. His curve has flattened - his growth is poor.

HOW DO YOU FILL IN THE MONTHS OF AGE?



- Enter the month and year of birth in first thick-lined box.
- Enter birth month in all the other thick-lined boxes, increasing the year each time.
- Then enter all the months following the birth month (one column per month).
- Use first three letters for the month name.
- Enter the year after each month of January

Making a calendar like this saves time working out the age at each visit, and prevents mistakes if the age is worked out differently at different visits.

IF YOU DO NOT KNOW THE BIRTH DATE HOW DO YOU ESTIMATE

THE CHILD'S AGE?

The mother may be able to relate it to holidays, well-known local events, political happenings, etc. Usually you can establish the **month** of birth - then, by filling in **all** the months, the age is automatically correct.

DESCRIBE HOW YOU PLOT THE CHILD'S WEIGHT ON THE CHART:

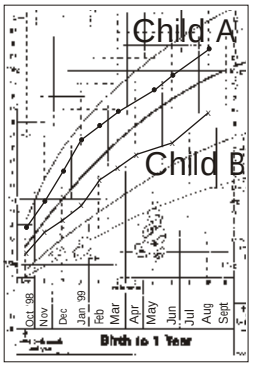
- Find column for the present month.
- Move up the column until the weight line is met for the number of kilograms.
- If weight is 'something and a half kilograms', put dot on half - kilogram line.
- If weight is between a whole and a half kilo, put dot between whole kilo and half kilo lines.
- Put a dot in the middle of the column on the dotted line, regardless of the date.
- Join the dot to the dot of the previous weight.
- If child did not come in previous few months, just join the dots across the empty columns.

HOW OFTEN SHOULD YOU MONITOR GROWTH?

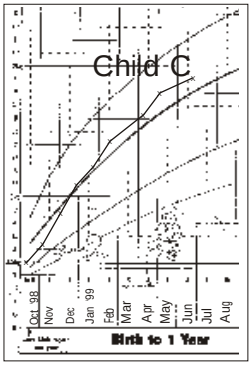
- Start at birth and continue till the child is five years old.
- Ideally growth monitoring should be **monthly** until the age of two years and then **three monthly** until five years.
- The ***minimal*** growth monitoring times are:
    - six times in first year
    - four times in second year
    - thereafter three times yearly

HOW DO YOU INTERPRET A CHILD'S GROWTH CURVE?

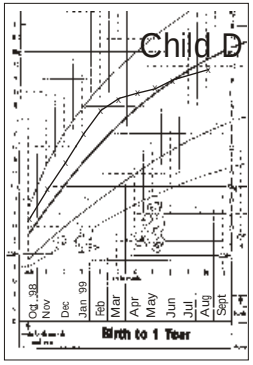
- If a child is growing well, the curve should be rising and the same shape as the reference curve. The 'road to health' describes a trend with every child moving upward as time passes moving to the right (Child A and Child B).

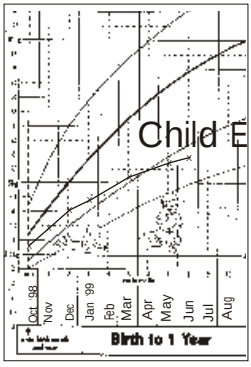


- The growth curve may be rising faster than the centile line. This is quite commonly seen in healthy babies in the first year of life and should not be a cause for concern. There are big children and little children, but all should grow every month (Child C).



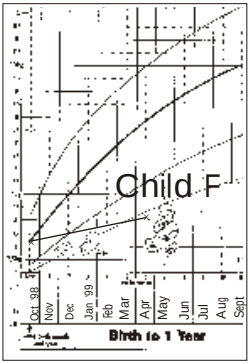
- You should be concerned if the growth curve is flat or falling (growth faltering) and you must try to find the reason for this and correct it (Child D). Any child who becomes malnourished does so over many months through inadequate growth, month after month or with episodes of infection or social deprivation. Malnutrition is not an acute condition but develops over time slowly. It cannot be seen unless the child is weighed regularly and the weight plotted accurately on a graph to make growth visible.





- Of concern are children who fall below the 3rd centile (under-weight) line. They need care and counselling. They may require extra food for a few weeks (Child E).

- Those below the 60% of expected weight line (marasmus) should be REFERRED to hospital (Child F). Remember to look for oedema (swelling) of the feet, a sign of kwashiorkor, the most serious form of malnutrition. These should be REFERRED immediately.

