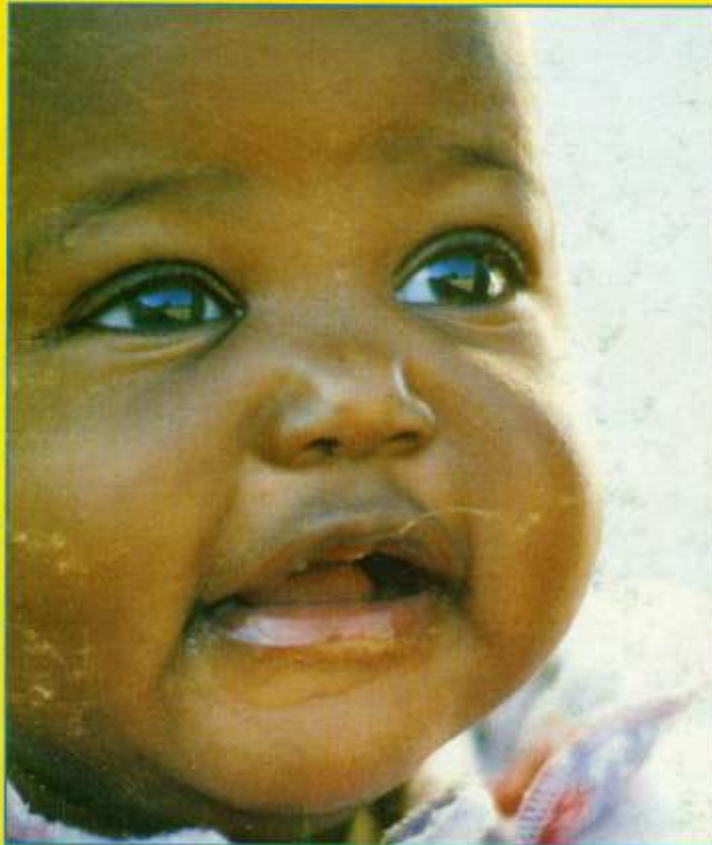


**PREVENTION, CONTROL
AND TREATMENT OF
VITAMIN A DEFICIENCY**



**POLICY GUIDELINES
FOR HEALTH WORKERS**



PREFACE

Vitamin A is one of the important food substances that the body needs to maintain the health of the eyes, as well as general health and well being, particularly of growing children.

Vitamin A deficiency is one of the major causes of blindness in developing countries. Blind people, similarly disabled people, tend to be neglected and may eventually become underfed, malnourished and die.

Namibia has a serious problem of Vitamin A deficiency. A study carried out among children 2 - 6 years old in 1992, revealed that up to half of the pre-school children in Namibia have Vitamin A deficiency, of either severe or moderate nature. It therefore means that half of Namibia's pre-school children are at risk of becoming blind if no efforts are made to control the situation.

Health workers are key in the control of Vitamin A deficiency and blindness. This can be done through taking preventative actions such as education of the public on the importance of production and consumption of green leafy vegetables and orange and yellow fruits. In addition, health workers should be able to diagnose the problem early and treat it accordingly. They can also supervise control measures such as Vitamin A supplementation and control of intestinal parasites that interfere with Vitamin A absorption.

Supervisors at the regional and district levels must work with community's own resource persons in detecting the early signs of Vitamin A deficiency so that they can identify children with these signs and take appropriate control measures.

Mothers and families in general must be taught about the importance of green leafy vegetables and orange or yellow coloured fruits and how to identify children with the early signs of Vitamin A deficiency.

Children from the age of 6 months to 6 years, children who are suffering from malnutrition, measles, respiratory infections and tuberculosis are at great risk of becoming Vitamin A deficient. Health workers must pay particular attention to those at risk and all others who may be affected.

The Ministry of Health and Social Services has prepared this book with the intention to help health workers understand the importance of Vitamin A in the body, the consequences of its deficiency, its major sources and what they can do to assist children and others in communities.

The Ministry will make sure that Vitamin A capsules are available in health facilities for those who may need them. However, as a preventative measure, health workers should emphasize nutrition education for the community.

Dr. S. Amadhila
Permanent Secretary
Ministry of Health and Social Services

ACKNOWLEDGEMENT

The Nutrition Unit would like to acknowledge the contributions made by different individuals who were consulted in the process of developing these Policy Guidelines for Prevention, Control and Treatment of Vitamin A Deficiency.

