

Midwifery Level- III

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Acronyms

AIDS	Acquired Immune deficiency Syndrome
BMI	Body Mass Index
ENA	Essential Nutrition Action
FMOH	Federal Ministry of Health
HC	Head circumference
HIV	Human Immune Vires
MAM	Moderate Acute Malnutrition
MUAC	Mid Upper arm circumference
NNP	National Nutrition Program
NNS	National Nutrition Strategy
OTP	Outpatient Therapeutic Program
PEM	Protein Energy malnutrition
RUTF	Ready to Use Food
SAM	Sever Acute Malnutrition
SC	Stabilization Center
TFC	Therapeutic Feeding Center
WFL/H	Weight for Length/Height
WHA	World health assembly
WHO	World Health organization

Introduction to The module

This Module enables to identify the basic nutrition elements as well as to perform nutritional assessment using different methods. Types, classifications, management and prevention of nutritional deficiencies among mothers and children will be discussed broadly in this module. In general this module describes knowledge, skills and attitude required to assess, screen, identify,

Module units

- Nutritional assessment for related health issues
- Basic nutrition information/ education to the clients
- Management of clients with nutritional problems

Learning objectives of the Module

At the end of this session, the students will able to:

- Conduct nutritional assessment and identify nutritional related problems according to national nutritional assessment protocol of the Federal Ministry of Health (FMOH).
- Identify nutritional eligible community members and calculate number of expected group for nutritional problem from the catchment using standard statistical method.
- Identify basic educational materials and conduct practical nutrition education
- Identify and manage common nutritional problems (nutritional deficiency disease).
- Explain about essential nutritional action.
- Identify and manage low risk (under weight and stunted and high risk conditions (severe malnutrition)
- Discuss about emergency management of nutritional problems in outpatient therapeutic program (OTP), therapeutic feeding center (TFC) and stabilization center (SC).

Unit one: Nutritional assessment for related health issues

This learning unit is developed to provide the trainees the necessary information regarding the following content coverage and topics:

- Introduction to nutrition
 - ✓ Definition of terms(Food , Diet, Nutrition, Nutrients, Macro & Micro nutrients)
 - ✓ Basic nutritional elements (Macro & Micro nutrients)
- Nutritional assessment and screening.
- Nutritional related problems
- Nutrition indicators
- Nutritional interventional plan

This unit will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Definition of terms
- Identify basic nutritional elements (Macro and Micro nutrients)
- Conduct nutritional assessment and screening according to the national protocol
- Identify nutritional problems
- Identify nutrition indicators
- Calculate expected target group for nutritional problem from the catchment
- Develop appropriate interventional plan

1.1. Introduction to nutrition

1.1.1. Definition of terms

Food: is what we eat and drink to help keep us alive and well, to help us grow, develop, work and play. Food is anything edible. It includes all foods and drinks acceptable for that particular society, culture or religion. Food gives us a feeling of comfort and satisfaction. Eating certain foods establishes our identity. What we eat and how we eat makes up our food habit. Most of our food habits are learned in the home from our parents. As we grow up, our experience and learning help us to change some of these food habits.

Diet: is the sequence and balance of meals in a day. It is concerned with the eating patterns of individuals or a group. Some people may eat twice in a day (breakfast and dinner); others may eat four times (breakfast, lunch, snack and dinner); still others may seem to be chewing all day long.

Nutrition: is the interaction between food and the body. It is about the **nutrients** contained in food, and their action, interaction and balance in relation to health and disease. It is the process by which people can ingest, digest, absorb, transport, utilize and excrete food substances. In addition, nutrition is concerned with social, cultural and physiological implications of food and eating. In general, the science of nutrition is the science of showing how food nourishes the body.

Nutrient: is an active chemical component in food that plays a specific structural or functional role in the body's activity. Sugars, starches and fiber are often grouped together as they are all carbohydrates. Vitamins and minerals are needed in very small amounts and they are called micronutrients. Almost all foods are a mixture of nutrients. They contain different amounts of sugar, starch, fiber, fat, protein, minerals, vitamins and water.

Macro nutrient: 'Macro' means large; as their name suggests these are nutrients which people need to eat regularly and in a fairly large amount. They include carbohydrates, fats, proteins, fiber and water. These substances are needed for the supply of energy and growth, for metabolism and other body functions. Macronutrients provide a lot of calories but the amount

of calories provided varies, depending on the food source. For example, each gram of carbohydrate or protein provides four calories, while fat provides nine calories for each gram.

Micronutrients: As their name indicates (‘micro’ means small) micronutrients are substances which people need in their diet in only small amounts. These include minerals and vitamins (glow foods). Glow foods (vitamins and minerals) help the body fight infection and keep the eyes, skin and bones healthy and strong. Vitamins and minerals are known as micronutrients because they are very small. Fruits and vegetables are high in vitamins and minerals. It is important for pregnant women to eat as many different fruits and vegetables as they can.

1.1.2. Basic Nutritional Elements

Based on the amount of the nutrients that each person needs to consume on a daily basis, these nutrients are categorized into two groups. These are macronutrients, which should be consumed in fairly large amounts, and micronutrients, which are only required in small amounts.

Although most foods are mixtures of nutrients, many of them contain a lot of one nutrient and a little of the other nutrients. Foods are often grouped according to the nutrient that they contain in abundance.

Foods that contain a lot of protein are called body-building foods or growing foods. Foods that contain a lot of fat or carbohydrates and perhaps only a little protein are called energy-giving foods. Foods in which the most important nutrients are vitamins or minerals are called protective foods.

If people are to stay healthy they must eat a mixed diet of different foods which contain the right amount of nutrients.

A. Macronutrients

I. Carbohydrates

Carbohydrates are referred to as energy-giving foods. They provide energy in the form of calories that the body needs to be able to work, and to support other functions.

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Carbohydrates are needed in large amounts by the body. Indeed, up to 65% of our energy comes from carbohydrates. They are the body's main source of fuel because they are easily converted into energy. This energy is usually in the form of glucose, which all tissues and cells in our bodies readily use.

For the brain, kidneys, central nervous system and muscles to function properly, they need carbohydrates. These carbohydrates are usually stored in the muscles and the liver, where they are later used for energy.

The main sources of carbohydrates are bread, wheat, potatoes of all kinds, maize, rice, cassava, pasta, macaroni, banana, sweets, sugar cane, sweet fruits, and honey. Other foods like vegetables, beans, nuts and seeds contain carbohydrates, but in lesser amounts.

Classification of carbohydrates

Based on the number of **sugar units**, carbohydrates are classified into three groups; these are monosaccharaides, disaccharides and polysaccharides.

Monosaccharaides and disaccharides are referred to as simple sugars or simple carbohydrates that our body can easily utilize. Examples include sugar, honey, sweet fruits and sugar cane. Polysaccharides are called complex carbohydrates and they need to be broken down into simple sugars to be used by our body. Examples include starch and cellulose.



Figure 1.1. Foods rich in Carbohydrates

II. Proteins

About 10–35% of calories should come from protein. Proteins are needed in our diets for growth (especially important for children, teens and pregnant women) and to improve immune

functions. They also play an important role in making essential hormones and enzymes, in tissue repair, preserving lean muscle mass, and supplying energy in times when carbohydrates are not available.

Pregnant women need protein to build their bodies and that of the babies and placentas, to make extra blood and for fat storage. Breastfeeding mothers need protein to make breast milk.

Sources of protein

The main sources of proteins are meats, chicken, eggs, breast milk, beans, ground nuts, lentils, fish, cheese and milk. All animal foods contain more protein than plants and are therefore usually better sources of body building foods. However, even though plant proteins



Figure 1.2. Food rich in protein

III. Fats and oils

Fats and oils are concentrated sources of energy and so are important nutrients for young children who need a lot of energy-rich food. Fats can also make meals more tasty and satisfying. Fat is found in meat, chicken, milk products, butters, creams, avocado, cooking oils and fats, cheese, fish and ground nuts.

Classification of fats

Fats are classified into saturated and unsaturated fats. Saturated fats are not good for a person's health. Saturated fats are usually solid at cool temperatures. Eating too much saturated fat is not good for a person's health, as it can cause heart and blood vessel problems. Examples include fats from animal sources like butter, meat fats and oils from animal sources.

Unsaturated fats are usually liquid at room temperature. These types of fats are healthy fats. Examples include fats from fish, oil seeds (sesame and sunflower), maize oil and ground nut oil and breast milk.

As a general rule, plant sources of fats are better for a person's health than the animal sources, because animal fats contain more saturated fats.



Figure 1.3. Food rich in fats and oils

IV. Water

Almost every part of the body contains large amounts of water. 62% of human body is built from water. People can live without solid food for a few weeks, but we cannot live without water for more than a few days. An adult needs about 2–3 litres of water each day.

Water is essential for life. We need water for a number of reasons:

- ✓ For the body to make cells and fluids such as tears, digestive juices and breast milk
- ✓ For the body to make sweat for cooling itself
- ✓ For essential body processes — most take place in water
- ✓ For keeping the lining of the mouth, intestine, eyelids and lungs wet and healthy
- ✓ For the production of urine, which carries waste from the body?

V. Fiber

Fiber is a mixture of different carbohydrates which are not digested like other nutrients but pass through the gut nearly unchanged. Foods rich in fiber are 'kocho'; vegetables like cabbage, 'kosta', carrots, cassava; fruits like banana and avocado; peas and beans; whole-grain cereals like wheat flour and refined maize or sorghum.

Including fiber in the diet

Fiber should be included in the diet for the following reasons:

1. Fiber makes food bulky or bigger — this can help a person who is overweight to eat less food
2. Fiber makes the feces soft and bulky; this can help prevent constipation
3. Fiber slows the absorption of nutrients, so it helps nutrients to enter the blood stream slowly. This is important for patients with diabetes mellitus.



Figure 1.4. rich in fiber

B. Micronutrients

As their name indicates ('micro' means small) micronutrients are substances which people need in their diet in only small amounts. These include minerals and vitamins (glow foods). Glow foods (vitamins and minerals) help the body fight infection and keep the eyes, skin and bones healthy and strong. Vitamins and minerals are known as micronutrients because they are very small. Fruits and vegetables are high in vitamins and minerals. It is important for pregnant women to eat as many different fruits and vegetables as they can.

I. Vitamins

Vitamins are groups of related substances present in small amounts in foodstuffs and are necessary for the body to function normally. Vitamins are also called protective foods. They are grouped together because, as their name implies, they are a vital factor in the diet.

Classifications of vitamins

Vitamins are classified into two groups:

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Fat soluble vitamins (vitamins A, D, E and K) are soluble in fats and fat

solvents. They are insoluble in water. So these are utilized only if there is enough fat in the body.

Water soluble vitamins (vitamins B and C, and folic acid) are soluble in water and so they cannot be stored in the body.

The best sources of micronutrients in our diets are fruits and vegetables. These two food groups contain essential vitamins and minerals. Animal sources of foods are also both good sources of micronutrients. However, an adequate micronutrient intake can only be achieved through sufficient intake of a balanced diet that includes plenty of fruits and vegetables. Table sets out the functions of some of the important vitamins and examples of sources of food for each of these.

Table 1.1. Sets out the functions of some of the important vitamins and examples of sources of food for each of these.

Vitamins	Function	Food sources
Vitamin A	Night vision, Healing epithelial cells and Normal development of teeth and bones Note: Epithelial cells form the thin layer of tissue lining the gut, respiratory and genitourinary systems.	Breast milk, tomatoes, cabbage, lettuce, pumpkins Mangoes, papaya, carrots Liver, kidney, egg yolk, milk, butter, cheese cream
Vitamin B complex	Metabolism of carbohydrates, proteins and fats	Milk, egg yolk, liver, kidney, heart, Whole grain cereals, meat, whole bread, fish, bananas
Vitamin C	Prevention of scurvy, Aiding wound healing and Assisting absorption of iron	Fresh fruits (oranges, banana, mango, grapefruits, lemons, potatoes) and vegetables (cabbage, carrots, pepper, tomatoes) and Breast milk.
Vitamin D	Needed for absorption of calcium from small intestines and Calcification of the skeleton	Ultra violet light from the sun, Eggs, butter, fish, Fortified oils, fats and cereals
Vitamin K	For blood clotting	Green leafy vegetables, Fruits, cereals, meat, dairy products

II. Minerals

Minerals are the substances that people need to ensure the health and correct working of their soft tissues, fluids and their skeleton. Examples of minerals include calcium, iron, iodine, fluorine, phosphorus, potassium, zinc, selenium, and sodium. Table outlines the functions of some of these important minerals and examples of sources of food for each of these.

Table 1.2. Outlines the functions of some of these important minerals and examples of sources of food for each of these.

Mineral	Function	Food sources
Calcium	Gives bones and teeth rigidity and Strength	Milk, cheese and dairy products Foods fortified with calcium, e.g. flour, cereals. eggs, fish cabbage
Iron	Formation of hemoglobin	Meat and meat products Eggs, bread, green leafy vegetables, pulses, fruits
Iodine	For normal metabolism of cells	Iodized salt, sea vegetables, yogurt, cow's milk, eggs, and cheese Fish; plants grown in iodine rich soil
Zink	For children to grow and develop normally; for wound healing	Maize, fish, breast milk, meat, Beans
Fluorine	Helps to keep teeth strong	Water

1.2. Nutritional assessment and screening.

Nutritional assessment is the interpretation of anthropometric, biochemical (laboratory), clinical and dietary data to determine whether a person or groups of people are well nourished or malnourished (over nourished or under-nourished).

Nutritional assessment are more comprehensive than nutritional screens and generally completed by a registered dietitian.

Nutritional screening is defined as a process to identify an individual who is malnourished or who is at risk of malnutrition to determine if a detailed nutrition assessment is indicated.

Nutrition screening is the first step in identifying patients who are at risk for nutrition problems or who have undetected malnutrition. It allows for prevention of nutrition-related problems when risks are identified and when problems are confirmed. Early detection and early intervention are not only cost effective but result in improved health and quality of life.

Nutritional assessment can be done using the ABCD methods. These refer to the following:

- **A=Anthropometry**
- **B=Biochemical/biophysical methods**
- **C=Clinical methods**
- **D=Dietary methods.**

1.2.1. Anthropometric measurements

Used to assess growth in children by using several different measurements including length, height, weight and head circumference.

A. Length

A wooden measuring board (also called sliding board) is used for measuring the length of children under two years old to the nearest millimeter. Measuring the child lying down always gives readings greater than the child's actual height by 1-2 cm.



Figure 1.5. Measuring the length of children

B. Height

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This is measured with the child or adult in a standing position (usually children who are two years old or more). The head should be in the Frankfurt position (a position where the line passing from the external ear hole to the lower eye lid is parallel to the floor) during measurement, and the shoulders, buttocks and the heels should touch the vertical stand. Either a stadiometer or a portable anthropometer can be used for measuring. Measurements are recorded to the nearest millimeter.



Figure 1.6. Measuring the height of the children

C. Weight

A weighing sling (spring balance), also called the 'Salter Scale' is used for measuring the weight of children under two years old, to the nearest 0.1 kg. In adults and children over two years a beam balance is used and the measurement is also to the nearest 0.1 kg. In both cases a digital electronic scale can be used if you have one available. Do not forget to re-adjust the scale to zero before each weighing. You also need to check whether your scale is measuring correctly by weighing an object of known weight.



Figure 1.7. Measuring weight of children

Sometimes you will have to improvise. For example in the field set up, it is difficult to measure very young children who cannot sit by themselves using the weighing pant attached to the scale. In addition, some children panic during the measurement and urinate, making the pant dirty. Therefore, mothers or caregivers may not be happy to let their children be measured in such a manner. The weighing scale with the pant can be improvised by using a plastic washing-basin which is attached to the Salter Scale and adjusting the reading to zero. You need to ensure the basin is as close to the ground as possible in case the child falls out, and to make the child feel secure during weighing. If the basin is dirty, then you need to clean it with a disinfectant. This is a much more comfortable and reassuring weighing method for the child and you can use it for ill children much more easily than the approaches described above.