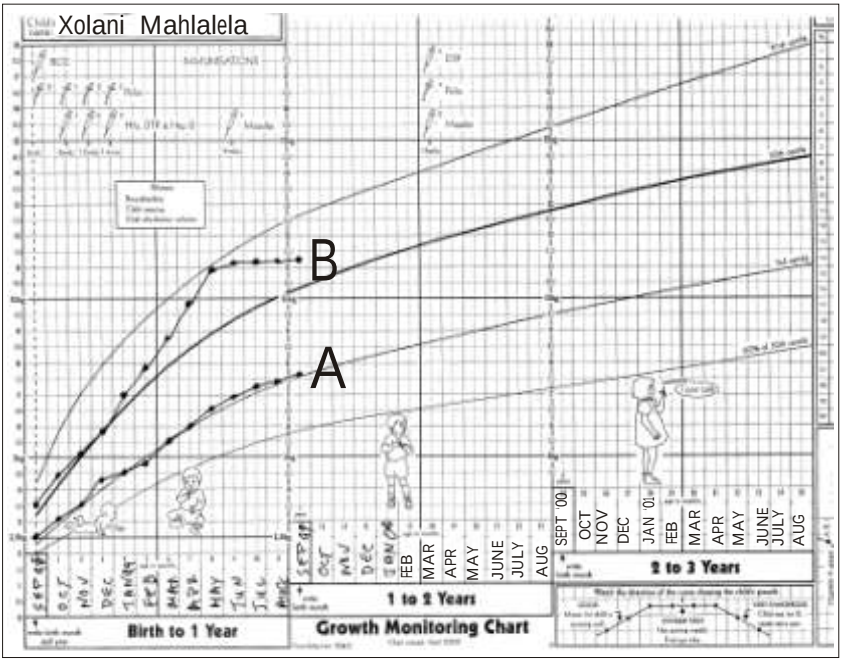


WHAT IF THE WEIGHT IS ON, OR EVEN BELOW THE 3RD CENTILE BUT WEIGHT GAIN

IS FOLLOWING THE LINE OF THE CURVE?

The monthly trend of the line is more important than the position of the weight on the chart.

- The child A is growing regularly and is healthy.
  - The child may be very short for genetic reasons - the parents may be short - and the weight is then appropriate for the length.
  - Some babies who are born with a low birth weight have a lower growth potential and always remain small and light. This is often seen in babies of mothers who have taken alcohol during pregnancy (fetal alcohol syndrome). If you are in any doubt about such children you should REFER.
  - If the length is above the 3rd percentile for the age, and the weight below the 3rd centile this indicates that the child is too thin because he or she is sick, or not eating enough.
- The child B, though still above the 50th centile, is a serious concern - he is at the same weight for five months - poor health, bad feeding or social neglect must all be considered and explored.



WHAT TO DO AT EVERY HEALTH FACILITY VISIT

- Ask about illness and feeding.
- Weigh child and plot the weight.
- Note the shape of the growth curve, which should be parallel with the centile lines.
- Explain the growth curve to the mother - and ask her to explain it to you !
- Encourage the mother/caregiver if the child is gaining weight.
- If no weight gain, discuss what is happening. Is the child sick? Is feeding adequate? Is the child left alone or neglected?
- With the mother, make a plan to address any problem uncovered by your history or exam; treat illness, review feeding patterns and pregnancy, encourage close care and attention.
- Make sure immunisations are given.
- Write in the monthly column:
  - Type of feeding, frequency
  - Any illness and its management.
- Make any additional comment on the inside of the RTHC.
- Tell mother when to return and write this on the RTHC; if faltering it should be within two weeks. Continue frequent revisists until weight gain resumes.
- Consider a home visit for a child whose weight falters for more that 2 months; you may discover many factors that need attention in the home environment.

FEEDING

WHAT RECOMMENDATIONS WOULD YOU GIVE TO THE MOTHER OR CARER ABOUT FEEDING DURING ILLNESS AND HEALTH?

1. Advise all mothers to breast feed exclusively until the baby is four to six months old.

- For all babies their own mother's breast milk is the best food possible. It provides immunity, the proper nutrients, and the more the child sucks the more milk the mother produces. All mothers can produce breast milk. Sometimes the stress of modem living and self doubts make some mothers think that they cannot produce enough. This is not correct. Proper counselling and guiding, reassuring mothers that physiologically they have the ability to produce the ideal food for their child is very important. Even twins and triplets can be fed adequately by mother's milk for the first four to six months of life.
- Breast feeding exclusively protects the child from many dangers in the environment. No matter how clean one tries to be, infectious organisms enter a young baby's mouth through food or drink other than breast milk and cause diarrhoea and other kinds of infections.
- In addition, allergies which may last lifelong are often contracted in the earliest months of life when the intestine is particularly susceptible and unable to deal with proteins and other complex substances found in food. Only mother's milk protects the child from developing these allergies.
- For a mother with (or suspected to have) HIV infection, exclusive breast feeding or no breast feeding is a choice she must make. Exclusive breast feeding for three months does not appear to place the child at any risk of HIV infection and provides obvious benefits, but partial breast feeding should be avoided.

2. Advise mother to continue breast feeding until baby is 24 months old.

- Milk is the natural food for all mammals and it is widely known that mother's milk is best for babies just as cow's milk is best for calves.
- If infant formula or cow's milk is to be given to a child under two years of age it is best used to enrich other foods like cereals rather than given as a liquid.

- If mother is HIV infected, seek special guidance for feeding beyond three months.

3. Advise introduction of solids/complementary feeding at four months only if the baby appears hungry after breast feeding or is not gaining weight adequately. In any case, introduce solids no later than six months.

- The feeding bottle is a dangerous instrument, almost impossible to clean, it is invariably contaminated with potentially harmful organisms that grow quickly in the milk.
- Use a cup or spoon to feed milk or other liquid feeds to a child as these can be readily cleaned, dried and made virtually sterile. Even newborn babies can be fed in this way, if exclusive breast feeding is decided against.

- Milk powder can be added directly to porridge or other cereal feeds and avoids the problem of dilution of powdered milk or the use of dirty water. When milk is added to cooked food before it is boiled, the problem of contamination is also avoided and the food is more attractive and enriched for the child. This is the best way to use powdered milk of any kind.

4. When introducing solids start with one to two feeds per day after breast feeding, then increase frequency.

5. Once feeding is established advise mother/caregiver to give five meals per day.

- Remember that a child has a very small stomach and requires more than twice as much food per kilogram of body weight for healthy growth as an adult (an adult requires about 40 kilocalories per kilogram while a growing child needs 100 to 110 kilocalories per kg).
- This means that a child must eat more frequently during the day than an adult. It is almost impossible for a young child to eat enough food at two or three sittings to satisfy her needs.
- Four or five feedings a day are necessary to reach an adequate diet.
- Remember, a child at one to two years of age requires half as much total food as an adult, even though she weighs only 10 or 11 kgs, while adults are 50, 60 or 70 kgs in weight.