Special thanks goes to Ms. Paulina Kisanga who has facilitated the writing of this document, Ms. Linda Louw for cover photo and design and to Teaching at Low Cost (TALK) for the use of their slides. Dr. Johan Baard and Dr. Vincent Orinda are to be sincerely thanked for their technical guidance.

The input from the officials of the Ministry of Agriculture Water and Rural Development, Mr N. D. Shikesho and Ms. S. Martin is greatly appreciated.

Finally, the Nutrition Unit would also like to thank UNICEF, Namibia, for financial and technical support towards the production of this book.

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1. INTRODUCTION

It is estimated that at least 40 million pre-school children world-wide today are vitamin A deficient. Furthermore, 13 million of them have eye damage due to vitamin A deficiency. Every year about 250,000 pre-school children become blind from vitamin A deficiency and all of these could easily have been prevented.

Apart from the 250,000 who become blind, almost 190 million others are at risk, because they live in areas that are deficient in vitamin A.

Namibia is one of those countries that have severe vitamin A deficiency as has been revealed by the 1992 study among pre-school children.

Vitamin A is a fat soluble vitamin which is very essential for most of the body functions. The body cannot make vitamin A, therefore it must be obtained from the daily diet.

The recommended daily dietary allowance for vitamin A is 400 micrograms. If excess of this amount is eaten in a day, it is stored in the liver. The liver has the capacity to store vitamin A for six months.

The body's needs for vitamin A increase during illnesses such as measles, respiratory infections, prolonged diarrhoea, malnutrition and malaria. These are the times when the body draws upon its liver vitamin A stores. If vitamin A intake is not adequate at times of illness, there is a likelihood that the body's stores will be exhausted and a person may become vitamin A deficient.

The deficiency of vitamin A causes a condition known as xerophthalmia, which is a spectrum of eye damage that may eventually lead to blindness.

Vitamin A deficiency can be prevented. The best short term intervention is massive dosage with vitamin A. Long term prevention can be achieved through nutrition education on food rich in vitamin A, breastfeeding and the use of food fortified with vitamin A.

2. SOURCES OF VITAMIN A RICH FOOD IN THE DIET

Health workers should promote vitamin A rich food that are available in their community. The following are just an example of food rich in vitamin A:

- * **Breastmilk**
- * **Green leafy vegetables:**
spinach/wild spinach, lettuce, sweet potatoes leaves,
pumpkin leaves, cowpea leaves, cassava leaves.
- * **Orange and yellow vegetables and fruit:**
pumpkin, sweet potatoes, carrots
beansprout
pawpaws
mangoes
local fruit that have orange or yellow colour
- * **Animal sources:**
milk
yoghurt
cheese
butter
eggs
liver and kidney
fish
- * **Fats:**
fortified margarine
cod liver oil
fish liver oils
other oil seeds available in your area

3. WHAT ARE THE FUNCTIONS OF VITAMIN A IN THE BODY?

- * Proper vision of the eyes. Vitamin A help the eyes to see in dim light and keep the surface of the eyes healthy.
- * Proper maintenance of the mucus membranes of the lungs and stomach. Without vitamin A from the diet, these membranes lose the ability to protect the body from infection.
- * Proper growth and development of children. When there is not enough vitamin A in the diet, the child loses appetite and this decreases intake of food which lead to malnutrition. Bone growth is particularly affected. When there is enough vitamin A in the body, appetite is good and proper growth in children is achieved.
- * Increased resistance against infections and diseases.

4. WHAT ARE THE CONSEQUENCES OF VITAMIN A DEFICIENCY?

- * Xerophthalmia (It is drying of conjunctiva and cornea followed by destruction of the cornea and blindness).
- * Blindness.

XEROPHTHALMIA CAN LEAD TO BLINDNESS WITHIN 48 HOURS IF NOT TREATED IMMEDIATELY.

- * Increased morbidity and mortality.
- * Increased severity and duration of illness.
- * Inadequate growth in children due to frequent diseases that increase the need for vitamin A.

5. WHO IS MOST AT RISK?

People of all ages can be affected by Vitamin A deficiency and xerophthalmia. However, some groups are more vulnerable than others.