Figure I.8. Measuring weight of a children using salter scale

D. Head circumference

The head circumference (HC) is the measurement of the head along the supra orbital ridge (forehead) anteriorly and occipital prominence (the prominent area on the back part of the head) posteriorly. It is measured to the nearest millimeter using flexible, non-stretchable measuring tape around 0.6cm wide. HC is useful in assessing chronic nutritional problems in children under two years old as the brain grows faster during the first two years of life. But after two years the growth of the brain is more sluggish and HC is not useful. In Ethiopia, HC is measured at birth for all newborn babies.



Figure I.9. Measuring HC of a children

Converting measurements to indices

An index is a combination of two measurements or one measurement plus the person's age. The following are a few indices that you may find useful in your work:

Weight-for-age is an index used in growth monitoring for assessing children who may be underweight. It is used to assess children under two years old.

Height-for age is an index used for assessing **stunting** (chronic malnutrition in children). Stunted children have low height for age, poor physical and intellectual performance and lower work output leading to lower productivity at individual level and poor socioeconomic development at the community level. Stunting of children in a given population indicates the fact

that the children have suffered from chronic malnutrition so much so that it has affected their linear growth.

Weight-for-height is an index used for assessing wasting (acute malnutrition).

Wasting is defined as a low weight for the height of the child compared to the standard child of the same height. Wasted children are vulnerable to infection and stand a greater chance of dying.



Figure 1.10. Shows picture of children who has been stunted and wasted respectively from left to right

Body mass index is the weight of a child or adult in kg divided by their height in meters squared: $\text{Weight (kg)} / (\text{Height in meters})^2$

Here is how to calculate each index for children.

$$\text{Weight for age} = \frac{\text{Weight of the child}}{\text{Weight of the reference child of the same age}} \times 100$$

$$\text{Weight for height} = \frac{\text{Weight of the child}}{\text{Weight of the reference child of the same age}} \times 100$$

Fig 1.11. Calculation of weight for age and weight for height

An indicator is an index (for example, a scale showing weight for age, or weight for height) combined with specific cut-off values that help you determine whether a child is underweight or

malnourished; for example, a child whose weight for age, or weight for height, falls below the cut-off values is considered to be underweight or malnourished.

You will be able to use anthropometric indicators to assess nutritional status, to evaluate the effects of interventions, to admit children to an intervention (treatment) programme and to discharge them from a programme. These indicators are therefore very important and knowing how to use them will help you plan effective nutrition interventions. Table summarizes the indices (column 1), cut-off values (column 2) and the nutritional problem that the cut-off values indicate (column 3).

Table 1.3. Summarizes the indices (column 1), cut-off values (column 2) and the nutritional problem that the cut-off values indicate (column 3).

Index	Cut-off value based on standard deviation (SD)	What it indicates
Weight-for-age	Less than 2 and more than 3	Moderate underweight
Weight-for-age	Less than 3	Severe underweight
Weight-for height	Less than 2 and more than 3	Moderate acute malnutrition (MAM)
Weight-for height	Less than 3 and/or bilateral pitting oedema	Severe wasting or severe acute malnutrition (SAM)

1.2.2. Biochemical/biophysical methods

In assessing body composition (fat content) the body is considered to be made up of two compartments: the fat mass and the fat free mass. Therefore different measurements are used to assess these two compartments.

I. Measurements of fat-mass (fatness)

As you read earlier Body Mass Index (BMI) is the weight of a person in kilograms divided by their height in meters squared. A non-pregnant adult is considered to have a normal BMI when it falls between 18.5 and 25 kg/m².

Table 1.4. Classification of malnutrition based on body mass index

BMI(Kg/m ²) cut-offs	Nutritional status
more than 40.0	Very obese
30.0-40.0	Obese
25-29.9	Overweight
18.5-24.9	Normal
17-18.49	Mild chronic energy deficiency
16-16.9	Moderate chronic energy deficiency
less than 16.0	Severe chronic energy deficiency

If an adult person has a BMI of less than 16 kg/m² they will not be able to do much physical work because they will have poor energy stores. In addition they will be at increased risk of infection due to impaired immunity.

Risk of mortality and morbidity is related to the nutritional status as assessed by the BMI. If people are too fat or too thin their health suffers. The risk of mortality and morbidity increases with a decrease in the BMI. Similarly, when the BMI increases to over 25 kg/m², the risk of mortality and morbidity increases.

II. Measuring fat-free mass (muscle mass)

An accurate way to measure fat-free mass is to measure the **Mid Upper Arm Circumference (MUAC)**. The MUAC is the circumference of the upper arm at the midway between the shoulder tip and the elbow tip on the left arm. A low reading indicates a loss of muscle mass.

MUAC is a good screening tool in determining the risk of mortality among children, and people living with HIV/AIDS. MUAC is the only anthropometric measure for assessing nutritional status among pregnant women. It is also very simple for use in screening a large number of people, especially during community level screening for community-based nutrition interventions or during emergency situations.

MUAC is therefore used as a screening tool for community based nutrition programmes such as an outpatient therapeutic programme (OTP), for community-based interventions, supplementary feeding programmes and enhanced outreach programmes throughout Ethiopia.

MUAC is also used for screening target children and pregnant women for severe acute malnutrition (SAM) and moderate acute malnutrition (MAM).

A special tape is used for measuring the MUAC of a child. The tape has three colours, with the red indicating severe acute malnutrition, the yellow indicating moderate acute malnutrition and the green indicating normal nutritional status.

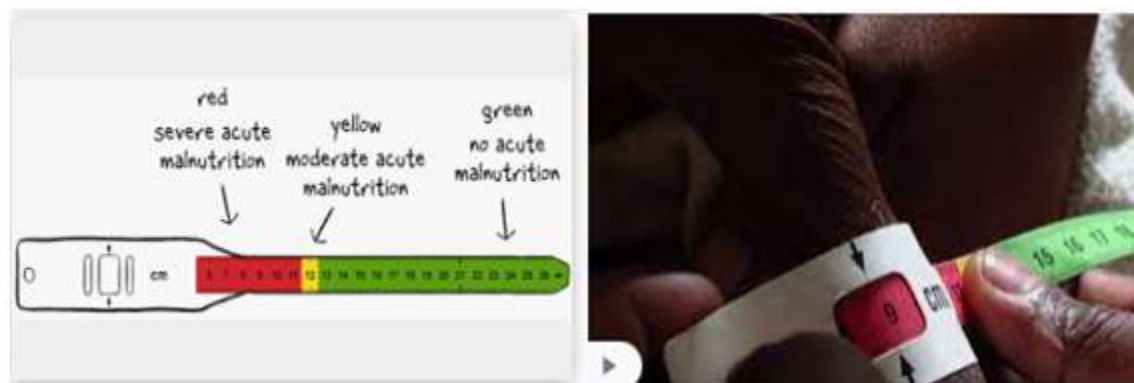


Figure 1.12. MUAC measuring tool and measuring MUAC from left right

Table 1.5. Cut-off points for screening in the community for SAM and MAM using MUAC

Target Groups	MUAC (in cm)	Malnutrition
Children under five	11-11.9	Moderate acute malnutrition (MAM)
	< 11 cm	Severe acute malnutrition (SAM)
Pregnant women/adults	17-21 cm	Moderate malnutrition
	18-21 cm with recent weight loss	
	< 17	Severe malnutrition
	< 18 cm with recent weight loss	

1.2.3. Clinical methods of assessing nutritional status

Clinical methods of assessing nutritional status involve checking signs of deficiency at specific places on the body or asking the patient whether they have any symptoms that might suggest nutrient deficiency from the patient. Clinical signs of nutrient deficiency include: **pallor** (on the palm of the hand or the conjunctiva of the eye), **Bitot's spots** on the eyes, pitting oedema, goiter and severe visible wasting.

I. Checking for bilateral pitting oedema in a child

In order to determine the presence of oedema, you should apply normal thumb pressure on both feet for three seconds. If a shallow print persists on both feet, then the child has nutritional oedema (pitting oedema).



Figure I.13. Checking edema

Grades of oedema

Depending on the presence of oedema on the different levels of the body it is graded as follows. An increase in grades indicates an increase in the severity of oedema.

- 0 = no oedema
- + = below the ankle (pitting pedal oedema)
- ++ = Pitting oedema below the knee
- +++ = Generalized oedema.

II. Bitot's spots

These are a sign of vitamin A deficiency and have a creamy colour and appear on the white of the eye.



Figure I.14. Bitot's spot

III. Goiter

Goitre is a swelling on the neck and is the only visible sign of iodine deficiency.



Figure I.14. Goiter

IV. Visible severe wasting

In order to determine the presence of visible severe wasting for children younger than six months, you will need to ask the mother to remove all of the child's clothing so you can look at the arms, thighs and buttocks for loss of muscle bulk. Sagging skin and buttocks indicates visible severe wasting.



Figure 1.15. Visible sever wasting

1.2.4. Dietary methods of assessing nutritional status

Dietary methods of assessment include looking at past or current intakes of nutrients from food by individuals or a group to determine their nutritional status. You can ask what the family or the mother and the child have eaten over the past 24 hours and use this data to calculate the dietary diversity score.

1.3. Nutritional related problems

Types of malnutrition

Malnutrition is a general term that includes many conditions, including under nutrition, over nutrition and micronutrient deficiency diseases (like vitamin A deficiency, iron deficiency anemia, iodine deficiency disorders and scurvy).

Based on the cause of malnutrition, there are two types of malnutrition these are:

1. Protein-energy malnutrition
2. Micronutrient malnutrition or deficiency.

1.3.1. Protein-energy malnutrition

Protein-energy malnutrition, as its name implies, is lack of adequate protein and/or calories in the body. This can be acute or chronic.

Chronic protein-energy malnutrition is manifested by stunting, which means short height or length for age. Stunting occurs as a result of lack of food, or an illness which has been there for a long period of time (also known as marasmus). **Stunting, or shortness**, is an indicator of chronic (long-term) malnutrition. It's often associated with poor development during childhood and is one of the harmful effects of poverty. Stunting is commonly used as an indicator for development, as it is highly related with poverty.

Acute protein-energy malnutrition is the term used to cover both moderate and severe wasting and nutritional oedema, which is swelling of parts of the body due to fluid building up in the tissues (also known as kwashiorkor). Acute protein-energy malnutrition occurs as a result of a recent lack of nutrients or illness. **Wasting, or thinness**, is an indicator of acute (short-term) malnutrition. Wasting is usually the result of recent food insecurity, infection or acute illness such as diarrhea. Measurement of wasting or thinness is often used to assess the severity of an emergency situation, with severe wasting being highly linked with the death of a child.

Underweight is an indicator of both acute and chronic malnutrition. Underweight is a highly useful indicator when examining nutritional trends. According to the Ethiopian Demographic Health survey (EDHS) 2016 38% of children under age 5 are stunted (short for their age); 10% are wasted (thin for their height); 24% are underweight (thin for their age), and 1% are

overweight (heavy for their height). Malnutrition is also very high amongst women. 22% of women age 15-49 are thin 15-49 are thin (with BMI less than 18.5), while 8% are overweight or obese. (Ethiopian Demographic Health Survey of 2016).

1.3.2. Micronutrient malnutrition or deficiency

A child whose diet lacks the recommended amounts of essential vitamins and minerals can develop micronutrient malnutrition. The child may not be eating enough of the recommended amounts of specific vitamins (such as vitamin A) or minerals (such as iron). The most common types of micronutrient deficiencies are:

- Vitamin A deficiency
- Iodine deficiency
- Iron deficiency and
- Vitamin A deficiency

1.4. Nutrition indicators

1.4.1. Nutrition indicators

Priority list of recommended nutrition eligible indicators with their definitions includes

- Prevalence of stunting (low height-for-age) in children under 5 years of age:**
Proportion of children with Height-for-Age < -2 standard deviations of the WHO child growth standards median. 38 % under 5 age children in Ethiopia are stunted 2016 DHS
- Prevalence of wasting (low weight-for-height) in children under 5 years of age:** Proportion of children with Weight-for-Height < -2 standard deviations of the WHO child growth standards median. 10% of under 5 age children in Ethiopia are wasted EDH 2016.
- Percentage of infants less than 6 months of age who are exclusively breast fed:** Proportion of infants aged 0- 6 months who are fed exclusively on breast milk. Only 58% of infants under age 6 months are exclusively breastfed in Ethiopia DHS 2016.
- Percentage of women of reproductive age (15-49 years of age) with anaemia**
Proportion of:
 - Non-pregnant women, age 15-49 years: haemoglobin < 12 g/dL.

- Pregnant women: haemoglobin < 11 g/dL.
- 24% of women in Ethiopia are age 15-49 are anaemic DHS 2016.

e. Prevalence of overweight (high weight-for-height) in children under 5 years of age: Proportion of children with Weight-for-Height -2 standard deviations of the WHO child growth standards median. 1% of under 5 age children in Ethiopia are overweight DHS 2016.

f. Percentage of infants born with low birth weight (< 2,500 grams): Proportion of infants born with birth weight < 2500 grams. 13% of infants in Ethiopia born with low birth weight < 2500 grams DHS 2016.

1.4.2. Target group for nutritional problem

If you do not have a census or register with the total number of population by population categories in your catchment area, use the following national statistics to determine nutrition targets and indicators.

To Estimate the Prevalence of stunting (low height-for-age) in children under 5 years of age in the catchment area and the Prevalence of wasting (low weight-for-height) in children under 5 years of age your catchment area use the following statistical method.

- Given that total number of population in your catchment area is 10,000
- Prevalence of children under age 5 are stunted (short for their age); is 38% at the national level DHS 2016.
- 14.7% of Ethiopian population is under age 5 DHS 2016.
- To determine total number of under age 5 children in your catchment area;
- Total number of < 5 children = $\frac{\text{total number of population} \times 14.7\%}{100\%} =$
- $\frac{10,000 \times 14.7\%}{100\%}$ 1470 of the total population
- Therefore, the total number of children under age 5 are stunted (short for their age) in your catchment area is determined by the following statistical

method.

- Total number stunted under 5 age = $\frac{\text{total No of } <5 \text{ age children} \times 38\%}{100\%}$
- Considering that Prevalence of children under age 5 are stunted (short for their age); is 38% DHS 2016.

$$= \frac{1470 \times 38\%}{100\%} = 558.6$$

1.5. Nutritional interventional plan

Nutrition intervention is set up to prevent nutritional problems, food shortage and deficiencies in a community. When there is a nutritional problem in a community, if the magnitude and the causes of the problem are known, we will plan to do intervention. Factors to be considered in the planning of intervention are:

- Identify the specific problem
- Decide the necessary intervention
- Plan for the intervention- this includes gathering the necessary resources and manpower.
- Implement the plan or intervention
- Evaluate the effectiveness of the intervention

The methods of nutritional interventions are

- Food fortification
- Food for work
- Price subsidization
- Supplementation
- Family planning
- Integration of nutrition with health
- Price policy
- Primary health care

Mechanisms of nutrition interventions

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There are five principal mechanisms through which all nutrition interventions work.

1. Availability of food at local or regional level, making the required foods more available with respect to place and time. This includes:
 - Food storage
 - Agriculture diversification
 - Food imports
 - Community and home gardens
 - Small livestock production schemes
 - Distribution of specific nutrients
 - Food fortification
2. Making the required foods more accessible and available to the households. This includes:
 - Supplementation of the necessary foods to pre-school, school children and women.
 - Price subsidization
 - Appropriate technology for food preparation and preservation
 - Food for work programme
 - Family planning
 - Integration of nutrition with health services
 - Technical changes in agricultural practices
 - Food stamp programme
 - Price policy programme.
3. Food utilization at household level, making better use of available foods, via food processing like fermentation, preparing weaning food. This includes:
 - Nutrition education (face to face, mass media),
 - Breast feeding promotion

- Food formulation
- 4. Distribution within the household:
 - Intra household distribution of food
 - Supplementation
 - Education
- 5. Physiological utilization
 - Health service activities
 - Primary health care
 - Environmental health

When should we intervene?