6. At nine months baby should be eating family foods four or five times daily.

- Pureed or strained family food is suitable provided it is not heavily spiced. Avoid pre-cooked bottled food as it is very expensive.

7. A small child must be fed whilst an older child eats for herself.

- A child under two years always requires the attention of a caregiver, otherwise he/she may not receive enough food and growth falters, even if the child appears quite healthy.

8. Advise continuation of breast feeding and complementary feeds during illness.

- It is particularly important to continue normal feeding during an illness. Many cases of malnutrition start off because the child was not fed adequately during a bout of diarrhoea.
- Mother/caregiver should give small frequent feeds throughout illness.

9. After the illness advise giving an extra feed daily until catch up growth has occurred.

- Measure recovery by adequate rising of the growth line until it reaches the same level as before illness.

WHAT ADVICE WOULD YOU GIVE ABOUT FEEDING PROBLEMS?

- If mother has difficulty with breast feeding, assess breast feeding and show her the correct position and attachment for breast feeding.
- If mother gives breast and supplementary feeds, advise her to breast feed first, then give additional food, preferrably porridge enriched with milk.
- If child is not feeding well during illness advise mother:
    - to breast feed more frequently/longer,
    - use appetizing foods,
    - clear blocked nose,
- Follow up any feeding problem in five days.

- Ensure emotional and social support and encouragement for mothers of malnourished children.
- Save food supplements for mother who clearly cannot afford adequate food, or whose child has persistent faltering, even before malnourished.
- Refer mothers of malnourished children to community development programmes - they may need help with housing, water, gardens, other support.
- Poor children qualify for child support grants, depending on a means test.

WHAT ARE THE FACTORS WHICH WOULD MAKE MONITORING THE GROWTH OF A CHILD MORE FREQUENTLY PARTICULARLY IMPORTANT?

Reasons in the child:

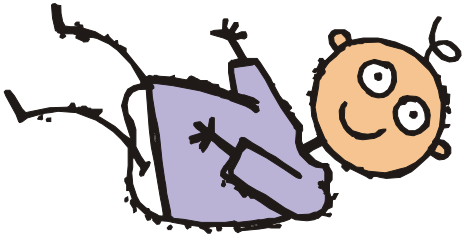
- Growth faltering
  - *Keep monitoring till normal growth resumes*
- Weight less than the 3rd centile
  - *Particularly vulnerable to infection*
- Low birth weight (less than 2.5kg at birth)
  - *Particularly vulnerable to infection, should show catch-up growth*
- Twin or multiple pregnancy
  - *One baby may be neglected at the expense of the other*
- Born less than 24 months after previous child
  - *Mother may not have the physical or emotional resources to cope with the new baby*
- Disability
  - *Children with disabilities are at risk of being neglected or even abused*
- Chronic illness (eg HIV or TB)
  - *Poor appetite, prone to infections, often withdrawn, fussy.*

Reasons in the family:

- Mother with many children

- Other children in family who are malnourished or died
- Single mother
- Child cared for by relative/caregiver
- A poor family
- Mother mentally or physically ill
- Mother is an adolescent (teenager)
- Alcohol abuse in the family

In all these categories the mother may be under stress, and the child at greater risk of neglect or abuse.



MALNUTRITION

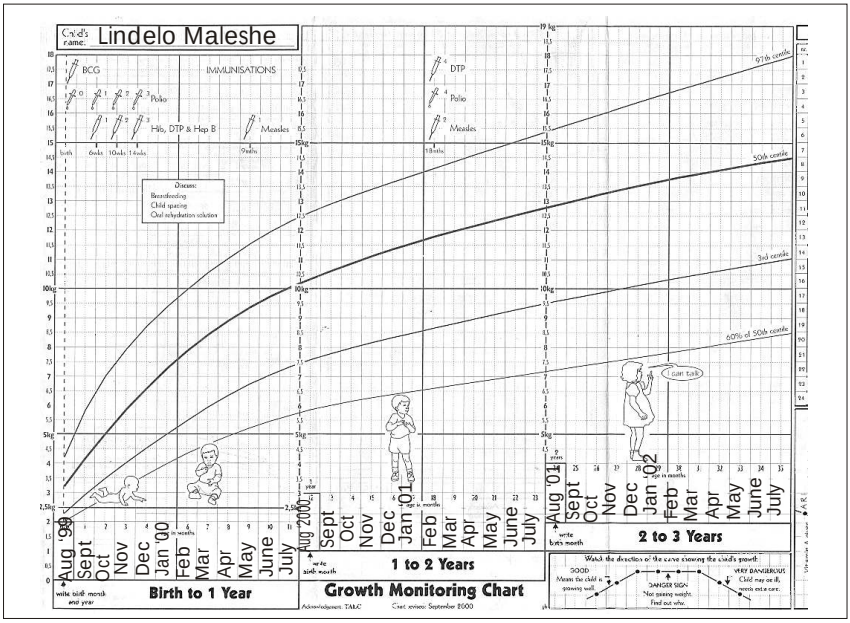
- Around the world :
  - One in four children is malnourished;
  - In sub-Saharan Africa undernutrition underlies more than one in three childhood deaths;
  - In South Africa one out of every four children is stunted. One in three has Vitamin A deficiency, a quarter are anaemic.