For example:

- * Children aged 6 months to 6 years are at the highest risk. This is because at this age children grow very fast and their requirements for vitamin A are high. Night blindness is very common in the early pre-school years. Even very mild vitamin A deficiency can be associated with increased childhood morbidity and mortality.
- * Children not breastfed.
- * Low birth weight infants.
- * Children living in drought affected areas. If there is a prolonged dry season, many pre-school children can become deficient periodically. If, at this time, there is also an outbreak of measles, this may lead to xerophthalmia.
- * Children with measles, acute respiratory infection, severe diarrhoea or any other illness are always at risk of vitamin A deficiency.
- * People depending on seasonal vegetables only.
- * Children living in poor socio-economic conditions where there is no safe water and environmental sanitation.
- * People living in refugee camps, prisons or urban slums.

**REMEMBER CHILDREN 6 MONTHS TO 6 YEARS
OF AGE ARE MOST VULNERABLE TO VITAMIN
A DEFICIENCY.**

**THE YOUNGER THE CHILD, THE MORE SEVERE
THE DISEASE AND THE QUICKER THE CHILD
GOES BLIND AND MAY DIE.**

6. WHAT ARE THE CAUSES OF VITAMIN A DEFICIENCY?

The causes of vitamin A deficiency may vary from place to place but in general they will be any of the following:

Direct causes

- * Low dietary intake of vitamin A.
- * Low vitamin A storage at birth due to maternal deficiency.
- * Low vitamin A storage in a low birth weight infant due to immaturity of the liver.
- * Interference with absorption due to malnutrition, diarrhoea and infestation with ascaris, hookworm or giardiasis.
- * Interference with transportation of vitamin A in the body due to lack of fat or protein.
- * Rapid loss and increased requirement of vitamin A in the body during diseases such as measles, acute respiratory infections, diarrhoea and malaria.

*** FAT AND PROTEIN ARE NECESSARY FOR PROPER UTILIZATION OF VITAMIN A IN THE BODY.**

Underlying Causes

The underlying causes of nutritional deficiencies although important, are often not taken into consideration. These include:

- * Household food insecurity. If households do not have adequate food, the children will be malnourished and also vitamin A deficient.
- * Lack of vegetable gardens.
- * Inadequate care for mothers and children.
- * Inadequate basic services such as safe water, environmental sanitation and firewood.
- * Inadequate knowledge on sources of vitamin A.
- * Inadequate Primary Health Care.

Basic Causes

Some of the causes of vitamin A deficiency are basic and may therefore need the support of the whole community, government, private institutions and NGO's.

These include:

- * Unavailability of land for home gardens.
- * Lack of water for irrigation.
- * Climatic conditions which lead to seasonal malnutrition and vitamin A deficiency.
- * Famine caused by drought, floods or wars.
- * Lack of national policy on food distribution.
- * Low purchasing power.
- * Traditional practises and believes in relation to production, processing and consumption of vitamin A rich food. For example:
 - a belief against feeding infant with colostrum.
 - a belief against eating of green vegetables
 - processing methods that remove vitamin A.

7. HOW TO RECOGNIZE VITAMIN A DEFICIENCY IN A CHILD

Health workers should examine the eyes of all clients for the following symptoms and signs of vitamin A deficiency:

i. NIGHT BLINDNESS:

This is the first eye symptom of vitamin A deficiency. The child cannot see in dim light or after dark.

ii. BITOT'S SPOTS:

Bitot's spots are an accumulation of dry silver-grey plaques on the conjunctiva. They differ in size, location and shape but have a similar appearance. They often appear at the sides of the eyeball.



iii. CORNEAL XEROSIS

This is drying and ulceration of the cornea. The cornea becomes dry and dull. If not treated immediately it can progress to an ulcer of the cornea within hours.

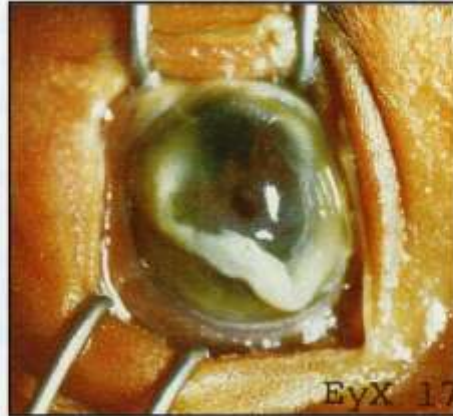


iv. KERATOMALACIA:

a. This is “softening” or “melting” and “wasting” of the cornea which can result into perforation of the cornea.