Many babies are born malnourished due to poor maternal nutrition before and during pregnancy.

Key Interventions to Improve Maternal Nutrition

Improving Maternal Nutrition

- Ensure access to and consumption of salt fortified with iodine in every household
- Distribute a high dose of vitamin A within six weeks after delivery
- Distribute iron supplements during the last six months of pregnancy
- Delay first pregnancy among teenage girls
- Increase birth intervals
- Increase food intake during pregnancy and lactation
- Increase access to labor saving devices

Rationale for supplements or fortified food products for mothers

- Certain nutrients in breast milk can be affected by maternal diet (vitamin A, thiamin, riboflavin, vitamin B6, vitamin B12, iodine, selenium)
- First choice is improvement of mothers diet, but cost constraints limit options

- Adequate micronutrient intake during lactation can benefit both mother and infant.

Health Sector and Maternal Actions to Improve Maternal Nutrition:

1. Adequate food intake during pregnancy and lactation

Essential Health Sector Actions

- Encourage increased food intake during pregnancy and lactation
- Monitor weight gain in pregnancy
- Counsel on reduced energy expenditure

Maternal Actions

- Eat at least one extra serving of staple food per day during pregnancy and the equivalent of an extra meal per day during lactation
- Gain at least one kilogram per month in the second and third trimesters of pregnancy
- Rest more during pregnancy and lactation

2. Adequate Micronutrient intake during pregnancy and lactation

Essential Health Sector Actions

- Counsel on diet diversification
- Prescribe and make accessible iron/folic acid supplements or multiple micronutrient supplements
- Anti-helminthic after 3rd months of pregnancy
- Assess and treat severe anemia in women
- Distribute vitamin A to postpartum women

Maternal Actions

- Increase daily consumption of fruits and vegetables, animal products, and fortified foods, especially during pregnancy and lactation

- Consume daily supplements (iron/folic acid - 60mg iron + 400mg folic acid or multiple vitamin/mineral supplements) during pregnancy and the first three months postpartum as long as breast feeding.
- If anemic, consume a daily dose of 120mg iron and at least 400mg folic acid for three months
- Consume a high dose (200,000 IU) of vitamin A immediately after delivery or within the first eight weeks after delivery

3. Reduction of malaria infection in pregnant women in endemic areas

Essential Health Sector Actions

- Prescribe and make accessible anti-malarial curative and/or prophylactic drugs for pregnant women (according to local recommendations)
- Treat clinical infections
- Promote use of insecticide treated materials

Maternal Actions

- In the second and third trimesters, take anti-malarial drugs as a curative treatment regardless of symptoms or take weekly anti-malarial prophylaxis starting at first antenatal visit
- Seek treatment for fever during pregnancy; take drugs to treat malaria and reduce fever; take iron/folic acid supplements to treat anemia
- Use insecticide-treated materials, such as bed nets

4. Reduction of hookworm infection in pregnant women in endemic areas

Essential Health Sector Actions

- Counsel on preventive measures (sanitation and foot-wear)
- Prescribe and make accessible anti-helminthic medication after first trimester of pregnancy

Maternal Actions

- Wear shoes and dispose of feces carefully to prevent infection

- Take a single dose of albendazole (400mg) or a single dose of mebendazole (500mg) in the second trimester of pregnancy as a treatment of hookworm. If hookworms are highly endemic (>50 percent prevalence), take an additional dose in the third trimester of pregnancy.

5. Birth spacing of three years or longer

Essential Health Sector Actions

- Promote optimal breastfeeding practices
- Promote family planning as a health and nutrition intervention; counsel on the need for a reproductive period to build energy and micronutrient stores
- Consider breastfeeding status when prescribing contraception

Maternal Action

- Initiate breastfeeding in the first hour after birth, breastfeed exclusively for about six months, and continue breastfeeding for two years or more
- Practice family planning to space births for at least three years; delay pregnancy so that there are at least six months between the period of breastfeeding and the subsequent pregnancy
- Use contraceptives that are recommended when breast feeding
- Use condoms prior to the decision to become pregnant and during pregnancy and lactation if there is a risk of HIV transmission.

Benefits of breastfeeding for the mother

- Breastfeeding is a contraceptive method during the first 6 months after birth if breastfeeding is exclusive and menses have not returned
- Immediately putting the baby to the breast helps to expel the placenta because the baby's sucking stimulates uterine contractions, and thus reduces risks of post-partum hemorrhage
- Initiating breastfeeding soon after birth (within 1 hour) helps to promote breast milk production and lactation

- Immediate and frequent suckling helps to prevent breast engorgement
- Breastfeeding helps to reduce the mother's workload since breast milk is available at anytime and anywhere, is always clean, healthy and available at the right temperature
- Breastfeeding is economical
- Increases nurturing bond between mother and child
- May reduce risks of breast cancer

Self-check-1	Written
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Directions: Answer all the questions listed below.

Test I- write “True” if the statement is correct or “False” if the statement is incorrect

1. One nutrient is more important than the others.
2. The function of Iron to give rigidity and strength of bones and teeth.
3. Head circumference is useful in assessing chronic nutritional problems in children under two years old.
4. A child whose diet lacks the recommended amounts of essential vitamins and minerals can develop micronutrient malnutrition.
5. Chronic protein-energy malnutrition is the term used to cover both moderate and severe wasting and nutritional oedema.

Test II- choose the correct answer among the alternatives for the following multiple chose questions

1. _____ is an active chemical component in food that plays a specific
 - A. Food
 - B. Diet
 - C. Nutrition
 - D. Nutrient
2. Among the following vitamins which is water soluble vitamin?
 - A. Vitamin A
 - B. Vitamin C
 - C. Vitamin D
 - D. Vitamin K
3. _____ is the only anthropometric measure for assessing nutritional status among pregnant women.

- A. Body mass index
 - B. Mid Upper Arm Circumference (MUAC)
 - C. Weight
 - D. Height
4. Bitot's spots are a sign of _____ deficiency.
 - A. Vitamin A
 - B. Iodine
 - C. Vitamin C
 - D. Calcium
 5. Which type of malnutrition is a result of recent food insecurity or illness?
 - A. Wasting (thinness)
 - B. Stunting, or shortness
 - C. Underweight
 - D. Over weight
 6. Which is **NOT** caused by micronutrient deficiency?
 - A. Kwashiorkor
 - B. Iron deficiency anemia (IDA)
 - C. Vitamin A deficiency (VAD), and
 - D. Iodine deficiency disorder (IDD)

Test- III. Write correct and short answer for the following essay item questions

- I. Given the following samples and determine the number of wasted children (low weight-for-height) in Y catchment area use.
 - Total population of Y is 40,000
 - Prevalence of children under 5 wasted (thin for their height); is 10% at the national level DHS 2016.
 - 14.7% of Ethiopian population is under age 5 DHS 2016.
 - Calculate the number of wasted children in Y catchment area

2. List the five principal mechanisms through which all nutrition interventions work.
3. Explain the Health Sector and Maternal Actions to Improve Maternal Nutrition in Africa:
4. Identify benefits of breast feeding for the mother

Operation sheet-1

Operation Title: Assess the mother and child for nutritional problem

Instruction: Read each step carefully and assess, manage and provide health education to the mother and child related to nutritional problem. The scale of the performance is described below;

- 2= step performed completely
- 1= step performed partially
- 0= step does not performed

Purpose:

- To assess nutritional problem of the mother and child
- To manage nutritional problem of the mother and child
- To provide health education to the mother and child related to nutritional problem

Required tools and equipment:

- Vital sign measuring equipment
 - ✓ Thermometer
 - ✓ Blood pressure apparatus
- Watch
- Weight scale
- Height scale
- Tape meter
- Salter scale

Procedures: look in the following table

Step	Activity	Performance		
		2	1	0
Maternal assessment				
1.	Take biographic data (name, age, address, marital states and occupation)			
2.	Ask history of chronic illness			
3.	Ask for nutritional related problem (malaria, hookworm)			

4.	Take vital sign			
5.	Measure weight and height			
6.	Determine body mass index (BMI)			
7.	Measure mead upper arm circumference (MUAC)			
Child assessment				
1.	Take biographic data (name, age, sex)			
2.	Check for birth weight			
3.	Ask for excessive breast feeding			
4.	Take immunization history(fully immunized, defaulted)			
5.	Ask for time of initiation of complementary feeding			
6.	Ask for history of diarrheal disease			
7.	Ask any birth defect			
8.	Measure weight for age			
9.	Measure weight for height			
10.	Measure MUAC			
11.	Observe the characteristic of hair			
12.	Check for angular stomatitis			
13.	Assess for skin fold			
14.	Assess for edema			
15.	Assess for palmar pallor			
16.	Document the finding			
Manage nutritional problems in mothers and children				
Manage maternal nutritional problems				
1.	Treat with iron supplementation			
2.	Advice the mother to take iron rich diet			
3.	Advice on balanced diet			
4.	Deworming			
5.	Appointment and follow ups			
Manage child nutrition problem				
1.	Treat the child in OTP or in TFP based on the finding			
2.	Provide vitamin A supplementation			
3.	Appointment and follow up			
Provide health education to the mother				
1.	Optimal breast feeding			
2.	Complementary feeding			
3.	Food cooking and hygiene			
4.	Birth spacing			

Quality criteria:

- There are 35 steps in this operation sheet
- Each step has a value of 3 points. $35 \times 3 =$ a total of 105 points
 - ✓ A score of 85 and more is competent
 - ✓ A score of 70 up to 85 is satisfactory
 - ✓ A score of below 70 is unsatisfactory

Unit Two: Basic Nutritional Information/ Education to the Clients

This learning unit is developed to provide the trainees the necessary information regarding the following content coverage and topics:

- Nutrition education
- Nutritional educational materials and products
- Nutrition Consulting
- Nutrition monitoring and reporting formats

This unit will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Define nutrition education
- Identify basic education materials and products
- Provide Nutrition Counseling
- Identify nutrition monitoring and reporting formats

2.1. Nutrition education

2.1.1. Definition of terms

Nutrition Education: Is a “A program to promote better health by providing accurate and culturally sensitive nutrition, physical fitness, or health (as it relates to nutrition) information and instruction to participants, caregivers and participants in a group or individual setting overseen by a dietitian or individual of comparable expertise. Nutrition education topics shall be based on the needs of the participants and should be culturally appropriate.

2.1.2. Purpose of nutrition education

Well-formulated and efficiently recognized nutrition education;

- Helps to support the client to make healthy choices at home
- Helps to have information, facts and skillfulness to make healthy food choices in the perspective of their way of life and economic sources.
- An important way of healthy eating, build good life long habits and struggle against the problems of obesity, under-nutrition, over-nutrition, and malnutrition;
- To identifying the problems that are associated with diet and nutrition and the good effects of a healthy well balanced diet.
- Will able to consume children a healthy and a well-balanced diet then they will be able to concentrate upon their studies and learn effectively.

2.1.3. Clients who need nutrition education

May include infants, children, adolescents, mothers, aged people, people with disabilities, people with physical or mental illness.

A. Infants

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Most of the time if an infant do not take exclusive breast feeding for six months and do not start supplementary feeding after 6 months of age it is prone to malnutrition. Optimal feeding of an infant is critical to break the cycle of malnutrition from generation to generation. Breast feeding is recognized as being the most important window of opportunity for establishing healthy growth. Infant and child feeding practices are major determinants of the risk of malnutrition.

B. Children

Need breast milk until they are at least two years old. They need at least three mixed meals and two snacks each day. They cannot eat large bulky meals. It is especially important for the meals to be clean and not to contain parasites or microorganisms that could cause diarrhoea or other infection. Feeding status during children is the determinant for physical, mental and reproductive growth of a person. This age group is where schooling is initiated so that proper nutrition is very important in school. If children do not feed property they will have week academic performance.

C. Adolescents

Adolescents undergo a very rapid growth during their puberty (called the pubertal growth spurt). During the pubertal growth spurt, they increase rapidly both in weight and height. Therefore, they need a nutrient intake that is proportional with their rate of growth.

D. Mothers

Due to pregnancy and child birth mothers have high requirements of energy, protein, essential fatty acids, vitamins and minerals. During pregnancy and after child birth a mother should need one and two extra meals respectively. The health of the mother and the growing fetus is related with the nutrition that the mother takes.

E. Aged people

people at this age group faces possible nutritional issues in old age like problems of procuring and preparing foods, psychosocial problems, digestion problems, nutrient absorption problems

renal changes memory loss (senile dementia), which may include forgetting to eat sensory changes physical problems like weakness, gouty arthritis and painful joints. People at this age group need at least two and if possible more meals each day as they may not eat much at each meal. They need fewer calories than younger people, but about the same amount of protein and other nutrients. Women who have stopped menstruating need less iron than childbearing women. Old people may need soft food.

F. People with disabilities

People who have physical disabilities may face problems of finance to purchase food, preparing foods, psychosocial problems and physical problems like disabilities and weakness. People with physical problem need the same amount and content food as healthy people so attention to people with physical problems is mandatory to increase their productivity and weakness.

G. People with physical or mental illness

During illness people need more nutrition for fast recovery and to fight against the infective agents. Prevent and seek early treatment of infections and manage symptoms through diet is mandatory. Illness affects food intake, digestion, absorption, and utilization, and poor nutrition reduces the ability to fight infection. Some symptoms of illness can be managed through diet. People with mental illness face problems of preparing foods, memory loss (senile dementia), which may include forgetting to eat sensory changes. There for people who have mental illness needs a close family who help them to get adequate nutrition.

2.2. Nutritional educational materials and products

Education materials include all materials that are used as teaching aids to support the communication process and bring desired effects on the audience. These are important aids needed to make easy or facilitate the nutrition education process. And they can be;

- **Leaf lets:** these teaching materials are prepared with a simple language containing both short sentences and illustrations (pictures or simple drawings). Leaflets are more appropriate for those who can read. Some people are too

shy to ask an advice so that they simply pick-up a leaflet and read it.

Leaflets are also important to give instruction how food is prepared. Although, they need educational experience written words have the advantage to be distributed to the audience so that they read and understand them at their convenient times.

- **Food models:** Food models are proven teaching aids made from plastic. Helps clients learn to choose great food and healthy portions.eg food model containing food samples for diabetic patients, grains, vegetables, fruits, dairy and protein. The food model should possess the color of the food for example green color for vegetables.
- **Charts**A chart is made up of a small number of posters that are meant to be shown one after the other. In this way, several steps or aspects of a central topic can be presented such as about balanced diet. When you use the flip chart in nutrition education you must discuss each page completely before you turn to the next and then make sure that everyone understands each message.
- **Posters**A poster is a large sheet of paper with words and pictures or symbols that put across a message. It is widely used by commercial firms for advertising products, but can also be used for nutrition education. Since a poster consists of pictures or symbols and words, it communicates nutrition messages both to literate and illiterate people. They should be posted where many people can see them when passing by - market areas, meeting halls, etc.

Purpose of posters

- ✓ To give information and advice
- ✓ To give directions and instructions (prevention strategies)
- ✓ To announce important events and programs e.g. World children's day

Standard rules in making posters

All words should be in the local language

- ✓ Words should be limited and simple

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- ✓ Symbols that illiterate people will also understand should be used
- ✓ Mix of colors should be used to attract attention
- ✓ Only put one idea on a poster. If you have several ideas, use a chart
- ✓ The poster should encourage practice-action oriented messages
- ✓ It is better to use real-life pictures if possible.

General principles to use posters

- ✓ They should contain the name of the event/problem, date, time, and place
- ✓ They should be large enough to be seen from some distance;
- ✓ They could be used for small or larger groups
- ✓ Should be placed where many people are likely to pass
- ✓ Never use them before pre-testing

2.3. Nutrition Counseling

Nutrition counseling: Is “the provision of individualized advice and guidance to individuals, who are at nutritional risk, because of their health or nutritional history, dietary intake, medication use, or chronic illness, about options and methods for improving nutritional status, performed by a health professional in accordance with state law and policy.”