HOW DO YOU FIND OUT TO WHAT EXTENT MALNUTRITION IS A PROBLEM IN YOUR DISTRICT?

- By keeping a Master Chart -a Community Growth Chart - on which all the children's weights are plotted, in your health facility (Booklet 1). See at what age the dots start to fall below the 3rd percentile line. Refer all those below the 60 percentile line. Are the lower weights from a particular community? If yes, community action is needed.
- By undertaking a Nutrition Survey to determine the number of stunted, underweight and wasted children in your district. For information on how to do this and how to interpret the results see Further Reading (FAO 1990).
- A quick and rough way to identify severely malnourished children is by measuring the circumference of the middle of the upper arm. In children between the ages of two and five years the circumference should be more than 13.5 cm. Below 12.5 cm may mean severe malnutrition. These children require further evaluation by weighing and examination.

HOW DO YOU ASSESS LINDELO?

Lindelo comes to the clinic in March 2000 for his 3rd DPTHiB, HBV and Polio. He weighs 7.0 kgm. He was born in August 1999 at home. In October he weighed 4.3 kgm, in December 6.2 kgm, in January 2000 6.3 kgm. Plot his growth curve. What do you do next?



You first assess Lindelo for severe illness - look for general danger signs.

Does Lindelo have any of these?

- Convulsions in this illness
- Vomits everything
- Stridor in a calm child
- Severe malnutrition (marasmus or kwashiorkor)
- Lethargic or unconscious
- Unable to drink or breast feed
- Bleeding spots in the skin (petechiae or bruising)

These have already been discussed in Booklet 3

WHAT ARE DANGER SIGNS IN CHILDREN YOUNGER THAN THREE MONTHS?

- Any of the clinical features just listed
- Fever (temperature above 37.5 °c in the axilla)
- Low body temperature (temperature below 35.5 °c in the axilla)
- Bulging fontanelle
- Grunting
- Chest indrawing
- Fast breathing (more than 60 per minute)

LINDELO DOES NOT HAVE ANY OF THESE SIGNS. WHAT QUESTIONS WOULD YOU NOW ASK LINDELO'S MOTHER?

- How many times a day is Lindelo breast fed? For how long?
- If breast milk substitutes are given:
  - How are they made up? How fed? How frequently given? How are they prepared, and is hygiene satisfactory?
- What type of food is eaten and how frequently is it given?
- Are the complementary feeds energy enriched? Eg with oil, margarine or peanut butter?
- Is there sufficient food available in the household?
  - If not, do you have food in the health facility to offer them?
- Who feeds the child? How often is she left alone?
- Does the child receive his own portion of food or does he share a plate/bowl with others?
- Are there any family members with TB or with a chronic cough?
- Has the child been ill recently?
  - Did he get extra food after the illness?

If any of the answers show that there may be a problem, stop and explain, then proceed further.

WHAT SPECIAL FEATURES WOULD YOU LOOK FOR IN LINDELO?

- Is there oedema of the feet?
- Is there pallor of the conjunctiva and palms? (Do a haemoglobin if possible).
- Check for vitamin deficiencies. (See pages 27- 34).
- Is there underlying illness such as respiratory infection or diarrhoea? (See Booklets 3 & 4)
- Investigate for TB (do a tine test and arrange a chest X-ray).

WHAT ARE THE EARLY SIGNS THAT WOULD MAKE YOU SUSPICIOUS OF HIV INFECTION?

- Persistent thrush in the mouth.
- Recurrent diarrhoea and troublesome nappy rashes.
- Enlarged lymph nodes in the neck, axillae, groins.

HOW DO YOU MANAGE LINDELO WHO HAS GROWTH FALTERING AND IS UNDERWEIGHT?

- Encourage and support frequent breast feeding.
- Advise mother to start complementary feeds immediately. All children should start solid feeds at six months.
- Help the mother to find ways to give the child more nutritious food, frequently, for example by adding oil, vegetables, egg.
- Encourage feeding during illness, eg diarrhoea or ARI.
- If you suspect TB or HIV arrange for further investigations.
- De-worm the child with mebendazole (Vermox Ò) or albendazole (Zentel Ò).
- Give iron if child is anaemic (see page 27).
- Give Vitamin A supplements (see page 28).
- Treat any illness (eg otitis, scabies, diarrhoea, ARI).
- Give food supplements if the mother cannot afford the food.
    - You should be able to help her through the PEM Scheme.
    - Show her how to use it and be sure she understands.

- Encourage using milk to enrich porridge. If given as liquid, give with a cup, or cup and spoon, rather than with a bottle.
- Advise the mother to return in two weeks.

TYPES OF MALNUTRITION

LET'S GO OVER THE TYPES OF MALNUTRITION AGAIN.

Growth faltering
This is when the growth is flat or dropping off in relation to the reference curve for two to three consecutive months.

Underweight is weight between the 3rd centile and 60% of the 50th centile.

Severe malnutrition?

This is of two types:

- **Marasmus** is present when the child's weight falls below the 60% of expected weight-for-age line or visible severe wasting.
- **Kwashiorkor** means that the child has oedema and the weight is generally below the 3rd centile, often the skin is peeling . Kwashiorkor can be seen in children who are above this weight especially if they started off above the 50th centile in the early months.
- If a child is both below 60% of expected weight and has oedema, the condition is **marasmic kwashiorkor** - the most severe grade of all.

SEVERE MALNUTRITION

MARASMUS

KWASHIORKOR

WHAT ARE THE MAIN REASONS FOR DEATHS FROM SEVERE MALNUTRITION?