- b. Bulging cornea containing iris and lens.
(melting).
- c. Soft, cloudy and bulging cornea.



v. CORNEAL SCAR:

This is a permanent scar due to keratomalacia. If vitamin A deficiency is treated early, the size of the scar may be minimized and sight may be saved.

**REMEMBER TO EXAMINE THE EYES OF ALL
CLIENTS TO FACILITATE EARLY DIAGNOSIS
AND TREATMENT.**

8. ASSESSMENT AND SURVEILLANCE OF VITAMIN A DEFICIENCY

It is important to know the extent and magnitude of the problem in a community. This can be done through routine examination of eyes. The following are different methods to encourage early identification and diagnosis, as well as monitoring:

- * Routine examinations of eyes of all children whenever they present for medical care or immunization.
- * Regular xerophthalmia surveillance in all health facilities, particularly in areas suspected of being high risk.
- * Periodic cross sectional surveys to give a national picture.

NOTE:

The situation should be considered seriously in a community if the prevalence of different signs in a given group of children is as shown:

- * **NIGHT BLINDNESS MORE THAN ONE IN EVERY 100 CHILDREN**
- * **BITOT'S SPOTS MORE THAN ONE IN EVERY 200 CHILDREN**
- * **CORNEAL XEROSIS MORE THAN ONE IN EVERY 10 000 CHILDREN**
- * **CORNEAL SCAR MORE THAN FIVE IN EVERY 10 000 CHILDREN**
- * **RETINOL LEVELS LESS THAN 10 $\mu\text{g}/\text{dl}$ SERUM IN 5% OF PRE-SCHOOLERS**
- * **RETINOL LEVELS LESS THAN 20 $\mu\text{g}/\text{dl}$ SERUM IN 15% OF PRE-SCHOOLERS**

9. GUIDELINES ON PREVENTION, CONTROL AND TREATMENT OF VITAMIN A DEFICIENCY AND XEROPHTHALMIA

Vitamin A deficiency and xerophthalmia can be prevented and treated provided that correct measures are taken immediately once it is recognized as a problem in a community.

A long term and sustainable control measure is Nutrition Education on production of vitamin A rich food and promotion of consumption of these food. In other countries food, such as margarine, sugar and rice are fortified with vitamin A and this serves as a long term solution to the problem.

Periodic Massive Dosing with vitamin A, 200, 000 IU, can be carried out in communities which are at risk of vitamin A deficiency before/or in combination with other long term measures.

Vitamin A supplementation has immediate impact on the child's vitamin A status and/or morbidity and mortality rate of a community.

Some of the prevention and control measures are given here:

9.1 VITAMIN A SUPPLEMENTATION

Capsules containing a large dose of vitamin A (200,000 IU) provide a quick temporary solution to vitamin A deficiency. Three different schedules are applicable depending on vitamin A and health status of individuals:

- * Prevention Schedule (see Table 1), for all:
 - children under six years of age
 - children in emergency situations
 - lactating mothers in the first month after delivery.

- * Disease Targeted Schedule (see Table 2), for all children presenting at health facilities with:
 - measles
 - marasmus
 - kwashiorkor
 - marasmic kwashiorkor
 - diarrhoea lasting more than one week
 - tuberculosis
 - acute respiratory infection
 - HIV / AIDS

- * Xerophthalmia Treatment Schedule (see Table 3), for all children presenting at health facilities with signs of vitamin A deficiency and xerophthalmia.

Table 1: Prevention Schedule

PREVENTION SCHEDULE

Give vitamin A to all children aged 6 months to 6 years, who present in any health facility, children in emergency situations, lactating mothers in the first month after delivery.

*** CHILDREN AGED 1-6 YEARS:**

- 200 000 IU vitamin A orally twice every year.

*** INFANTS AGED 6 MONTHS TO 1 YEAR AND THOSE BELOW 8 KG:**

- 100 000 IU vitamin A orally once. Give this dose with measles vaccine at 9 months.