Nutritional counseling is a two-way interaction through which a client and a trained counselor interpret the results of nutrition assessment, identify individual nutrition needs and goals, discuss ways to meet those goals, and agree on next steps. Nutrition counseling aims to help clients understand important information about their health and focuses on practical actions to address nutrition needs, as well as the benefits of behavior change. Nutrition counselors may be nurses or other facility-based providers or community health workers or volunteers.



Figure 2.1. Conducting effective nutrition counseling

Based on the results of nutrition assessment, health care providers can educate and counsel clients on the importance of nutrition and ways to gain or lose weight, strengthen immunity, manage symptoms of illness and address other identified needs.

What makes counseling effective?

Optimal counseling contributes to successful health and nutrition outcomes. Ideally, counseling should be done in a place where the client feels comfortable and has privacy. This may be more challenging in a busy health facility than in a community setting, but adjustments can be made to improve the situation.

Ethical principles for nutrition counseling

Upholding ethical standards is also essential for effective counseling.

1. **Provide accurate information.** Clients should be able to trust that counselors' words and actions are truthful and reliable.
2. **Keep client information confidential.** Clients need to know that counselors will keep their information confidential except as needed for their treatment or recovery.
3. **Respect clients' autonomy.** Clients have the right to make their own decisions without coercion.

4. **Keep clients' interests in mind.** Advise them based on professional assessment and offer alternatives if you cannot help them.
5. **Do no harm.** Avoid any interventions that could harm or exploit clients emotionally, financially, or medically.
6. **Be fair.** Treat all clients fairly and without discrimination. Respect clients' rights, dignity, and individual difference

The foundation of effective counseling is asking questions about the client's symptoms and situation to be able to give appropriate information and support the client to make healthy choices at home. Just telling people what to do does not mean that they will do it, because knowledge is not enough to change behavior.

Counselors need to know not only what messages are appropriate, but also how to prioritize those messages depending on clients' needs and how to deliver them effectively in a short time. This requires practice and experience. Different mnemonic devices have been developed to help counselors remember the steps in counseling and guide sound technique. These can also be used during training role-plays and supervision and mentoring visits.

Tips for Effective Nutrition Counseling

- Do more listening than talking.
- Ask open-ended questions, not just questions clients can answer with "yes" or "no."
- Repeat what clients say to make sure you understood them correctly.
- Show interest in and empathy for clients' problems and situations.
- Avoid judging clients.
- Listen to what clients think and respect their feelings, even if information may need correction.
- Recognize and praise what clients are doing correctly.
- Suggest actions that are possible for clients given their situations.
- Give only a little bit of information at a time.
- Use simple language.

- Give suggestions, not commands.

GALIDRAA approach to counseling

GALIDRAA has proven effective in many settings and captures the essential elements of effective counseling interactions.

GALIDRAA

- **G**reet the client. Ask him or her to sit down and then exchange introductions to establish a comfortable atmosphere.
- **A**sk the client about his or her situation and current practices using open-ended questions and familiar language.
- **L**isten to what the client and/or caregiver says. Notice body language, use probing questions, and reflect back what the client says to make sure you understand it correctly.
- **I**dentify the client's key problems and help select the most important ones to address.
- **D**iscuss options, considering what is realistic and using visual materials to engage the client and/or caregiver in discussion.
- **R**ecommend and negotiate a small, doable action, explaining the rationale and benefits.
- Ask the client to repeat what he or she understood from the discussion and what action he or she **A**grees to try at home.
- Make a follow-up **A**ppointment and ask the client to repeat the date.

2.4. Nutrition Monitoring and Reporting Formats

Format 2.1. Nutrition monitoring and reporting format

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NUT_U5SMN	Children aged <5 yr screened for acute malnutrition
NUT_U5SMN.1	Total Number of children < 5 yr screened for acute malnutrition
NUT_U5SMN.1.1	Age: 0 - 5 Months
NUT_U5SMN.1.2	Age: 6 - 23 Months
NUT_U5SMN.1.3	Age: 24 - 59 Months
NUT_U5SMN.MAM.1	Number of <5yr children screened and have moderate acute malnutrition
NUT_U5SMN.MAM.1.1	Age: 0 - 5 Months
NUT_U5SMN.MAM.1.2	Age: 6 - 23 Months
NUT_U5SMN.MAM.1.3	Age: 24 - 59 Months
NUT_U5SMN.SAM.1	Number of U5 yr children screened and have severe acute malnutrition
NUT_U5SMN.SAM.1.1	Age: 0 - 5 Months
NUT_U5SMN.SAM.1.2	Age: 6 - 23 Months
NUT_U5SMN.SAM.1.3	Age: 24 - 59 Months
NUT_TX-U5MN_SAM	Admission and treatment outcome for management of severe acute malnutrition in children under 5 yrs for SC
NUT_TX-U5MN_SAM_Beging_SC_1	Total SAM at the beginning of the month
NUT_TX-U5MN_SAM_Beging_SC_1.1	Age: 0 - 5 Months
NUT_TX-U5MN_SAM_Beging_SC_1.2	Age: 6 - 23 Months
NUT_TX-U5MN_SAM_Beging_SC_1.3	Age: 24 - 59 Months
NUT_TX-U5MN_SAM_Adt_SC_2	Total number of children with SAM admitted to SC during the reporting period(new and re-admission)
NUT_TX-U5MN_SAM_Adt_SC_2.1	Age: 0 - 5 Months
NUT_TX-U5MN_SAM_Adt_SC_2.2	Age: 6 - 23 Months
NUT_TX-U5MN_SAM_Adt_SC_2.3	Age: 24 - 59 Months
NUT_TX-U5MN_SAM_Stab_SC_3	Number of children stablized
NUT_TX-U5MN_SAM_Stab_SC_3.1	Age: 0 - 5 Months
NUT_TX-U5MN_SAM_Stab_SC_3.2	Age: 6 - 23 Months
NUT_TX-U5MN_SAM_Stab_SC_3.3	Age: 24 - 59 Months
NUT_TX-U5MN_SAM_Cur_SC_4	Number of children cured
NUT_TX-U5MN_SAM_Cur_SC_4.1	Age: 0 - 5 Months
NUT_TX-U5MN_SAM_Cur_SC_4.2	Age: 6 - 23 Months

NUT_TX-U5MN_SAM_died_SC_5.1	Age: 0 - 5 Months
NUT_TX-U5MN_SAM_died_SC_5.2	Age: 6 - 23 Months
NUT_TX-U5MN_SAM_died_SC_5.3	Age: 24 - 59 Months
NUT_TX-U5MN_SAM_TO_SC_6	Number of children transferred out
NUT_TX-U5MN_SAM_TO_SC_6.1	Age: 0 - 5 Months
NUT_TX-U5MN_SAM_TO_SC_6.2	Age: 6 - 23 Months
NUT_TX-U5MN_SAM_TO_SC_6.3	Age: 24 - 59 Months
NUT_TX-U5MN_SAM_Def_SC_7	Number of children defaulted
NUT_TX-U5MN_SAM_Def_SC_7.1	Age: 0 - 5 Months
NUT_TX-U5MN_SAM_Def_SC_7.2	Age: 6 - 23 Months
NUT_TX-U5MN_SAM_Def_SC_7.3	Age: 24 - 59 Months
NUT_TX-U5MN_SAM_NR_SC_8	Number of children -non-respondent
NUT_TX-U5MN_SAM_NR_SC_8.1	Age: 0 - 5 Months
NUT_TX-U5MN_SAM_NR_SC_8.2	Age: 6 - 23 Months
NUT_TX-U5MN_SAM_NR_SC_8.3	Age: 24 - 59 Months
NUT_TX-U5MN_SAM_MT_SC_11	Number of children Medical transfer
NUT_TX-U5MN_SAM_MT_SC_11.1	Age: 0 - 5 Months
NUT_TX-U5MN_SAM_MT_SC_11.2	Age: 6 - 23 Months
NUT_TX-U5MN_SAM_MT_SC_11.3	Age: 24 - 59 Months
NUT_TX-U5MN_SAM_UK_SC_10	Number of children unknown status
NUT_TX-U5MN_SAM_UK_SC_10.1	Age: 0 - 5 Months
NUT_TX-U5MN_SAM_UK_SC_10.2	Age: 6 - 23 Months
NUT_TX-U5MN_SAM_UK_SC_10.3	Age: 24 - 59 Months
NUT_TX-U5MN_SAM_Ext_SC_9	Number of children who exit from severe acute malnutrition treatment during the reporting period(SC)
NUT_TX-U5MN_SAM_Ext_SC_9.1	Age: 0 - 5 Months
NUT_TX-U5MN_SAM_Ext_SC_9.2	Age: 6 - 23 Months
NUT_TX-U5MN_SAM_Ext_SC_9.3	Age: 24 - 59 Months
NUT_TX-U5MN_SAM_OTP	Admission and treatment outcome for management of severe acute malnutrition in children under 6-59 Months for OTP
NUT_TX-U5MN_SAM_Beging_OTP	Total SAM at the beginning of the month for OTP
NUT_TX-U5MN_SAM_Stab_OTP_1	OTP_Number of children stablized
NUT_TX-U5MN_SAM_cur_OTP_2	OTP_Number of children cured

Self-check-2	Written
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Directions: Answer all the questions listed below.

Part I- write “True” if the statement is correct or “False” if the statement is incorrect

1. Well-formulated and efficiently recognized nutrition education helps to support the client to make healthy choices at home
2. Optimal counseling contributes to successful health and nutrition outcomes.

Part II- choose the correct answer among the alternatives for the following multiple chose questions

1. Which is the target of nutrition education?
 - A. Infant
 - B. Women
 - C. Aged people
 - D. People with disabilities
 - E. All
2. Which client have a problem of procuring and preparing foods, psychosocial problems, digestion problems, nutrient absorption problems renal changes memory loss (senile dementia), which may include forgetting to eat sensory changes physical problems like weakness, gouty arthritis and painful joints.
 - A. Adolescents
 - B. Aged people
 - C. People with disabilities
 - D. People with physical or mental illness

3. _____ are prepared with a simple language containing both short sentences and illustrations (pictures or simple drawings). Leaflets are more appropriate for those who can read.
 - A. Leaf lets
 - B. Food model
 - C. Poster
 - D. Flip charts
4. Which is **NOT** the standard rule in making poster?
 - A. Words should be limited and simple
 - B. Mix of colors should be used to attract attention
 - C. Several ideas can put on a poster
 - D. It is better to use real-life pictures if possible
5. Which are **NOT** the characteristics tips for effective nutrition counseling?
 - A. Do more talking listening than talking
 - B. Avoid judging clients
 - C. Recognize and praise what clients are doing correctly
 - D. Give suggestions, not commands.
6. During nutrition counseling if clients make decisions with coercion, which ethical principle of nutrition counseling is violated?
 - A. Provide accurate information.
 - B. Keep client information confidential.
 - C. Respect clients' autonomy.
 - D. Keep clients' interests in mind.

Part III- write correct and short answer for the following essay item questions

1. Differentiate between nutritional education and nutritional counseling
2. Explain about the principles of effective nutrition counseling

Unit Three: Management of clients with nutritional problems

This learning unit is developed to provide the trainees the necessary information regarding the following content coverage and topics:

- Nutritional problems (nutritional deficiencydisease)
- Essential Nutrition Action (ENA)
- Low risk conditions of nutritional problem
- high risk conditions of nutritional problem
- Emergency conditions of nutrition
 - ✓ Outpatient therapeutic program (OTP)
 - ✓ Therapeutic feeding center (TFC)
 - ✓ Stabilization center (SC)
- Balanced diet

This unit will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Identify and manage common nutritional problems (nutritional deficiency disease)
- Explain essential nutrition action.
- Diagnose and manage children present with low risk and high risk conditions of nutritional problem
- Discuss about emergency condition of nutrition
- Prepare balanced diet

3.1. Nutritional problems (nutritional deficiency disease)

3.1.1. Protein Energy Malnutrition(PEM)

PEM is a clinical syndrome mainly due to deficiency of macronutrients (protein and energy) and micronutrients. PEM is frequently observed in children between 6 months and 5 years of age. Marasmus peaks in the first year and Kwashiorkor between 1 and 3 years of age. Stunting is most common between 2.5 and 3 years of age. PEM is more common during the weaning period and the rainy season.

The causes are classified as the follows:

1. **Immediate causes:** inadequate dietary intake (lack of food) and disease.
2. **Underlying causes:** insufficient food available to families (household food insecurity), inadequate care of women and children, insufficient health care, and an unhealthy environment.
3. **Basic causes:** inadequacies in educational, political, and economic systems and problems with the availability and control of resources.eg. war and drought

Protein and calorie deficiency

Marasmus is due to both calorie and protein deficiency, predominantly calorie. Kwashiorkor is due to more marked protein deficiency than calorie which leads to edema.

Classification of PEM

I. In infants < 6 months

- Has three classifications; these are

1. Severe acute malnutrition

- ✓ Weight for length < -3Z score, OR
- ✓ Oedema of both feet

2. Moderate acute malnutrition

- ✓ Weight for length \geq -3Z to < -2Z score, AND
- ✓ No oedema of both feet

3. No acute malnutrition

- ✓ Weight for length \geq -2Z score AND

- ✓ No oedema of both feet

II. In children 6-59 months

- Has four classifications; these are

1. Complicated severe acute malnutrition

- ✓ WFL/H < -3Z or MUAC < 11.5 cm or
- ✓ Oedema of both feet (+, ++), AND:
 - Medical complications, or
 - Failed Appetite test
- ✓ +++ Oedema OR
- ✓ Severe wasting with oedema
- ✓ Weight for length/height (WFL/H < -3Z with oedema or
- ✓ MUAC < 11.5 cm with oedema

2. Uncomplicated severe acute malnutrition

- ✓ WFL/H < -3Z or
- ✓ MUAC < 11.5 cm or
- ✓ oedema of both feet (+, ++) AND
 - No medical complication, and
 - Pass appetite test

3. Moderate acute malnutrition

- ✓ WFL/H ≥ -3Z to < -2Z or
- ✓ MUAC 11.5 cm to < 12.5 cm AND
- ✓ No oedema of both feet

4. No acute malnutrition

- ✓ WFL/H ≥ -2Z or
- ✓ MUAC ≥ 12.5 cm AND
- ✓ No oedema of both feet



Figure 3.1. Marasmus and Kwashiorkor from left to right

3.1.2. Anthropometric criteria for classifications of PEM

When the nutritional status of a child deteriorates in a relatively short period of time, the child can be said to have acute malnutrition. Weight-for-height, MUAC and oedema are used to decide if someone is acutely malnourished or not. Oedema in children almost always signifies the presence of severe acute malnutrition. However, when using MUAC and weight-for height you need to use 'cut-offs' in order to determine whether a child has complicated severe acute malnutrition or severe acute malnutrition or moderate acute malnutrition or no acute malnutrition.

The presence of one criterion is sufficient to categorize a patient as malnourished. If there is any one indicator from the severe acute malnutrition column, then the child or adult is classified as severely malnourished. If there is no indicator in the severe column, and there is at least one indicator in the moderate acute malnutrition column, then the child or adult is classified as moderately malnourished.