Severely malnourished children with wasting and/or oedema are usually very ill and often have complications. With incorrect care many die or recover slowly. The main reasons are:

- Low blood glucose (hypoglycaemia)
- Low temperature (hypothermia)
- Mismanagement of dehydration
- Missed infections. These are often found in children with unsuspected HIV infection. HIV also often accounts for chronic marasmus which cannot be corrected.
- Severe anaemia

These children MUST be REFERRED to hospital or to a health care facility which deals specially with such children.

- Firstly, assure the child has not got an empty stomach - breast feed or give milk - assess the child for low blood sugar using a blood glucose testing strip and if present treat with oral 10% dextrose water or give more milk.

- Secondly, keep warm - wrap in a blanket.
- Thirdly, if child has severe diarrhoea give ORS (See Booklet 4).
- Fourthly if a child has pneumonia give oxygen and first dose of antibiotic (See Booklet 3).

HAVE YOU HEARD OF THE TEN STEPS TOWARDS IMPROVED CARE OF SEVERE MALNUTRITION?

Severely malnourished children are at great risk and require treatment in hospital. If you cannot refer to an expert centre and have to deal with the child yourself the following ten steps recommended by the World Health Organisation are the ones to remember.

PUT THEM ON YOUR NOTICE BOARD!!

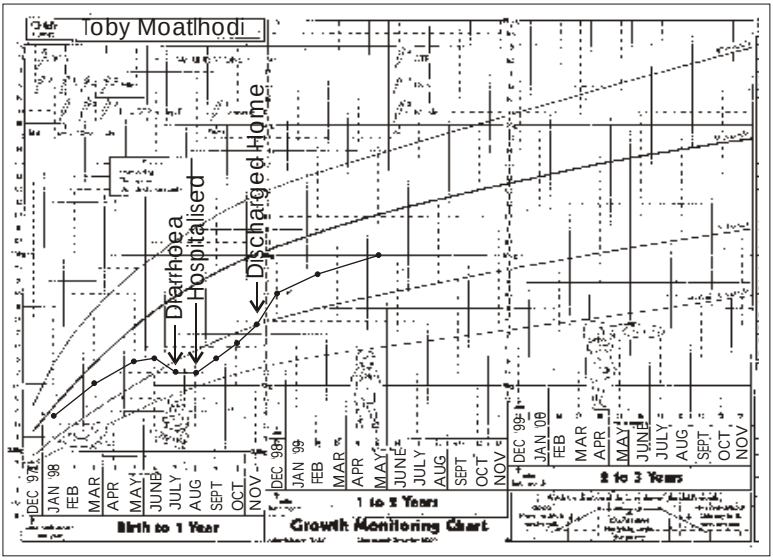
- **Treat or prevent low blood sugar**
  (by giving glucose or sugar water)
- **Treat or prevent low body temperature**
  (wrap child in a blanket)
- **Treat or prevent dehydration**
  (ORS)
- **Correct imbalance of electrolytes**
  (Electrolyte mixture)
- **Treat infections**
  (Cotrimoxazole or specific antibiotic)
- **Correct deficiencies of micronutrients (vitamins and minerals)**
  (multivitamins plus Vitamin A)
- **Start gradually increasing feeding**
  (feed at least every three hours, and through the night)
- **Rebuild wasted tissues (catch-up growth)**
  (Calorie-dense feeds)
- **Provide stimulation, play and loving care**
- **Prepare for follow-up after hospital discharge**

RECOVERY FROM SEVERE MALNUTRITION TAKES PLACE IN TWO PHASES. WHAT ARE THEY?

- Stabilisation takes about a week, in which infection is controlled, and feeding is gradually increased.
- Rehabilitation takes the next five weeks, when electrolyte and micronutrient deficiencies are corrected, tissues rebuilt, and sensory stimulation and love rekindled.

WHAT IS CATCH-UP GROWTH?

- When the child is recovering from undernutrition, the growth curve should rise faster than the reference curve until he/she reaches the growth line appropriate for that particular child.
- Catch-up growth may also be seen after de-worming, if there has been a big worm-load (see page 24).
- If the child is not showing catch-up growth, find out whether he/she is:
  - Getting sufficient extra energy-rich food
  - Sick (consider TB or HIV) or
  - Being abused or poorly cared for.
- If no treatable cause is found, REFER the child.

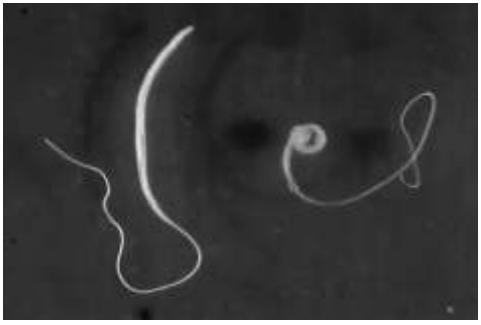


WORMS

HOW MAY WORMS CAUSE MALNUTRITION?

Children who are heavily infected with intestinal parasites, such as ascaris, trichuris and giardia may become seriously malnourished, often showing oedema from low protein levels, and clubbing of the fingers and toes.

The best-known intestinal worm is **ASCARIS**. It is best known because of its large size, and because it is often vomited or passed in the stool when the child is ill. It causes symptoms only when worms get knotted up resulting in obstruction of the bowel, or a worm blocks the bile or pancreatic ducts.