*** MOTHERS IMMEDIATELY AFTER DELIVERY:**

- 200 000 IU vitamin A orally. Do not give vitamin A capsules to mothers later than one month after delivery.
-

Note:

- * Do not give vitamin A to children who are less than 6 months old.
- * For children who cannot swallow a capsule, cut the capsule and squeeze liquid into the child's mouth.
- * For infants aged 6 months to 1 year use half the total number of drops in one capsule.
- * Record doses of vitamin A in the vertical age columns in the child's growth chart.
- * Do not give vitamin A to mothers later than one month after delivery. (The mother might be pregnant).
- * Record doses of vitamin A in the mother's post natal record and health passport.

Table 2: Disease Targeted Schedule

DISEASE TARGETED SCHEDULE

Give vitamin A to pre-school children presenting at health facilities with measles, marasmus, kwashiorkor, marasmic kwashiorkor, diarrhoea lasting seven days or longer, tuberculosis, acute respiratory infection and HIV / AIDS.

*** CHILDREN AGE 1-6 YEARS:**

- 200 000 IU vitamin A orally at time of FIRST CONTACT with health worker.
- Repeat dose the following day.

*** INFANTS AGE 6 MONTHS TO 1 YEAR AND ALL WHO WEIGH LESS THAN 8 KG:**

- 100 000 IU vitamin A orally at time of FIRST CONTACT with health worker.
- Repeat dose the following day.

Note:

- * Do not give vitamin A to children less than 6 months old.
- * Do not give vitamin A to children who have already received a dose of vitamin A supplement within the preceding three months.
- * For children who cannot swallow a capsule cut it and squeeze liquid into the child's mouth.
- * For infants aged 6 months to 1 year, use half the total number of drops in one capsule.
- * Record doses of vitamin A in the vertical age columns in the child's growth chart.

Table 3: Xerophthalmia Treatment Schedule

XEROPHTHALMIA TREATMENT SCHEDULE

Give vitamin A for all stages of active xerophthalmia, night blindness, Bitot's spots, conjunctiva xerosis, corneal ulceration.

**Corneal eye involvement is an emergency.
Act fast to save sight.**

*** CHILDREN ONE YEAR OF AGE AND OLDER:**

Immediately on diagnosis	200 000 IU vitamin A orally.
The following day	200 000 IU vitamin A orally.
4 weeks later	200 000 IU vitamin A orally.

*** CHILDREN UNDER ONE YEAR OLD AND
CHILDREN OF ANY AGE WHO WEIGH LESS
THAN 8 KG**

Immediately on diagnosis	100 000 IU vitamin A orally.
The following day	100 000 IU vitamin A orally.
4 weeks later	100 000 IU vitamin A orally.

*** WOMEN OF REPRODUCTIVE AGE WHO HAVE
XEROPHTHALMIA SIGNS**

- 10,000 IU vitamin A orally per day for 14 days.

Note:

- * The first dose should be given immediately once xerophthalmia is diagnosed.
- * The second dose should be given to the mother to administer at home.
- * The third dose should not be given to the mother to administer, rather the child should be brought back.
- * For children who cannot swallow a capsule, cut it and squeeze liquid into the child's mouth.
- * For infants aged 6 months to 1 year use half the total number of drops in one capsule.
- * Women of reproductive age are given lower dosages of vitamin A.
- * Record doses of vitamin A in the vertical age column in the child's growth chart.

IMPORTANT OPERATIONAL FACTORS ABOUT VITAMIN A SUPPLEMENTATION

Several factors must be born in mind for efficient delivery of the service. The success of vitamin A supplementation depends on the coverage of the target groups which are:

- all children aged 6 months to 6 years.
- all children showing signs of xerophthalmia.
- women in child bearing age showing signs of xerophthalmia.
- children with diarrhoea lasting 7 days or more.
- children with acute respiratory infection.
- children with malnutrition.
- children with tuberculosis.
- children with measles.
- children with HIV / AIDS.

Factors that improve coverage are:

(a) Timely Procurement and Distribution

The coverage will depend on the availability of vitamin A at the peripheral level. Therefore procurement and distribution must be efficient.

- * Health facilities should calculate their requirements based on the categories of target groups and required dosages for each group and these must be sent to the central medical stores at the beginning of each financial year.

* The important element is the size of the population which require vitamin A supplementation. For instance:

- age of children.
- conditions to be treated in the catchment area.
- total number of women in the reproductive age who may be deficient.
- total number of children in the age group of 6 months to 6 years.
- the estimated number with active xerophthalmia.