CHECK FOR ACUTE MALNUTRITION, IN INFANTS < 6 MONTHS

LOOK AND FEEL

If child is < 6 months old:

- Look for pitting edema of sacrum and both feet
- Measure weight, length and determine Weight For Length (WFL)

SIGNS	CLASSIFY AS	
<ul style="list-style-type: none"> WFL < -3Z score, OR Oedema of both feet 	SEVERE ACUTE MALNUTRITION	► If ► If • • • •
<ul style="list-style-type: none"> WFL ≥ -3Z to < -2Z score, AND No oedema of both feet 	MODERATE ACUTE MALNUTRITION	► As fer ► As ► Fo ► Fo
<ul style="list-style-type: none"> WFL ≥ -2Z score AND No oedema of both feet 	NO ACUTE MALNUTRITION	► As fer ► Fo ► If

Figure 3.2. Assess and classing format of acute malnutrition for infant < 6 months age

CHECK FOR ACUTE MALNUTRITION, IN CHILDREN 6 - 59 MONTHS			
For children aged 6 months up to 5 years:			
LOOK AND FEEL: <ul style="list-style-type: none"> Look for pitting oedema of both feet (+, ++, +++)^a Measure and determine WFL/H Z-score (< -3, -3 to -2, ≥ -2), or Measure MUAC^b (<11.5cm, 11.5 to 12.5cm, ≥ 12.5cm) <p>If child has</p> <ul style="list-style-type: none"> + /+++ oedema, or WFL/H <-3Z or MUAC <11.5 cm; AND No severe wasting with oedema^c <p>- Look for any medical complications listed below:</p> <ul style="list-style-type: none"> Any General Danger Sign Any severe classification Pneumonia^d Dehydration Persistent diarrhea Dysentery Measles (now or with eye/mouth complications) Fever ≥ 38.5°C Low body temperature (<35°C axillary) Dermatosis +++^e Vitamin A deficiency eye signs <p>If child has</p> <ul style="list-style-type: none"> + /+++ oedema, or WFL/H <-3Z or MUAC <11.5 cm; AND No severe wasting with oedema^b, AND No medical complication Do Appetite test (Passed, Failed) <p>a. Oedema grading: bilateral oedema below ankles (+); below the knees & the elbows (++); generalized oedema involving the upper arms & face (+++).</p> <p>b. If you determine WFL/H, MUAC is not required. Don't do both at same time.</p> <p>c. Child with WFL/H <-3 Z plus oedema, or with MUAC <11.5cm plus oedema.</p> <p>d. Diagnosis of dehydration in SAM is mainly by using patient's history rather than on patient's examination alone.</p>	SIGNS	CLASSIFY AS	
	<ul style="list-style-type: none"> WFL/H < -3Z or MUAC <11.5 cm or Oedema of both feet (+, ++), AND: <ul style="list-style-type: none"> Medical complications, or Failed Appetite test +++ Oedema OR Severe wasting with oedema (WFL/H < -3Z with oedema or MUAC <11.5 cm with oedema) 	COMPLICATED SEVERE ACUTE MALNUTRITION	<ul style="list-style-type: none"> Admit to hospital Refer urgently Give 1st dose Treat the complications Advise the mother to keep the child warm Advise the mother to continue feeding
	<ul style="list-style-type: none"> WFL/H < -3Z or MUAC <11.5 cm or oedema of both feet (+, ++) AND No medical complication, and Pass appetite test 	UNCOMPLICATED SEVERE ACUTE MALNUTRITION	<ul style="list-style-type: none"> If OTP is available, start standard treatment Give R Give or Counsel Advise Assess Follow-up If no OTP If there is patient
	<ul style="list-style-type: none"> WFL/H ≥ -3Z to < -2Z or MUAC 11.5 cm to <12.5 cm AND No oedema of both feet 	MODERATE ACUTE MALNUTRITION	<ul style="list-style-type: none"> Admit or follow up Assess for according to Assess for If feeding Follow up
	<ul style="list-style-type: none"> WFL/H ≥ -2Z or MUAC ≥ 12.5 cm AND No oedema of both feet 	NO ACUTE MALNUTRITION	<ul style="list-style-type: none"> Assess for Follow up If no feeding

Figure 3.3. Assess and classing format of acute malnutrition for infant 6-59 months age

Table 3.1. shows the criteria (indicators) you need to use to decide the level of acute malnutrition in adults

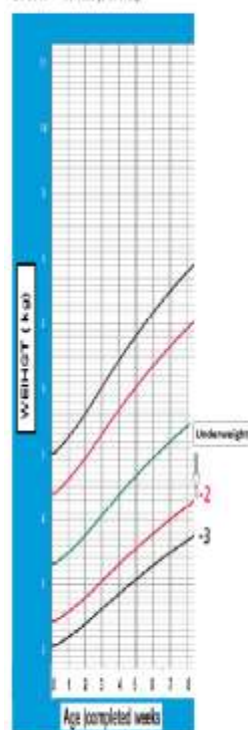
Indicator	Sever acute malnutrition	Moderate acute malnutrition	No acute malnutrition
Adults (older than 18 years)			
BMI	Less than 16	Between 16-16.99	18.5-24.99
Oedema	Present	Absent	Absent
MUAC (cm)	Less than 17 cm or Less than 18 with recent weight loss or chronic illness	17-21 cm or 18-21 cm depending on presence of recent weight loss or chronic illness	No weight loss

As indicated in the table, there are different indicators for severe acute malnutrition and moderate acute malnutrition depending on whether you are measuring an adult or a child. If you look in the column 'severe acute malnutrition' (SAM) you will see that if a child's weight/height measurement is less than 70% of the normal range for his age (which can also be written as $<70\%$), then the child has an indicator of SAM. Another criterion is when the child's MUAC is less than 11 cm (written as <11 cm).

The presence of one criterion is sufficient to categorize a patient as malnourished. If there is any one indicator from the severe acute malnutrition column, then the child or adult is classified as severely malnourished. If there is no indicator in the severe column, and there is at least one indicator in the moderate acute malnutrition column, then the child or adult is classified as moderately malnourished.

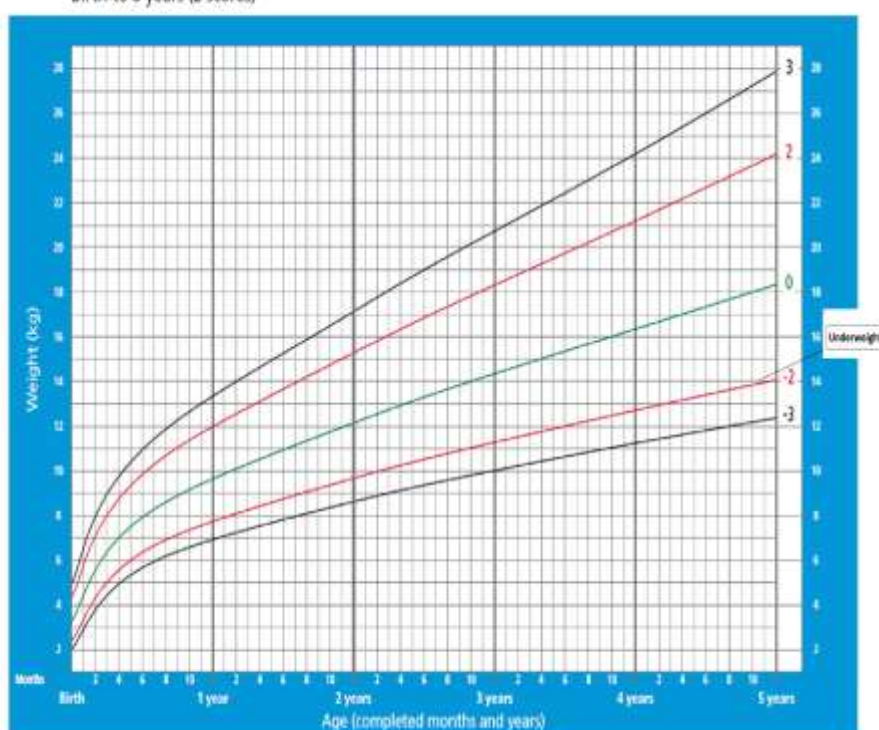
Weight-for-age BOYS

Birth to 2 months (z-scores)



Weight-for-age BOYS

Birth to 5 years (z-scores)



World Health Organization

WHO Child Growth Standards

Figure 3.3. Growth monitoring chart using weight for age for boys



Figure 3.4. Growth monitoring chart using weight for age for girls

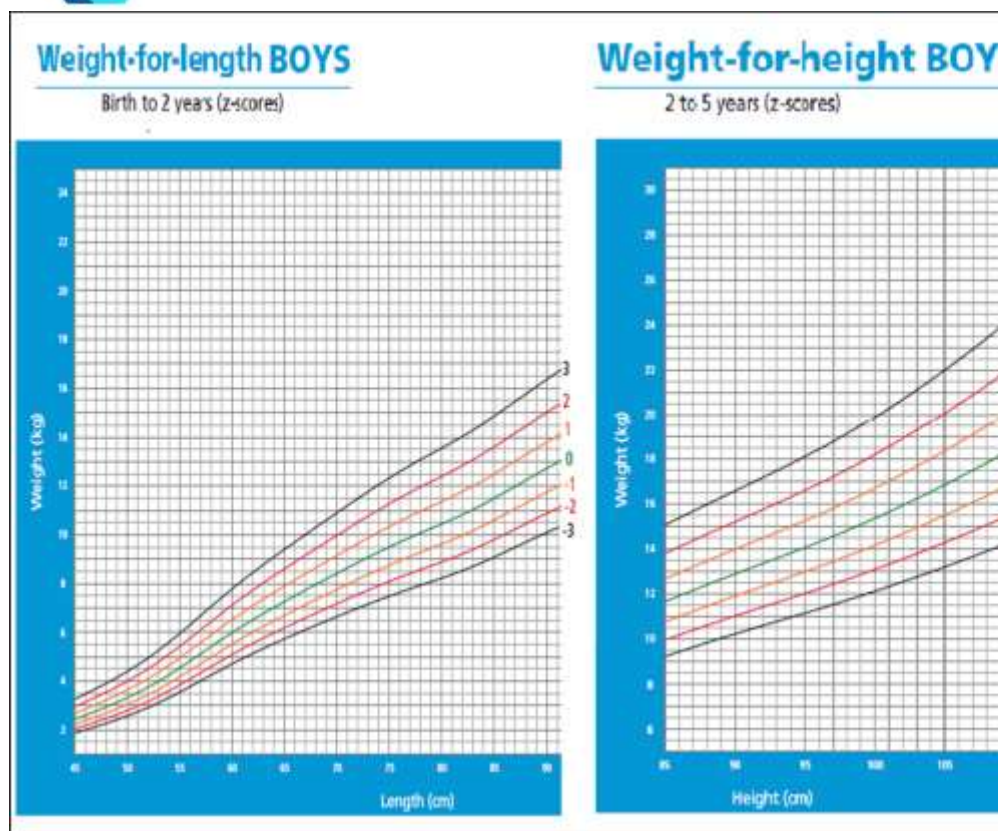


Figure 3.5. Growth monitoring chart using weight for height for boys



Figure 3.6. Growth monitoring chart using weight for height for girls

Treatment of PEM

All children less than 6 months of age with severe acute malnutrition and 6- 59 months of age with complicated severe acute malnutrition should be referred to hospital for therapeutic feeding programme (TFP) or stabilization center (SC) using F75, F100 and ready to use feeding (RUTF).

3.1.3. Vitamin A deficiency

Untreated Clinical vitamin A deficiency can lead to childhood blindness and it is likely that vitamin A deficiency is one of the major contributing factors to the high under-five mortality rate of Ethiopia 67/1000 EDHS 2016.

Rationale for action against vitamin A deficiency

Action against vitamin A deficiency is important, because improving a child's vitamin A status:

- Increases their chance of survival
- Reduces the severity of the childhood illness
- Prevents night blindness/blindness and may reduce birth defects

- Is very cost-effective.

Causes of vitamin A

Vitamin A deficiency (VAD) results when body stores are used up either because too little vitamin A is present in the foods, or there is insufficient absorption of vitamin A from foods. For example, if a diet is lacking in oils or fats, vitamin A is not well absorbed and utilized. VAD can also result from rapid utilization of vitamin A during illnesses (particularly measles, diarrhea and fevers), pregnancy and lactation, and during phases of rapid growth in young children. If the vitamin A status in the body is very low:

- The immune systems become weak and illness is more common and more severe, increasing under-five death rates
- The eye could be damaged with appearance of lesions, and when severe, blindness can occur
- There is an increased risk of a woman dying during pregnancy or during the first three months after delivery.

Population at risk of vitamin A deficiency

- Infants and children under five and pregnant and lactating women

Strategies to control vitamin A deficiency

The main strategies which have been adapted globally to control and eliminate vitamin A deficiency are explained below:

1. **Promote and support exclusive breastfeeding up to six months of age** breast milk protects infants in their first six months against infectious diseases that can deplete vitamin A stores and interfere with vitamin A absorption.
2. **Vitamin A supplementation (VAS)**

Supplementation is a low-cost and highly effective means of improving vitamin A status, and the quickest intervention that can be implemented on a national scale.

- Vitamin A capsules given twice yearly at six months intervals to children 6 to 59 months is protective, and sufficient for a child's requirement

- Vitamin A capsules given to postpartum mothers within 45 days after delivery increases the amount of the vitamin A in the breast milk and therefore the infant's intake of vitamin A.
- Dietary approaches are also important and include:
 - ✓ Fortification which is the process of adding vitamin A to foods commonly consumed by vulnerable population. It is an effective and sustainable strategy to combat vitamin A deficiency

Doses and schedules for vitamin A supplements

Vitamin A supplementation should be given to those at risk using the amounts given in the table below.

Table 3.2. Dos and schedule of vitamin A supplimentation

Age	Dose	Frequency
Children 6-11 months	100,000 IU (one capsule of 100,000 IU)	Once
Children 12-59 months	200,000 IU (two capsules of 100,000 IU)	Once every four to six months
Postpartum women	200,000 IU (three capsules of 100,000 IU)	Within 45 days of delivery

Do not give a vitamin A capsule if the child has already received a dose within the last month.

Do not give A large dose of vitamin A supplements to pregnant women it may cause teratogenicity effect on the fetus.

Dietary diversification and modification for Vitamin A

Encourage family members to grow and consume vitamin A rich foods at all times. Examples of food sources rich in vitamin A are;

Animal sources of Vitamin A

- The best food sources are animal foods such as egg yolks, organ meats such as liver, whole milk and milk products, fish and butter.

- The best source of vitamin A for infants is breast milk. The mother's secretion of vitamin A into breast milk is related to her own vitamin A status.

Plant Sources of Vitamin A

- The best plant sources of vitamin A are dark orange or dark yellow fruits and vegetables such as papayas, mangos, pumpkins, carrots and yellow or orange sweet potatoes, and dark green vegetables such as spinach and kale



Figure 3.7. Food items rich in Vitamin A

3.1.4. Iodine Deficiency

Globally, 30% of the world's population is affected with iodine deficiency disorder (IDD). In Ethiopia, one out of every 1000 people is affected and about 50,000 prenatal deaths occur yearly due to iodine deficiency disorder. Goiter is caused by iodine deficiency due to marked decrease in the amount of iodized salt being consumed in households. Babies born from mothers with IDD suffer from some degree of learning disability.

Causes of iodine deficiency

Iodine is found naturally in topsoil, but in most areas Ethiopia and especially the highlands, top soil has been lost due to deforestation, erosion and flooding, and thus food crops lack iodine resulting in dietary iodine deficiency.

Rationale for action against iodine deficiency

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- Universal salt iodization (USI) can lead to an increase of the average intelligence of the entire school age population by as much as 13 points
- Salt iodization will improve the physical and mental development of millions of people
- The intellectual and cognitive development of whole generations of Ethiopian children will be reduced by around 10% unless adequate iodine is provided.

Population at risk of iodine deficiency.

- People of all ages and sexes are vulnerable
- More at risk are the fetus, young children, pregnant women, and lactating mothers

Strategies to control iodine deficiency

The main strategies to control and eliminate iodine deficiency are the following:

- Universal iodization of salt for human and animal consumption

Iodine deficiency disorder can be eliminated by the daily consumption of iodized salt which is both a preventive and corrective measure for iodine deficiency and the most effective, low-cost, long-term solution to a major public health problem. The daily requirement of iodine for adults is 150 micrograms.

- Supplementation of iodine capsules to populations in areas where iodine deficiency is very common

As a short-term strategy in highly endemic areas, iodized oil capsules should be distributed on a one-time basis to individuals.