WHIPWORM -Trichuris - is one of the most common worm infections in humans. Trichuris has an anterior whiplike portion (the head end) and a posterior bulky part. They measure approximately 40 mm. The worm remains in the gut by embedding the head and anterior portion of the body in the intestinal mucosa. Each adult worm sucks about 0,005 ml of blood per day, and also causes damage to the mucosal surface, which results in diarrhoea (blood and mucus), protein loss and other losses.

HOOKWORM - Ankylostoma - are small worms which live in the upper bowel attached to the mucosa and also suck blood. Heavy infections may lead to:

- severe anaemia (Hb can be below 5 g%)
- hypoproteinemia and oedema.

HOW CAN THESE WORM INFESTATIONS BE TREATED?

- Mebendazole 100 mg twice a day for three days OR Albendazole 400 mg as a single dose are safe and highly effective treatments for all of these worm infestations.
- Piperazine syrup is an older treatment which is only effective against ascaris. It paralyses the worms and causes their rapid expulsion, but does not kill them. Piperazine is given before the evening meal in a dosage of 75 mg/kg to a maximum of 4g. Piperazine sometimes causes neurological side-effects, such as ataxia and dizziness.

MICRONUTRIENTS

Apart from protein, fat and carbohydrate, which form the major nutrients in all foods, there are numerous other nutrients required in very small quantities. These nutrients are therefore called “micronutrients” - they are essential for healthy growth and living. Vitamins and “trace” minerals, the “micros”, are found in fruits, vegetables, eggs, milk and meats.

IRON

WHY IS IRON SO IMPORTANT?

Iron is necessary not only for the red blood cells but also for tissues throughout the body, including the brain.

Anaemia due to lack of iron is present in at least a third of children under five years in developing countries and about 1/5th of South African children. Children who lack iron show poorer learning ability, even if they are not anaemic.

HOW DO CHILDREN BECOME IRON DEFICIENT?

Iron deficiency affects people of all ages. Young children are especially likely to be iron deficient for the following reasons:

- Newborns receive their initial store of iron via the placenta.
- If they are born early or are multiple births they will receive less.
- Delayed feeding of complementary foods.
- Giving foods poor in available iron, such as those low in Vitamin C and high in phytate (eg porridge).
- Feeding cow's milk from a young age. Fresh or pasteurised cow's milk is not only very low in iron, but also often causes a low grade allergic reaction in the gut which affects iron absorption.
- Chronic blood loss, from nosebleeds or especially from hookworm and whipworm infections, and malaria in some areas.
- Pregnant and lactating mothers are especially at risk for iron deficiency. As a result she may be tired and weak, and be less able to cope well with the baby. The infant may also lack iron as a result, and become anaemic later.

WHAT ARE THE IMPORTANT SOURCES OF IRON IN THE DIET?

Iron is of two types: haem-iron and non-haem-iron:

- Haem iron is present in meat, poultry, fish.
- Non-haem iron is present in cereals, vegetables and pulses (peas, beans, lentils).

Only a portion of the iron is absorbed from these foods, but more from haem than non-haem sources. For best absorption of iron haem and non-haem foods should be given together.

- Vitamin C-containing fruits and vegetables also help the absorption of iron.

HOW CAN WE PREVENT IRON DEFICIENCY IN CHILDREN?

- By delaying the clamping of the umbilical cord until it has stopped pulsating the baby receives extra blood and iron from the placenta.
- Preterm babies and twins must be given supplemental iron to build up the stores. Start at about one month and continue for six months. This is best given as Ferro drops (2 mg of iron/kg/day).
- Start complementary (mixed) feeding at between four to six months.
- Giving fruit or vegetables rich in Vitamin C helps absorption of available iron.
- If possible give haem-iron and non-haem-iron foods together at the same meal. This increases the absorption of iron from the gut.
- Continue breast feeding. Avoid especially fresh, boiled or pasteurised **whole** cow's milk as the exclusive milk feed until the child is older than 15-18 months.

HOW WOULD YOU TREAT ANAEMIA IN INFANCY AND THE PRESCHOOL CHILD?

Iron deficiency is by far the commonest cause of anaemia.

- Iron is available in liquid form for children in the form of various salts of iron (ferrous sulphate, lactate, citrate, fumarate or gluconate). Each of

these contains different amounts of elemental iron. To correct iron deficiency anaemia you should give one or other of these orally in a dose of 5 mg of **elemental** iron/kg/day for one month.

The following doses are equivalent to 5mg/kg of elemental iron per day:

Ferrous sulphate (syrup)	25mg/kg/day
Ferrous lactate (FerrodropsÒ)	0.25ml/kg/day
Ferrous fumarate (FersamelÒ)	l5mg/kg/day
Ferrous gluconate (FerluconÒ)	40mg/kg/day

- If there is no improvement after one month, the cause must be found elsewhere - REFER!
- If there *is* improvement, a second month of iron treatment should be given to build up the body's stores.

VITAMIN A

WHAT ARE THE HARMFUL EFFECTS OF LACK OF VITAMIN A?

Severe deficiency of Vitamin A causes difficulty with vision at night (night blindness), and dryness of the conjunctiva and cornea, which can lead to severe damage to the eye - keratomalacia. This is the most important cause of blindness in children worldwide, and is totally preventible.

Deficiency of Vitamin A also increases the severity of various infections. By giving supplements of Vitamin A to children with measles it has been shown that mortality, complications, and duration of hospital stay are diminished. Other infections are effected similarly.

HOW DOES VITAMIN A DEFICIENCY COME ABOUT?