(b) Efficient Delivery System

* The vitamin A capsules should be made available within the Primary Health Care delivery system and all health facilities such as:

- outreach services
- clinics
- health centres and
- hospitals.

* It should also be available within specific services such as:

- Programme for Prevention of Blindness.
- Expanded Programme for Immunization (EPI). As the coverage of immunization is increasing in Namibia, this opportunity should be used to screen for vitamin A deficiency and deliver vitamin A capsules. At the time when the measles vaccine is being given, (at 9 months of age) the first dose of vitamin A should also be given.

- The Growth Monitoring and Promotion Programme particularly at the community level, should be utilized for vitamin A supplementation.
- The Control of Diarrhoeal Diseases Programmes are a good opportunity for administration of vitamin A to all children with acute and prolonged diarrhoea.
- National AIDS Control Programme.
- Paediatric wards in hospital or health centre.
- Nursery schools for children under 5 years of age.

(c) Administration of Vitamin A

* Preparation

The vitamin A that is currently available in Namibia is prepared in the form of capsules coated in gelatine. Each capsule contains 200 000 IU of vitamin A (or 110 mg retinol palmitate). Vitamin E is added to it to enhance the absorption and increase the stability of vitamin A.

* Stability of Vitamin A capsules

The biological activity and chemical stability of vitamin A is affected by sunlight.

**STORE CAPSULES AT ROOM TEMPERATURE
IN CLOSED DARK CONTAINERS TO PRESERVE
VITAMIN A.**

- Stored in this way vitamin A will be stable for up to 3 years.
- Once opened, the capsule should be used within 4 - 6 months.

* Dosages

The dosages for the different target groups have been shown in Tables 1, 2 and 3. These dosages should be followed.

* Recording

It is important to record all dosages in a person's health passport, mother's card or a child's growth card as indicated in Figure 1.

* Safety

Vitamin A supplementation is safe and very effective provided:

- the correct dosage is given
- the dosage is recorded on the person's health passport to avoid duplication.

There may be minor side effects such as headaches or vomiting, which last for a short period.

**VITAMIN A SHOULD NOT BE USED IN
PREGNANCY AND FOR WOMEN IN CHILD
BEARING AGE EXCEPT AS INDICATED.**

* Training

- The medical staff must be able to diagnose and treat xerophthalmia.
- They should be able to train health workers, community health workers and community extension officers on:
 - diagnosis of vitamin A deficiency.
 - prevention of vitamin A deficiency.
 - control of vitamin A deficiency.
 - treatment of vitamin A deficiency.

* Monitoring and Evaluation

This is important because it enables the health workers to know whether vitamin A capsules are effectively delivered and if so, to whom and where. This will:

- reduce problems of supply and delivery
- reduce problems of duplication of dosages
- ensure safety and coverage

Evaluation should mostly emphasize the coverage rates of target populations for vitamin A supplementation.

Impact in terms of reduction of xerophthalmia cases can also be obtained if there is good recording.

IMPORTANT FACTS ABOUT VITAMIN A

- * Breastmilk is the major source of vitamin A, especially colostrum. Other sources are green leafy and yellow vegetables and fruits, dairy and meat products.
- * Vitamin A is not destroyed by normal cooking process, but it is destroyed by sunlight. Therefore sun dried vegetables and meat have little vitamin A, however, they may be good sources of other nutrients.
- * Vitamin A may have severe effects on pregnant women. It is therefore recommended that all women of child bearing age should be given a lower dose of vitamin A, e.g. 100 000 IU, which has been found to be safe.
- * The toxic effects associated with excessive intake of vitamin A can be divided into three categories.

i. Acute:

An overdose of vitamin A can cause headache, nausea and vomiting, bulging fontanelle in children, increased intracranial pressure, dry skin and generalized peeling of the skin.

ii. Chronic:

Prolonged daily intake of vitamin A can result in toxic effects such as headache, dry skin, and bone pains and fragility.

iii. Toxicity in pregnancy:

Pregnant mothers should not be given vitamin A because it might affect the foetus. When ingested in large amounts in early pregnancy, vitamin A can cause spontaneous abortion and birth defects such as deformities of the cranium, face, heart, thymus, kidney and cerebral nervous system.