3.1.5. Iron Deficiency

Anemia is a widespread health problem affecting more than two billion people worldwide — one third of the world's population. More than half (57%) of Ethiopian children age 6-59 months and 24 % of Ethiopian women aged 15-49 are anemic (mainly due to low blood iron status). The consequences of anemia are multiple. Iron deficiency can delay muscular and nervous system development and mental performance, especially in preschool age children. In adults, anemia reduces work capacity, mental performance and reduces tolerance to infections. Iron deficiency anemia can also cause increased maternal mortality due to bleeding problems. Maternal anaemia can lead to prenatal infant loss, low birth weight, and pre-term births.

Rationale for action against iron deficiency anemia

Control of anemia will:

- Decrease maternal mortality
- Decrease premature birth, inter-uterine retardation and low birth weight
- Decrease infant mortality (due to low birth weight)
- Increase capacity to learn
- Increase productivity in all individuals.

Causes of iron deficiency

Anemia has multiple causes. Its direct causes can be broadly categorized as poor, insufficient or abnormal red blood cell production, excessive red blood cell destruction, and excessive red blood cell loss. Contributing causes include poor nutrition related to dietary intake and dietary quality (iron deficiency in particular), infectious and parasitic diseases; inadequate sanitation and health behaviors; lack of access to health services; and poverty. The two major direct causes of anemia, with excessive red cell destruction, are malaria and worm infections.

Population at risk of iron deficiencies.

- Low birth weight infants
- Children aged six-24 months
- Adolescent girls
- Pregnant and lactating women
- Children between six and 11 years of age
- People living with HIV and AIDS

Strategies to control iron deficiency

The main strategies are the following:

- Supplementation of iron and folic acid for pregnant and lactating women

Table 3.3. Sets out the correct dosage and duration for iron and folic acid for pregnant and lactating women.

Iron-folic acid doses	Duration
-----------------------	----------

Iron: 60 mg/day Folic acid: 400 mcg/day	<ul style="list-style-type: none"> Six months during pregnancy where anemia prevalence is less than 40% Six months during pregnancy and three months postpartum where anemia prevalence is equal to or more than 40%
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- Supplementation for children and adolescents

Many children from six to 24 months of age need more iron than is available in breast milk and common complementary foods. Infants with low birth weight have fewer iron stores, and are thus at a higher risk for deficiency after two months of age. In areas where iron fortified complementary foods are not available for regular consumption, children should routinely receive supplements in the first year of life. In areas where anemia prevalence in young children is 40% or more, delivery of iron supplements should continue through the second year of life, and also be given to adolescent girls. The dos of Iron and Folic acid for children should be 2 mg/kg bodyweight/day

Folic acid: 50 mcg/ day respectively.

Treatment of severe anemia

If anemia is diagnosed by clinical examination (extreme pallor of the palms of the hands) or by laboratory tests at health center, treatment is as set out in the table below.

Table 3.4. Outlines dosage and duration of administration of iron and folic acid for treatment of sever anemia

Group	Iron-folic acid dose	Duration
Children under two years old	Iron: 25 mg/day Folic acid: 100-400 mcg/ day	Three months
Children two-12 years old	Iron: 60 mg/day Folic acid: 400 mcg/day	Three months
Adolescents and adults, including pregnant women	Iron: 120 mg/day Folic acid: 400 mcg/day	Three months

Dietary diversification

Food diversification is an important strategy for prevention of iron deficiency. Populations should be encouraged to produce and consume iron-rich foods at all times. The best source of iron for infants is breast milk.

Animal sources of iron

Animal products (meat, organs and blood) provide the best food sources of dietary iron. If these are available, children six to 24 months of age and pregnant women should have priority to include small amounts in their diet.

Animal products provide iron that is absorbed easily. Animal products are also the only source of vitamin B12, an important micronutrient for preventing anemia.

Plant sources of iron

The best plant sources of iron include dark green leafy vegetables and legumes. Legumes are also excellent sources of folic acid. Consumption of foods which are rich in vitamin A will also prevent anemia. Food processing techniques such as cooking, germinating, fermenting and soaking of grains should be encouraged as they reduce factors that inhibit iron absorption.



Figure 3.8. Foods rich in Iron and Folic acid

Control of malaria and worms

To control non-iron deficiency anemia it is also critical to coordinate action with the malaria control and worms control programmes. Pregnant and lactating women and children should

sleep under insecticide-treated bed nets. Children between one and five years of age should receive de-worming drugs. Children under one year old are not treated, as they are not exposed to infection.

Table 3.5. Recommended drugs for de-worming pre-school children (one to five years).

Drug	Dose for each age group		
	0-1 year	1-2 year	2-5 year
Albendazole	No treatment	½ tablet	1 tablet
Mebendazole 500 mg tablet	No treatment	1 tablet	1 tablet

3.1.6. Vitamin D deficiency (Rickets)

Vitamin D deficiency leads to rickets which is a bone problem associated with disability.

Sources of vitamin D

Vitamin D is a fat soluble vitamin and its two main sources are:

1. Dietary

Fish liver oil -very rich, others eggs, butter, fish, Fortified oils, fats and cereals

2. Sunlight

Causes of Vitamin D Deficiency

Causes of Vitamin D Deficiency include:

- Inadequate exposure to sunlight – the commonest cause in Ethiopia.
- Inadequate dietary intake
- Others: -
 - ✓ Chronic GIT disorders which leads to malabsorption.
 - ✓ Liver and renal disorders
 - ✓ Anticonvulsants (phenytoin, phenobarbitone)

Children at high risk for rickets include:

- Low birth weight, preterms, twins.
- Breast fed and inadequately exposed to sunlight.
- Infants born from mothers with osteomalacia.

Clinical features

The peak age is 6 months to 2 years.

The early signs of vitamin D deficiency include:

- Craniotabes - ping pong feeling on pressing the skull.
- Rachitic rosary- palpable enlargement of costochondral junction.
- Enlarged ends of long bones of arm and legs (wide wrist)

The late/advanced signs signs of vitamin D deficiency include:

- Frontal bossing, pigeon chest, bow legs/knocked knees, hypotonia, caput quadratum (box like head), Harrison's groove, fractures, etc.
- Wide fontanel /delayed closure and delayed teeth eruption.

Diagnosis

Diagnosis is mainly clinical and involves:

- Wrist X-ray – shows decreased bone density and irregular and cuped ends of bones.
- Normal/low serum calcium, low phosphorus, elevated alkaline phosphatase

Complications

Complications include the following:

- Pneumonia – Atelectasis
- Hypokalemic tetanic
- Fracture
- disability

Treatment

There are two forms of treatment:

- Vitamin D3 (cholecalciferol) is the best treatment
 - ✓ Dose - 600,000, i.m stat.
 - ✓ Healing occurs after 2-4 wks which can be proved with a wrist X-ray.
- Sunlight exposure is useful if no vitamin D3 is available.

3.2. Essential Nutrition Action(ENA)

3.1.7. Introduction

ENA is affordable and effective interventions to improve the nutritional status of women and children and a framework for program actions to deliver nutrition services. If we use ENA approach to nutrition, estimated decrease of child mortality is 25%. Major emphasis is given to essential nutrition actions (ENA) in all national nutrition-related policies, strategies, programmes and guidelines including the National Nutrition Strategy (NNS), the National Nutrition Programme (NNP) and the National guidelines for control and prevention of micronutrient deficiencies.

3.1.8. The seven essential nutrition actions (ENA) and key messages.

1. Exclusive breastfeeding for 6 months

- Initiate breast feeding within one hour after delivery
- Exclusively breast feeding for the first six months
- The mother breast feeding frequently, day and night
- Mother allows infant to breast feed on demand (as often as the infant wants) every two to three hours (8-12 times per 24 hour)
- Mother breast more frequently (or expresses her milk if the infant cannot breast feed)
- The mother positions and attaches infant correctly at the breast
- The mother offers second breast after infant releases the first
- The mother should eat more than usual (one additional meal)

2. Adequate complementary feeding starting at 6 months with continued breastfeeding for 2 years

- At six months, mother or care giver introduces soft, appropriate foods and continues breast feeding on demand
- The mother or caregiver increases the frequency of feedings and the amount of food, as the child gets older.

- Increase food thickness (density) and variety as the child gets older
- Increase the amount of food as the child gets older
- Good hygiene and safe food preparation
- Active/responsive feeding

3. Appropriate nutrition care of sick and malnourished children

- Breast more frequently (or express her milk if the infant cannot breastfeed)
- **Baby older than six months:** the mother should also offer the baby bland food (even the baby is not hungry) and increase the frequency of feeding

4. Maternal nutrition during pregnancy

- Iron and folic acid supplementation
- Treatment and prevention of malaria
- Increase food intake
- One extra meal each day during pregnancy
- De-worming during the third trimester of pregnancy
- Vitamin A capsule within 45 days of delivery

5. Adequate intake of vitamin A for women and children

- Breast feeding
- Vitamin A supplementation a single dose to lactating mothers within six weeks after delivery
- Consumption of vitamin A rich foods (dark green leafy vegetables, yellow and orange fruits and vegetables)
- Vitamin A supplementation a single dose every six months for all children six to 59 months and when comes with severe acute malnutrition (SAM), measles, acute respiratory infections, diarrhea or vitamin A deficiency

6. Adequate intake of iron for women and children

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- De-worming of children aged two to 59 months every six months and prevent women in the third trimester
- Using bed nets
- Diversifying diet consumption of foods from the six groups according the food guide pyramid
- Cooking in iron pots (the iron from pots will get in to the food and supply the consumer with iron)
- Iron supplementation to pregnant women and children

7. Adequate intake of iodine by all household members

- Consumption of iodized salt by the family

3.1.9. Integrating the seven ENAs into the six health contacts

Mothers and children have six health contacts therefor nutrition behaviour change communication and promoting the seven essential nutrition actions will be an important element within these six health contacts. The six health contacts and the key nutrition action messages you need to communicate at each contact are identified below.

1. Pregnancy

- Consumption of at least one additional meal
- Iron and folic acid supplementation
- Iodized salt consumption by the family
- Optimal/exclusive breast feeding
- Infant feeding options if the mother is HIV positive
- Use of impregnated bed nets
- Deworming in the third trimester
- Tetanus toxoid vaccination
- Regular antenatal visit

2. Delivery

- Safe delivery

- Vitamin A (within six weeks after delivery)
- Iron and folic acid supplementation
- Optimal/exclusive breast feeding
- Use of impregnated bed nets if the area has malaria
- Consumption of at least two additional meals
- Infant feeding options if the mother is HIV positive

3. Postnatal and family planning

- Iron and folic acid
- Family planning
- Consumption at least two additional meals
- Infant feeding options for HIV positive mother
- Vaccination

4. Immunization

- Deworming
- Assessment and treatment of infant's anaemia
- Use of impregnated bed nets if the area has malaria
- Family planning

5. Well child and growth monitoring and promotion

- Monitor growth
- Counsel on infant feeding
- Iodized salt
- Vaccination
- Use of impregnated bed nets if the area has malaria

6. Sick child visit

- Monitor growth
- Treat the child according to integrated maternal and newborn and child hood illness (IMNCI) guidelines.

- Counsel on seek child feeding
- Check immunization is complete
- Vitamin A
- Deworming
- Counsel infant feeding options if the mother is HIV positive

3.1.10. The Critical Nutrition Actions (CAN)

Along the lines of the ENA, nutritionists developed a set of Critical Nutrition Actions (CNA), originally for people living with HIV but later applied to adults with any infectious or chronic disease. The CNA messages (listed next) can be used in nutrition education and individual counseling.

1. **Get weighed regularly and have weight recorded.** Regular weight loss of more than 6 kg in 2 or 3 months indicates poor health or eating habits (or fast progression of HIV to AIDS in people living with HIV). Ideally, clients should be weighed on every visit. Weight should be recorded in clinic records and on cards given to clients to take home.
2. **Eat a variety of foods and increase your intake of nutritious foods.** Many diets are overbalanced in carbohydrates and do not contain enough protein and fruits and vegetables. People with limited resources may not be able to eat three meals and two snacks a day, but they can be counseled to eat locally available and affordable foods from each food group to vary the diet and increase energy consumption.
3. **Drink plenty of boiled or treated water.** Drinking water removes toxins, including those caused by infection or medicines. Drinking unsafe water can cause infections such as diarrhea. All water used to drink, swallow medicines, and prepare juices should be filtered and boiled or treated with a point-of-use water treatment product (e.g., chlorine) in the form of a solution, tablet, or powder. Drinking water should be stored in a clean, covered container with a narrow neck to prevent contamination and poured rather than ladled out.
4. **Avoid habits that can lead to poor nutrition and poor health.** Alcohol interferes with nutrient digestion, absorption, storage, and utilization; limits the effectiveness of

some drugs; and may work synergistically with HIV to promote microbial translocation and immune activation. Smoking interferes with appetite, increases the risk of cancer and respiratory infections, and can reduce T-cell function, accelerating the progression of HIV to AIDS. Junk food, which has little nutritional value, can be harmful to health and is a poor use of limited income. Unsafe sex increases the risk of sexually transmitted infections.

5. **Maintain good hygiene and sanitation.** Food- or water-borne infections affect digestion and absorption of food and remove essential nutrients from the body. Proper hand washing, treatment and safe storage of drinking water, appropriate food hygiene, and sanitary disposal of feces can significantly reduce the transmission of pathogens that cause diarrhea.
6. **Get exercise whenever physically possible.** Regular physical activity—even walking, climbing stairs, or doing household chores—builds and strengthens muscles, increases appetite, helps manage stress, and improves health and alertness.
7. **Prevent and seek early treatment of infections and manage symptoms through diet.** Illness affects food intake, digestion, absorption, and utilization, and poor nutrition reduces the ability to fight infection. Some symptoms of illness can be managed through diet.
8. **Take medicines as prescribed and manage side effects and medicine-food interactions through diet.** Not taking medicines as prescribed may cause resistance. Some traditional medicines can interfere with the effectiveness of other drugs, have side effects, or be ineffective themselves (despite claims).

3.3. Treatment of Low risk conditions of nutritional problem

3.3.1. Treatment of severe uncomplicated malnutrition

A child will be classified as having severe uncomplicated malnutrition in the following cases:

If a child's age is six months or above and the child has;

- WFL/H < -3Z or

- MUAC < 11.5 cm or
- oedema of both feet (+, ++) AND
- No medical complication, and
- Pass appetite test

Assessing appetite

In a child who is ≥ 6 months old, if WFL/H < -3Z or MUAC is < 11.5 cms , or if oedema of both feet (+, ++) and has no medical complications(i.e. general danger sign, severe classification, pneumonia, watery diarrhoea with dehydration, persistent diarrhoea, dysentery, measles, hypothermia (axillary temperature <35.0C) or high fever (> 38.50C), dermatosis +++), **assess appetite**.

How to do the appetite test?

1. The appetite test should be conducted in a separate quiet area.
2. Explain to the care taker the purpose of the appetite test and how it will be carried out.
3. The care taker and the child, where possible, should wash their hands.
4. Verify with the caregiver how long since the child ate or drank before the appetite test to ensure that a failed appetite test is not due to the child just having eaten.
5. The care taker should sit comfortably with the child on her lap and either offers the Ready to Use Therapeutic Food (RUTF) from the packet or put a small amount on her finger and give it to the child.
6. If the child refuses to eat, the caregiver should continue to gently encourage the child to eat. However, the child should not be forced.
7. Provide clean water for the child to drink while eating the RUTF.
8. Observe the child eating the RUTF **for 30 minutes** and decide if the child passes or fails the test.

RUTF Appetite Test Results

If a child aged six months or above has a MUAC less than 11.5 cm or pitting oedema of both feet and has no medical complications, you should assess the child's appetite. An appetite test is not needed when the child has any one of the following:

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Fail: a child that does not take at least the amount of RUTF shown in the following table below should be referred for in-patient care. You should:

- Explain to the caregiver the reasons for recommending in-patient care; decide with the caregiver whether the child will be treated as an in-patient or an out-patient.
- Refer the child to the nearest therapeutic feeding unit (TFU) or hospital.