Children on poor diets may develop severe deficiency after bouts of gastroenteritis, measles or TB. Children with severe malnutrition should have their eyes examined carefully for corneal dryness or damage, or Bitot's spots - raised areas on the sclera.

WHAT SHOULD YOU DO TO CORRECT IT?

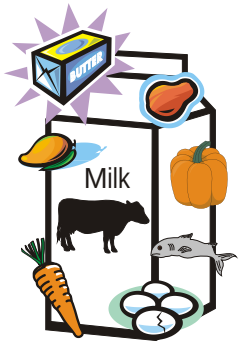
Although Vitamin A deficiency severe enough to cause these eye changes is not common in South Africa, subclinical deficiency is a problem in many communities.

Children with measles, severe malnutrition, diarrhoea and pneumonia or eye changes should be treated immediately with Vitamin A capsules or solution:

Under six months	50,000 IU per day for two days
Six to twelve months	100, 000 IU per day for two days
Twelve months and older	200, 000 IU per day for two days

If there are eye signs of Vitamin A deficiency repeat the dose after four to six weeks.

WHAT FOODS CONTAIN VITAMIN A?



Vitamin A is a fat soluble vitamin found in animal foods such as milk, butter, eggs, liver and fish. Vitamin A is also formed from beta-carotene, which is found in yellow fruits such as pawpaw and mango and vegetables like yellow sweet potato, pumpkin, carrots, and yellow maize. Green leafy vegetables are also rich in beta-carotene.

HOW CAN VITAMIN A DEFICIENCY BE PREVENTED?

- Breast feeding protection and promotion
  Breast milk can supply all of the Vitamin A that an infant needs for the first six months of life and continues to be an important source till the age of two years. Encourage mothers to breast feed exclusively for four to six months and to introduce Vitamin A-rich complementary foods early.
- Use fruit and vegetables in season to the fullest extent possible
- Recommend foods rich in Vitamin A:

Liver	Sweet potato	Carrot	Kidney
Butter/margarine	Yellow cheese	Spinach	Broccoli
Butternut	Mango	Paw paw	

- Food fortification
  This is the addition of Vitamin A (or other micronutrients) to foods commonly consumed by the community. The labels of foods which are fortified should indicate this.
- Supplementation of Vitamin A
  The routine provision of high dose Vitamin A supplements is very effective in deficient communities. Vitamin A supplementation has now been accepted as National policy and will be provided to children six monthly from six months onwards.

Eastern Cape Nutrition Protocols

Vitamin A Supplementation

Ver: 1/3/99

Background

Vitamin A is essential for ensuring the integrity of epithelial tissue (skin, eyes, lining of the lung and intestine) against infection. It ensures optimum functioning of the immune system. Proper child growth and development requires Vitamin A.

A national survey in 1993 indicated that the national prevalence of Vitamin A deficiency and low Vitamin A status was 33% (Eastern Cape 31%).

Lack of Vitamin A is associated with increased mortality and morbidity in childhood, especially from infections.

Vitamin A supplementation has been instituted to improve the health of all South African children.

Overdosing children with Vitamin A does not improve its effect and may be dangerous. Thus, the recording of each dose on the 'Road to Health Card' and administration at the correct time is very important.

Protocol

Maternal

All women should receive Vitamin A 200,000 units before discharge from the

maternity ward. This will ensure that the mothers breast milk will contain adequate quantities of Vitamin A for at least 6 months.

Children

Vitamin A 100,000 units should be given orally to all children at, or at the first opportunity after, 6 months of age unless this is after the age of 12 months when 200,000 units are given.

Thereafter 200,000 units should be given every 6 months until two years of age.

Administration

Vitamin A is given as liquid containing gelatin capsules. Pierce capsule and squeeze content into child's mouth.

To give 100,000 units use a 200,000 unit capsule. Puncture one capsule with a needle and count the number of drops you can squeeze out of the capsule. When giving 100,000 units, puncture the capsule to be given and squeeze out half the total number of drops in the capsule into the child's mouth.

Give at the first opportunity after 6 months of age and thereafter every 6 months (or as soon as possible after each 6 months) until over 2 years of age.

Record dose on 'Road to Health Card' in the correct blocks.

Do not repeat more often than 6 months, except in the event of clinical measles or other severe infection.

Special Situations

Measles

Children with measles are at increased risk of severe illness and death if not supplemented with Vitamin A.

In case of acute measles in addition to other treatment give :

< 12 months old
100,000 units immediately and repeat after 24 hours

≥ 12 months old
200,000 units immediately and repeat after 24 hours

Vitamin A



Vitamin A is found in many fruits, vegetables, poultry, eggs and meat products. The best way to assure adequate Vitamin A is to ensure a varied diet containing greens (spinach), yellow and red vegetables (carrots), yellow fruits (paw-paw, mango), eggs, cheese, liver. Vitamin A supplements are given to infants up to two years of age with expectation that a varied diet will be consumed daily by that age.

- Toxicity

  Side effects are rare if the correct dose is given. If high doses are taken very often (such as monthly or more often) there may be harmful effects, such as headache, nausea, vomiting and diarrhoea. These are reversible. The health worker should clearly record when a capsule is given to a mother or child and follow the recommended schedule (note, some countries give Vitamin A supplements four monthly so precise adherence to the “six monthly” schedule is not critical).

VITAMIN D

WHAT ARE THE EFFECTS OF VITAMIN D DEFICIENCY?

This vitamin is required, with calcium and phosphate, for bone formation. Without it, the bones become soft, and bend and break easily. This is called rickets.

HOW DOES VITAMIN D DEFICIENCY COME ABOUT?