9.2 NUTRITION EDUCATION TO THE COMMUNITY

Nutrition education is important for:

- * increasing awareness on vitamin A deficiency.
- * enabling communities to identify vitamin A rich food.
- * increasing the production and consumption of vitamin A rich food.
- * promoting breastfeeding and correct introduction of solid food to children.
- * promoting other child survival measures such as prevention of diseases and prevention of protein energy malnutrition.
- * promoting immunization and oral rehydration therapy.

EXAMPLES OF SHORT MESSAGES ON NUTRITION EDUCATION

- * A vitamin A deficient child cannot see in the dark.
- * A vitamin A deficient child has dry eyes.
- * Check your child's eyes regularly and report to a health worker any of the signs of vitamin A deficiency.
- * Vitamin A deficiency can make your child blind.
- * A capsule of vitamin A saves your child's sight.
- * Good sources of vitamin A are breastmilk, green leafy vegetables and orange and yellow fruits.

- * Breastfeed your child exclusively for 6 months and continue complemented breastfeeding up to two years and beyond.
- * Grow green leafy vegetables and orange/yellow fruit in your garden.
- * Eat green leafy vegetables and yellow and orange fruit daily.
- * Liver, milk, butter, fish and fish oils are the best sources of vitamin A. Eat these foods whenever possible.
- * Immunise your children against diseases.
- * Monitor your children's growth to detect early malnutrition.
- * Feed your children at least 5 times a day.
- * Keep your children's food, utensils and surroundings clean to prevent infection.
- * Take a child with measles to a Health worker.

9.3 GARDENING

Growing vegetables and fruits, and consuming them is a good preventive measure against vitamin A deficiency. Health workers should encourage households to develop one square metre garden plots to grow green leafy vegetables that can grow easily in particular communities.

Involve agricultural extension workers, community development officers, community leaders, water experts and other members of the community so that they may assist with development of household and clinic gardens.

HOW TO DEVELOP ONE SQUARE METRE GARDENS AT HOUSEHOLD LEVELS.

a. Planning a garden and the kind of crops to grow.

Before cropping plan can be decided upon, the following points must be considered:

- The area of land available.
- Soil type and depth.
- Features such as permanent windbreaks and unavoidable shades. No vegetable will produce satisfactorily if subjected to heavy shade for several hours a day, or to moderate shade throughout the day. Light is also important for plant growth.
- Presence of perennial weeds.
- Presence of persistent diseases and plant nematodes.
- The experience of the grower.
- The likes and dislikes of the family.

b. Land

The size of the area available for vegetables has a considerable bearing upon the type of vegetable it will be most profitable to grow.

- A small garden 1m long and 1m wide, can give vegetables all year round if you look after it well.
- The grower should concentrate on the closely spaced crops such as beans, carrots, beets and turnips.

- A 1m² garden can accommodate several rows of carrots, beans or beets and only 2-3 rows of vegetables such as cauliflowers or tomatoes, which require much more room to develop satisfactorily.

c. Preparation

- Choose a flat place with the best soil (loamy), e.g. an old kraal.
- Clear it of trees, stumps, stones and grass roots.
- Measure an area 1m long and 1m wide and dig it out knee-high (one spade deep) and place in weeds, leaves, compost or manure and cover with garden soil.
- Prepare it into a fine seedbed.
- Fence it off.
- Sow your seeds directly or make use of transplanting, where seedlings are available.
- Water it evenly.
- Mulch, thin and control weeds and diseases as appropriate.
- Harvest.
- Next planting time, rotate crops.

9.4 FORTIFIED FOOD

Certain food such as margarine are already fortified with vitamin A. Health workers should encourage people to purchase those food whenever possible.

10. CONCLUSION

After reading this book, health workers will know that vitamin A deficiency and xerophthalmia can be prevented.

They will know and understand the importance of Vitamin A in the body, the causes and consequences of its deficiency, people at risk, the major food sources and be able to recognize vitamin A deficiency.

Health workers will also be able to emphasize the need for vitamin A supplementation and nutrition education, assist communities with gardening and encourage the use of fortified food.

The guidelines therefore, were prepared to guide health workers in the prevention, treatment and control of vitamin A deficiency and xerophthalmia.

These guidelines call for action and requires the commitment and support of all from the Community, District, Regional and National levels.

This is but one action of the Government to establish effective durable programmes for achieving our objective to overcome hunger and micronutrient malnutrition.