The appetite test should always be performed carefully. You should always offer treatment as an in-patient for children who fail their appetite tests. If there is any doubt, however, then you should refer the child for in-patient treatment until their appetite returns.

Table 3.6. Appetite test for treatment of sever uncomplicated malnutrition

APPETITE TEST: This is the minimum amount that malnourished children should take to pass the appetite test			
Plumpy'nut®		BP-100®	
Body weight (kg)	Sachet	Body weight (kg)	Bars
<4	$\frac{1}{8}$ – $\frac{1}{4}$	<5	$\frac{1}{4}$ – $\frac{1}{2}$
4 up to 10	$\frac{1}{4}$ – $\frac{1}{2}$	5 up to 10	$\frac{1}{2}$ – $\frac{3}{4}$
10 up to 15	$\frac{1}{2}$ – $\frac{3}{4}$	10 up to 15	$\frac{3}{4}$ –1
>15	$\frac{3}{4}$ –1	>15	1–1 $\frac{1}{2}$

If the child is aged two years or above, you should also give mebendazole or albendazole, preferably at the second out-patient visit which should take place seven days after the first visit. Advise the mother that she should return for a follow-up visit within seven days, so that you can see whether the child has made progress.

The out-patient therapeutic programme (OTP)

An OTP is a programme that provides home-based treatment and rehabilitation for children with severe uncomplicated malnutrition. These children can be admitted directly into an OTP, treated with routine drugs and given ready-to-use therapeutic food (RUTF) to eat at home.

The children attend the OTP every week for a medical check-up, receive additional medical treatments if required and are given a one-week supply of RUTF.

Ready-to-use food (RUTF) is therapeutic food that can be consumed easily by children straight from the packet or pot without any cooking. It is a high-energy, nutrient-dense food. It is easy to use and store. It can be kept in simple packaging for several months without refrigeration. It can be kept for several days even when opened.

BP-100® and Plumpy'nut® are the commonly known RUTF preparations. If you have both products available, you should give children under two years of age either Plumpy'nut, or crush BP-100 and make this into porridge for the child. Children above the age of two years can take the BP-100 biscuit and you may not need to make porridge. The amount of RUTF that should be given to severely malnourished children is based on their weight as indicated in table below.

Table 3.7. Giving RUTF to severely malnourished children is based on their weight

	RUTF (Plumpy Nut)500 Kcal/92 gm sachet)	
Weight of child	Sachets per day	Sachet per week
3.5 to 3.9	1½	11
4.0 to 5.4	2	14
5.5 to 6.9	2½	18
7.0 to 8.4	3	21
8.5 to 9.4	3½	25
9.5 to 10.4	4	28
10.5 to 11.9	4½	32
≥ 12	5	35

Key education messages for care takers of children on OTP

1. RUTF is a food and medicine for malnourished children only. It should not be shared
2. Sick children often do not like to eat. Give small regular meals of RUTF and encourage the child to eat often, every 3-4 hours (up to 8 meals per day)

3. RUTF is the only food these children need to recover during their time in OTP
4. For breast-fed children, always give breast milk before the RUTF and on demand
5. Always offer plenty of clean water to drink while eating RUTF
6. Do not mix RUTF with liquids as this might cause bacterial growth.
7. Use soap for child's hand and face before feeding, if possible
8. Keep food clean and covered
9. Sick children get cold quickly, always keep the child covered and warm
10. With diarrhoea, never stop feeding. Give extra food and clean water (or breast milk)

NB – Check the mothers understanding using appropriate checking questions.

A child with severe uncomplicated malnutrition should also receive routine drugs. These drugs are very important for the child to recover quickly. Table sets out what routine medicines should be given to severely uncomplicated malnourished children and the correct dosage according to their age and previous treatment history.

Table 3.8. Outline administrations of routine drugs

Drug	Treatment
Vitamin A	1 dose at admission for all children except those with oedema or those who received vitamin A in the past six months
Folic acid	1 dose at admission
Amoxicillin	1 dose at admission + give treatment for seven days to take home.
Deworming	1 dose on the second week (second visit)
Measles vaccine (from nine month old)	1 vaccine dose on the fourth week (fourth visit)

The following four tables specifically to vitamin A, folic acid and Amoxicillin and show what dose should be given to severely malnourished children and when.

Table 3.9. Dose of Vitamin A administration to severely malnourished children

Age to months	Vitamin A IU orally
6-11	One blue capsule (100,000 IU)
12 (or 8 kg) and more	Two blue capsules (200,000 IU)

Table 3.10. Dose of folic acid administration to severely malnourished children

When	Amount
At admission	5 mg

Table 3.11. Dose of Amoxicillin administration to severely malnourished children

Weight in age	Dosage twice per day	250 mg capsule/tablet
<5 kg	125 mg	1/2
5-10 kg	250 mg	1
10-20 kg	500 mg	2
20-35 kg	750 mg	3
>35	1000 mg	4

Table 3.12. Dose of Albendazole and mebendazole administration to severely malnourished children

Deworming drug	Age up to 2 years
Albendazole 400 mg	1 tablet once
Mebendazole 100 mg	5 tablet once

Follow-up care for severe uncomplicated malnutrition

Follow-up care for a child assessed as having severe malnutrition is an important part of the OTP and the mother or caregiver should be advised to come to the health post every week for two months, using a check list.

Checklist for follow-up of a child with severe uncomplicated malnutrition

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Follow-up should be done every seven days for at least two months as follows:

Ask about

- Diarrhoea, vomiting, fever or any other new complaint or problem
- Whether the child is finishing their weekly RUTF ration.

Check for

- Complications
- Temperature, respiration rate
- Weight, MUAC and oedema
- Appetite (do the appetite test).

Decide on action

Refer urgently to hospital if there is any one of the following:

- Development of any new complication
- Failed appetite test
- Increase/development of oedema
- Weight loss for two consecutive visits
- Failure to gain weight for three consecutive visits

If there is no indication for referral, give:

- De-worming and measles vaccination
- Weekly ration of Plumpy'nut® or BP-100®
- Appointment for next follow-up and record the information on the OTP card.

Discharge

A child stays in the programme until they meets the discharge criteria or have been in the programme for a maximum of two months. The discharge criteria depend on the admission criteria.

- For those who were admitted based on oedema: discharge if there is no oedema for two consecutive visits (14 days)

- For those who were admitted without oedema: discharge when the child reaches the discharge target weight. (As indicated in the chart booklet).

The child who fails to reach the discharge criteria after two months of OTP treatment, must always be referred to a hospital.

3.3.2. Treatment of moderate acute malnutrition

A child classified as having moderate acute malnutrition has a higher risk of severe disease. Counsel to take energy-rich food to take at home, as well as more fat and protein in the diet is mandatory. You would need to assess the child's feeding and counsel the mother about the best way to feed the baby at home. The follow up visit for a child with moderate acute malnutrition is after 30 days.

Follow-up care for moderate acute malnutrition

If a child was classified with moderate acute malnutrition and the mother has been given counselling to help her improve feeding and care of her child, she should be advised to return for a follow-up visit after 30 days. If there was a feeding problem as judged by the feeding recommendations, the mother should be advised to return with the child earlier than 30 days.

The activities of the follow up care include;

After 30 days

- Measure the child's MUAC and determine if the child still has moderate acute malnutrition
- Reassess feeding.

Treatment

- If the child no longer has moderate acute malnutrition, praise the mother and encourage her to continue her good care of the child
- If the child still has moderate acute malnutrition, counsel the mother about any feeding problems you have identified. Ask the mother to return again in one month. Continue to see the child monthly until the child is feeding well and no longer has moderate acute malnutrition.

Exception

A child for whom you do not think that feeding will improve, or whose MUAC is not improving, must always be referred to a hospital for better management.

3.4. Treatment of high risk conditions of nutritional problem

High risk nutrition condition includes SAM in age up to six months and complicated SAM in six months and above

Definition and criteria

- **SAM in age up to six months**
 - ✓ Weight for length < -3Z score, OR
 - ✓ Oedema of both feet
- **Complicated SAM Age six months and above and**
 - ✓ WFL/H < -3Z or MUAC < 11.5 cm or
 - ✓ Oedema of both feet (+, ++), AND:
 - Medical complications, or
 - Failed Appetite test
 - ✓ +++ Oedema OR
 - ✓ Severe wasting with oedema
 - ✓ Weight for length/height (WFL/H < -3Z with oedema or
 - ✓ MUAC < 11.5 cm with oedema

Treatment

Refer urgently to Therapeutic feeding Unit (TFU), also called Stabilization center (SC) for an in-patient management of the child.

The aim of treatment of these patients is to return them to full exclusive breast feeding.

Thus, the admission criterion is failure of effective breast feeding and the discharge criterion is gaining weight on breast milk alone (anthropometry is not used as primary admission criterion).

The management includes three phases of treatment

Phase I

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- Prevent and RX. Complications
- Start to feed
- Give routine medications
- Monitor the patient

Transition phase

- Continue to feed
- Continue the medication started in the phase I

Phase 2

- Feed
- Start to give iron supplements
- provide psychosocial support
- Monitor the response
- Teach the mother about feeding

3.5. Emergency conditions of nutrition

3.3.3. Criteria for therapeutic feeding center (TFP)/Stabilization Center (SC)

Therapeutic feeding programmes (TFPs) provide a rehabilitative diet together with medical treatment for diseases and complications associated with the presence of severe acute malnutrition. This is a unit in a hospital where severely malnourished children with complications or poor appetite are referred and managed. The criteria for admission to in-patient or outpatient care;

Table 3.13. Criteria for admission to in-patient or outpatient care for treatment of SAM

Factor	Inpatient care	Outpatient care
Anthropometry	6 months to 18 yrs: <ul style="list-style-type: none"> W/H or W/L <70% OR MUAC <110mm with length >65cm Adults: <ul style="list-style-type: none"> MUAC <180mm with recent weight loss or underlying chronic illness OR MUAC<170mm OR BMI <16 	
Bilateral pitting edema	Bilateral pitting edema grade 3(+++) Marasmic – kwashiorkor	Bilateral pitting edema Grade 1 to 2 (+ and++)
Appetite	Poor Appetite	Good Appetite
Medical complications	<ul style="list-style-type: none"> severe/intractable vomiting hypothermia: axillary T° <35°C OR rectal <35.5°C fever>39°C fast breathing based on age extensive skin lesions very weak, lethargic, unconscious Fitting/convulsions Severe dehydration based on history & physical examination Any condition that requires an infusion or NG – tube feeding. Very pale (severe anaemia), jaundice, bleeding tendencies 	Alert with no medical complications

3.3.4. Treatment Phases

Treatment Objective

- Treat life-threatening complications
- Rehabilitate with nutrition
- Achieve catch-up growth

Phase I (Inpatient facility)

- Treat poor appetite and/or major medical complications.
- Formula used during this phase is F75.
- Weight gain at this stage is dangerous.

Transition phase

- Avoid a sudden change to large amount of diet before physiological function is restored.

- Patients start to gain weight as F100 is introduced
- The quantity of F100 given is equal to the quantity of F75 given in phase I.

Phase II

- Good appetite
- No major medical complications
- Can occur at inpatient or outpatient setting
- F100 (inpatient only) or ready to use therapeutic feeding (RUTF).

I. Phase I

Non pharmacologic Treatment of complications

Dehydration

- “Therapeutic window” is narrow in a patient with severe acute malnutrition –
- Quickly go from having depleted circulation to over – hydration with fluid overload and cardiac failure
- IV infusions should be avoided whenever possible.
- The standard protocol for the well-nourished dehydrated child should not be used.
- A supply of modified ORS or Rehydration salt for malnutrition (ReSoMal) should never be freely available for the caretakers to give to the child whenever there is a loose stool.
- Ongoing loss replacement should not be given when there is no dehydration.

a. Marasmic patient

- The usual signs of dehydration are not reliable.
- History is more important than physical examination.
- ✓ A definite history of significant recent fluid loss – usually diarrhoea which is clearly like water (not just soft or mucus) and frequent with sudden onset within the past few hours or days.
- ✓ History of a recent change in the child’s appearance.

- ✓ If the eyes are sunken then the mother must say that the eyes have changed to become sunken since the diarrhoea has started.
- ✓ The child must not have any edema.
- ✓ Shock may be diagnosed when there is definite dehydration plus a weak or absent radial or femoral pulse, and cold hands and feet, and decrease in level of consciousness.

Treatment

- Rehydration should be oral whenever possible.
- IV infusions should be avoided except when there is shock or loss of consciousness from confirmed dehydration.
- Weight is the best measurement of fluid balance.
- Before starting any rehydration treatment, weigh the child; mark the edge of the liver and the skin with indelible pen and record respiratory rate.
- Start with 5ml/kg of Rehydration salt for malnourished (ReSoMal), every 30 minutes for the first 2 hours orally or by NG – tube and then adjust according to the weight change observed. If continued weight loss, increase the rate of administration of ReSoMal by 10ml/kg/hr.
- Weigh the child every hour and assess liver size, respiration rate, and pulse rate and pulse volume.

Table 3.14. composition of ReSoMal, standard-ORS and reduced osmolality.

<u>Composition</u>	ReSoMal (mmol/L)	Standard ORS (mmol/L)	Reduced osmolality ORS
Glucose	125	111	75
Sodium	45	90	75
Potassium	40	20	20
Chloride	70	80	65
Citrate	7	10	10
Magnesium	3
Zinc	0.3
Copper	0.045
Osmolality (mOsm/L)	300	311	245

To make ReSoMal (45 mmol Na/L) from the new 75 mmol Na/L WHO-ORS, add 1.7 L of cooled boiled water to each 1-litre sachet of WHO-ORS, add 33ml electrolyte mineral solution and 40g sugar.

Routine medication

Routine medication includes:

- Vitamin A given on day 1, 2, and 14. For children 6-11 months of age give 100,000 iu and for children of 12 months or older (more than 8 Kg in weight) give 200,000 iu
- Folic acid given as a 5 mg single dose
- Antibiotics: During the phase, the first line antibiotics are amoxicillin or cotrimoxazole and the second line antibiotics are gentamicin or chloramphenicol
 - ✓ Treat orally as much as possible.
 - ✓ If there are no apparent signs of infection and complication, give oral cotrimoxazole or amoxicillin
 - ✓ If there are signs of infection or complication, give ampicillin and gentamicin or penicillin with gentamicin.