Vitamin D is produced in the skin by exposure to sunlight. This happens when infants are kept indoors all day or are covered completely by clothing and a bonnet. Vitamin D is present in breast milk, but levels may be very low in winter months. Cows' milk is very low in Vitamin D. Pre-term infants are very susceptible to Vitamin D deficiency.

HOW CAN RICKETS BE PREVENTED?

Sensible but not excessive exposure to sunlight should be recommended. Full-term babies should receive about 400 IV Vitamin D /day for the first year of life. This is generally easily achieved from breast feeding or a balanced diet. Pre-term infants and twins require 800 IV/day, and this should be given as vitamin drops (Vidaylin or Abidec).

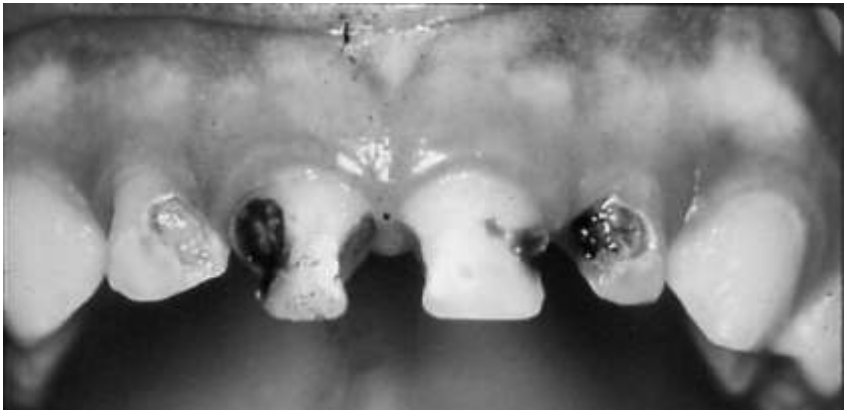
OTHER VITAMIN DEFICIENCIES

WHAT OTHER VITAMIN DEFICIENCIES CAN OCCUR IN CHILDREN?

Vitamin C deficiency causes scurvy. Fruit, fruit juice and vegetables (for Vitamin C) should always be included in the diet. **Vitamin B** complex deficiencies result in pellagra and beri beri. Milk is a very rich source of B complex vitamins. Milder deficiency of Vitamin B may result in general dryness or hypopigmentation of the skin and dermatitis at the angles of the mouth. If this is suspected, give Vitamin B complex by mouth.

WHAT ARE THE IMPORTANT TRACE ELEMENTS?

Fluoride is of great importance in preventing dental caries, the commonest chronic disease among children.



The main source of fluoride is water, and the cheapest, safest and most effective way of giving fluoride to children is by adding it to the water supply (fluoridation). But most water sources in South Africa contain well below the

optimal concentration of fluoride, which is one part per million. You should find out what the water levels are in your area.

- When levels in water are very low you should recommend daily fluoride supplements for children (sodium fluoride O.55mg equivalent to O.25mg of fluoride) for the first 18 months.
- After that age, encourage regular twice-daily tooth brushing with fluoride containing tooth-paste.

Iodine deficiency causes goitre (an enlarged thyroid gland) and hypothyroidism. It is the most important cause of preventable brain damage in the fetus and infant and it may result in impaired learning ability in children. Iodine is best given by adding it to table salt. All table salt in South Africa is supposed to be iodised as a public health measure to prevent and control iodine deficiency. But variations in the iodine content of salt may result in some areas receiving too little. Health workers should therefore be on the lookout for signs of goitre. Be sure salt in the local shops is iodised.

OBESITY

Sam is a large active baby of 10 months. He is still on the breast and taking solids very well. His weight started on the 50th centile and is now well above the 97th.

SHOULD YOU BE CONCERNED ABOUT OBESITY?

- Obesity is also a form of malnutrition, but at least 90% of fat babies lose their obesity in childhood.
- You should generally not warn mothers against "overfeeding" in children under 18 months.
- Don't recommend skim milk for fat babies!
- Only when there is a family history of obesity in one or other parent should you give sensible advice on controlling weight gain.

FURTHER READING

Ashworth A, Jackson A, Khanum S, & Schofield C. Ten steps to recovery. Child Health Dialogue 1996. 2nd and 3rd quarter issues 3 and 410-12.

The WHO Ten Steps. Kwik Skwiz #16 Initiative for Sub-district Support. HST.

For further information contact:

- UWC Public Health Programme. Phone (021) 9592809
- MCH Information and Resource Centre (021) 6854103 #248
- Department of Health. Vitamin A deficiency 1998

Savage King, F; and Burgess A. Nutrition in Developing Countries 2nd edition. Oxford University Press. Oxford New York Tokyo 1993. pages 339-343.

FAO (1990). Conducting small scale nutrition surveys: a field manual. Nutrition in Agriculture, no.5. FAO, Rome

World Health Organisation. Measuring change in nutritional status. Geneva: WHO 1983.

BEFORE THE CHILD GOES HOME FROM THE CLINIC, MAKE SURE THAT

- *HE OR SHE IS FULLY IMMUNISED*
- *THE MOTHER HAS RECEIVED NUTRITIONAL ADVICE*
- *THE MOTHER CAN REPEAT THE INSTRUCTIONS IN HER OWN LANGUAGE*
- *THE MOTHER KNOWS WHEN TO COME BACK*

ANSWERS

1 - T

2 - F

3 - F

4 - T

5 - T

6 - F

7 - T

8 - T

9 - F

10. - F

11. - T

12. - T

13. - F

14. - T

15. - F

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NOTES

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