- Measles vaccination if the child is older than 6 months and not vaccinated
- Treat for malaria according to the national guideline

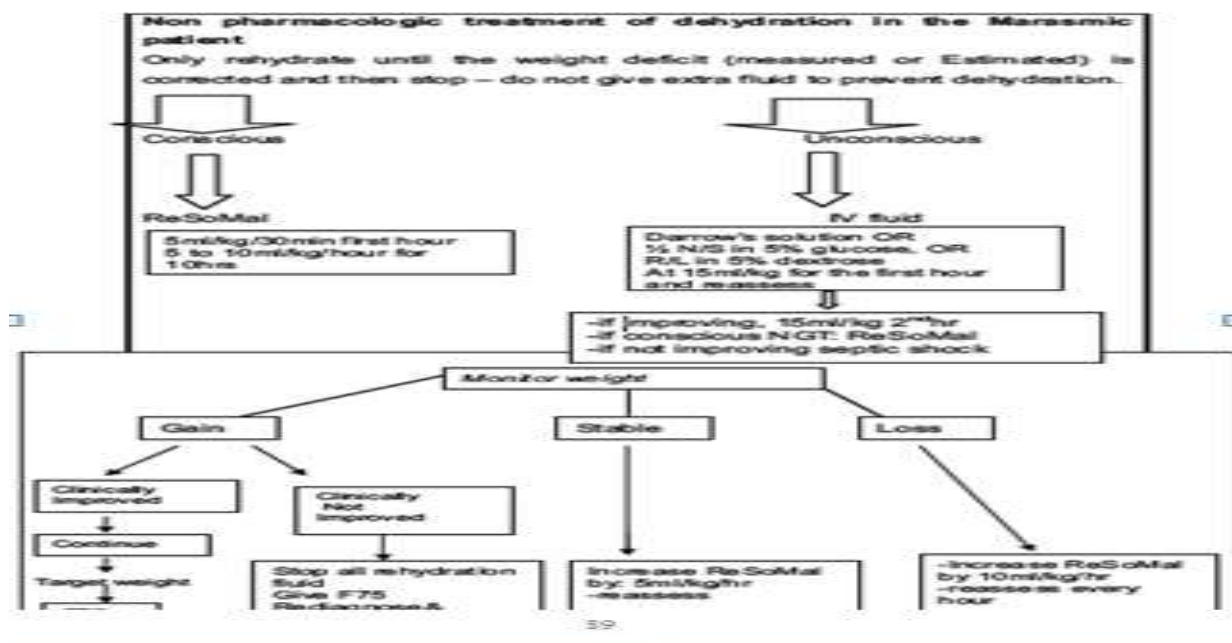


Figure 3.9. Rehydration monitoring

b. Kwash patient

- All children with edema have an increased total body water and sodium – they are over – hydrated.
- Edematous patients cannot be dehydrated although they are frequently Hypovolemic.
- If a child with kwashiorkor has definite watery diarrhea and the child is deteriorating clinically (excessive weight loss, more than 2% of the body weight per day), then the fluid lost can be replaced on the basis of 30ml of ReSoMal per day.

c. Septic shock

- A fast weak pulse with cold extremities
- Disturbed consciousness
- Give broad – spectrum antibiotics

- Keep warm to prevent or treat hypothermia
- Give sugar – water by mouth or nasogastric tube as soon as the diagnosis is made.
- Full blown septic shock – treat as in the Marasmic patient.
- Treat hypothermia, severe anaemia, severe pneumonia and any major medical complications

Diet

- F-75 (130ml=100kcal) should be used at this phase (see table for amounts).
- Use NG – tube for feeding if the child is taking <75% of prescribed diet per 24hrs or has pneumonia with a rapid respiratory rate or consciousness is disturbed.

Nasogastric tube is indicated in the following cases:

- Pneumonia with rapid breathing
- Painful oral lesions
- Disturbances of consciousness
- The Patient is taking less than 75% of the daily milk

Table 3.15. Amount of F75 give during phase I

Class of Weight (Kg)	8 feeds per day ml for each feed	6 feeds per day ml for each feed	5 feeds per day ml for each feed
2.0 to 2.1 Kg	40 ml per feed	50 ml per feed	65 ml per feed
2.2 – 2.4	45	60	70
2.5 – 2.7	50	65	75
2.8 – 2.9	55	70	80
3.0 – 3.4	60	75	85
3.5 – 3.9	65	80	95
4.0 – 4.4	70	85	110
4.5 – 4.9	80	95	120
5.0 – 5.4	90	110	130
5.5 – 5.9	100	120	150
6 – 6.9	110	140	175
7 – 7.9	125	160	200
8 – 8.9	140	180	225
9 – 9.9	155	190	250
10 – 10.9	170	200	275
11 – 11.9	190	230	275
12 – 12.9	205	250	300
13 – 13.9	230	275	350
14 – 14.9	250	290	375
15 – 19.9	260	300	400
20 – 24.9	290	320	450
25 – 29.9	300	350	450
30 – 39.9	320	370	500
40- 60	350	400	500

Pharmacologic

Table 3.16. Dose and administration of routine medications during phase II and phase II

	Direct admission to in-patient (phase I)	Direct admission to outpatient (phase II)
Vitamin A*	One dose at admission One dose on discharge	One dose on the 4th week
Folic acid	One dose at admission if signs of aneamia	One dose at admission if signs of aneamia
Amoxicillin	Every day in phase I + 4 more days in Transition	One dose at admission + give Treatment for 7 days at home
Malaria	According to the national protocol	According to national protocol
Measles (in Those above 9 months Old)	One vaccine at admission if no card One vaccine at discharge	One vaccine on the 4th week
Iron	Add to F100 in phase 2	No. iron is already in all RUTF
Deworming	One dose at the start of phase 2	One dose on the 2nd week

*Do not give Vitamin A to edematous children (wait till edema disappears).

II. Transition phase

Progress to from phase I to transitions phase when

- Appetite has improved
- Begins to loose edema and weight
- No IV line or NGT.
- The only change made to the treatment in phase I, is a change in the diet that is given from F75 to F100 or RUTF.
- The number of feeds, their timing and the volume of the diet given remains exactly the same as in phase I.

The amounts given in the table are for the full 24 hour period. The amounts represent an average increase in energy intake of about one third over the amount given during Phase I. However, this varies between an increment of 10% and 50% depending upon the actual weight and the product used. Each of the RUTF products is nutritionally equivalent to F 100, with the exception that they have an appropriate amount of iron added during manufacture for children

in Phase 2 (i.e. children who pass the appetite test). If both F100 and RUTF are being given they can be substituted on the basis that about 100 ml of F100 = 20g of RUTF.

Table 3.16. Amount of F100 to give during the transition phase

Class of Weight (Kg)	8 feeds per day	6 feeds per day	5 feeds per day
Less than 3Kg F100 full strength should not be given – Only F100 diluted should be given			
3.0 to 3.4 Kg	60 ml per feed	75 ml per feed	85 per feed
3.5 – 3.9	65	80	95
4.0 – 4.4	70	85	110
4.5 – 4.9	80	95	120
5.0 – 5.4	90	110	130
5.5 – 5.9	100	120	150
6 – 6.9	110	140	175
7 – 7.9	125	160	200
8 – 8.9	140	180	225
9 – 9.9	155	190	250
10 – 10.9	170	200	275
11 – 11.9	190	230	275
12 – 12.9	205	250	300
13 – 13.9	230	275	350
14 – 14.9	250	290	375
15 – 19.9	260	300	400
20 – 24.9	290	320	450
25 – 29.9	300	350	450
30 – 39.9	320	370	500
40 – 60	350	400	500

The table gives the amount of F100 (full strength) that should be offered to patients in Transition Phase. They should normally be taking 6 feeds during the day and none at night. The table below gives the amount of RUTF to give per feed if some of the feeds are being given as

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F100 and others as RUTF. A common variation is to give 5 or 6 feeds of F100 during the day and then 3 or 2 feeds of RUTF during the night – this gives 8 feeds in total during the day. The volume of F100 is then read off from the previous table and the grams of RUTF from the next table, both using the 8 meals per day column and the appropriate class of weight.

Criteria to move back from transition phase to phase I

- Increasing edema.
- If a child who did not have edema develops edema.
- Rapid increase in the size of the liver.
- Any other sign of fluid overload.
- Tense abdominal distension.
- Significant refeedingdiarrhoea with weight loss.
- Develops medical complications.
- If NG tube is needed.
- If patient takes <75% of the feeds in transition phase even after interchange between RUTF and F100.

III. Phase II

Progress to Phase II from transition phase when:

- Good appetite is restored (at least 90% of the RUTF or F100 prescribed in transition phase)
- No or minimal edema (+).

Table 3.17. Phase 2 amounts of F100 and RUTF to give at each feed for 5 or 6 feeds per day

Class of weight (Kg)	6 feeds/day		5 feeds/day	
	F100	RUTF	F100	RUTF
	ml/feed	g/feed	ml/feed	g/feed
< 3kg	Full strength F100 and RUTF are not given below 3 kg			
3.0 to 3.4	110	20	130	25
3.5 – 3.9	120	22	150	30
4.0 – 4.9	150	28	180	35
5.0 – 5.9	180	35	200	35
6.0 – 6.9	210	40	250	45
7.0 – 7.9	240	45	300	55
8.0 – 8.9	270	50	330	60
9.0 – 9.9	300	55	360	65
10.0 – 11.9	350	65	420	75
12.0 – 14.9	450	80	520	95
15.0 – 19.9	550	100	650	120
20.0 – 24.9	650	120	780	140
25.0 – 29.9	650	140	900	160
30.0 – 39.9	850	160	1000	180
40.0 – 60.0	1000	180	1200	220

Table3.18. Phase 2 (out-patients): amounts of RUTF to give

Class of weight (Kg)	RUTF Paste		PLUMPY'NUT ®		BP100 ®	
	Grams per Day	Grams per Week	Sachet per Day	Sachet per week	Bars per Day	bar per week
3.0 – 3.4	105	750	1 ^{1/4}	8	2	14
3.5 – 4.9	130	900	1 ^{1/2}	10	2 ^{1/2}	17 ^{1/2}
5.0 – 6.9	200	1400	2	15	4	28
7.0 – 9.9	260	1800	3	20	5	35
10.0 – 14.9	400	2800	4	30	7	49
15.0 – 19.9	450	3200	5	35	9	63
20.0 – 29.9	500	3500	6	40	10	70
30.0 – 39.9	650	4500	7	50	12	84
40.0 – 60.0	700	5000	8	55	14	98

3.6. Balanced diet

Definition and benefits a balanced diet

Eating a balanced diet means choosing a wide variety of foods and drinks from all the food groups. It also means eating certain things in small amounts, namely saturated fat, cholesterol, simple sugar and salt. The goal is to take in all of the nutrients you need for health at the recommended levels and perhaps restrict those things that are not good for the body. To know if the diet is balanced and to plan a balanced diet you have to think about two things: the mixture of foods and the amount of food a person eats.

Helping families to have good balanced diet

The best way to help individuals to prepare a balanced diet is to learn which foods people use, the amount of different foods available, and how they prepare their meals. Then you can decide if people need help or further support or information to improve the balance of things they eat.

Figure shows a food pyramid. It helps to identify the food groups people should combine in order to make a balanced diet. The food groups at the top of the pyramid should be eaten in moderation (small amount) but food groups at the bottom of the pyramid should be eaten in larger amounts.

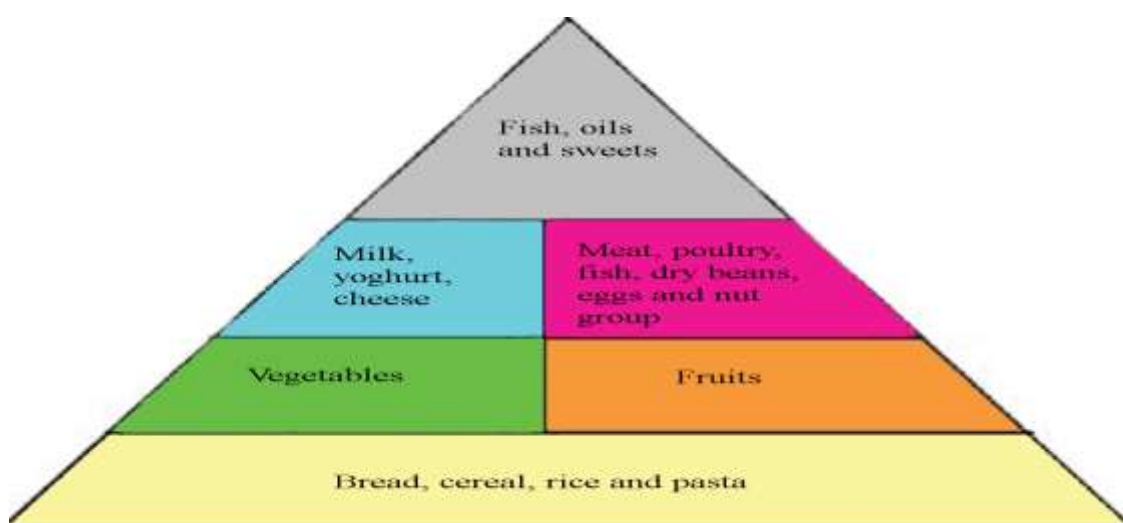


Figure 3.10. Food pyramid

The mixture of foods to use

The staple food is the common type of food that is consumed by the community. It should be part of a balanced diet because it's the main part of most meals. The staple diet may vary from region to region. For example, 'injera' is the staple diet in many sites, maize in other areas, and 'kocho' in the southern part of the country. These foods are usually cheap, and provide most of the energy, protein and fiber in a meal, as well as some vitamins.

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Adding other foods to the staple food

In order to have a good balanced diet, people will need to eat other foods in addition to the staple foods. The additional foods are important because they:

- Provide nutrients that may not be available in the staple food. For example, legumes such as peas, beans and lentils add protein, iron and other minerals and fat; green and yellow vegetables and fruits add vitamins A and C, folate, and fiber.
- Make the food less bulky
- Make the diet more tasty and interesting to eat.

A diet which is composed of staples, legumes and vegetables or fruits is a good, balanced diet because this combination of foods will provide most of the nutrients that the people in need. Adding animal sources to the sample is also good because they contain plenty of protein, have high energy (due to the fats), and the iron is easily absorbed compared with the iron sourced from plants.

Therefore adding small amounts of animal products like meat, milk and eggs to staples, legumes and vegetables will improve the balanced diet. As well as protein, animal foods will also provide fat (for energy) and vitamins (especially vitamin A and folate), iron and zinc.

Self-check-2

Written

Directions: Answer all the questions listed below.

Part I- write “True” if the statement is correct or “False” if the statement is incorrect

1. The best source of iron for infants is breast milk.
2. To prevent Vitamin A deficiency among pregnant mother a large dose of vitamin A supplements should be given.
3. Many diets are balanced and do contain enough carbohydrates, protein and fruits and vegetables.
4. Food- or water-borne infections affect digestion and absorption of food and remove essential nutrients from the body.
5. The presence of one criterion is sufficient to categorize a patient as malnourished.
6. The follow up visit for a child with moderate acute malnutrition is after 7 days.

Part II- choose the correct answer among the alternatives for the following multiple chose questions

1. Control of malaria and worms is used to prevent primary ____
 - A. Vitamin A deficiency
 - B. Iron deficiency
 - C. Iodine deficiency
 - D. Calcium deficiency
2. Rickets is caused by deficiency of _____
 - A. Vitamin A
 - B. Iodine
 - C. Iron
 - D. Vitamin D

3. According to essential nutrition action approach which is **NOT** true the key practice of maternal nutrition during pregnancy
 - A. Iron and folic acid supplementation
 - B. Treatment and prevention of malaria
 - C. One extra meal each day during pregnancy
 - D. Vitamin A capsule during the third trimester of pregnancy
4. Which critical nutrition action message can **NOT** be used in nutrition education and individual counseling?
 - A. Eat a variety of foods and increase your intake of nutritious foods
 - B. Drink plenty of boiled or treated water
 - C. Drink alcohol to facilitate and accelerate digestion after taking of diet
 - D. Maintain good hygiene and sanitation
5. Which is **INCORRECT** about Ready-to-use therapeutic food (RUTF)?
 - A. RUTF is a food and medicine for malnourished children only.
 - B. For breastfed children, breast milk should always be given before the RUTF.
 - C. RUTF should be given before other foods.
 - D. Plenty of clean water to drink should always be offered to the child when he or she is eating RUTF.
6. Among the following drugs which drug is **NOT** routine drug for a child with severe uncomplicated malnutrition?
 - A. Amoxicillin
 - B. Vitamin A
 - C. Iron
 - D. Folic acid
7. Which is **NOT** the criteria to move back from transition phase to phase I
 - A. Rapid increase in the size of the liver.
 - B. No or minimal edema (+).

- C. Tense abdominal distension.
D. Develops medical complications.
8. Which is **NOT** the indication to insert nasogastric tube for a child with severe acute malnutrition?
- A. Pneumonia with rapid breathing
B. Painful oral lesions
C. If the child is conscious
D. The Patient is taking less than 75% of the daily milk

Part III- write correct and short answer for the following essay item questions

1. List the causes of iron deficiency
2. Describe the seven essential nutrition action
3. List the criteria's to classify as complicated SAM for a child 6 months and above
4. Explain non pharmacological treatments of complications of SAM

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