



Manage Nutritional Problems in Mothers and Children

NTQF Level III

Learning Guide # 1

Unit of Competence	Manage Nutritional Problems in Mothers and Children
Module Title:	Managing Nutritional Problems in Mothers and Children
LG Code:	HLT MDW3 M09 LO01-01
TTLM Code:	HLT MDW3 TTLM 0919v1

LO 1: Plan and undertake assessment for nutrition related health issues



Instruction Sheet	Learning Guide # 1
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This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Overview of food, diet and nutrition
- Nutrients and their sources
- Nutritional assessment and screening
- Nutrition related problems
- Calculation of target group with nutritional problems
 - ✓ Number of eligible from the catchment areas
 - ✓ Implementation of standard statistical method
- Developing interventional plan

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, **upon completion of this Learning Guide, you will be able to:**

- Screen and conduct nutritional assessment according to national nutritional assessment protocol of the FMOH
- Identify nutrition related problems
- Conduct resource mapping using the standard format of FMOH
- Identify nutrition eligible community members
- Calculate number of expected target group for nutritional problem from the catchments using standard statistical method
- Develop appropriate interventional plan.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1 and Sheet 2 Sheet 3 Sheet 4 Sheet 5 and Sheet 6



4. Accomplish the “Self-check 1, Self-check 2, Self-check 3, Self-check 4, Self-check 5 and Self-check 6 in **page 8, 17, 33, 42, 46 and 53 respectively.**
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1, Operation Sheet 2 , Operation Sheet 3 and Operation Sheet 4 ” in page 35, 36, 37 and 38.
6. Do the “LAP test” in page 39



1.1. Definition of food, diet and nutrition

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.

A **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.

1.2. The function of food

The main functions of food is



- To provide energy and warmth for the body
- To build, maintain and repair the body.
- To control body process and protection against diseases and infections

By performing these functions, food helps us to have energy for work, to keep healthy, warm, well-nourished, free of infections and alive. By helping us to understand how food and nutrients work, the science of nutrition plays a fundamental role in the promotion of health, in the prevention of illness and in the restoration of health following illness or injury.

Food contains chemical substances called nutrients and these are found in varying amounts and combinations in different foods. Nutrients are the part of food which the body uses to:

- Build the body, produce fluids and repair tissues; for example, proteins such as meat, eggs, fish, milk
- Produce energy so that the body can keep alive and warm and so it can move and grow; for example, carbohydrates such as 'teff', bread, sugar and pasta
- protect the body from disease; for example, vitamins and minerals such as green vegetables oranges, carrots and bananas
- Help chemical processes.

Enough food containing the necessary nutrients should be eaten every day (such as carbohydrates, proteins, water, vitamins and minerals). It is likely that you will get enough of the other nutrients (for example dietary fiber) that your body needs by doing this. No one food supplies all the nutrients the body needs. No one nutrient is more important than the others. Each nutrient does specific jobs. The nutrients work together to keep us healthy.

It is important to include fiber (roughage) in the diet because it makes the bowels work properly and provides bulk to make us feel full. Fresh fruits and vegetables, peas and beans, whole wheat flour and unrefined maize or sorghum flour give us fiber.



1.3. The importance of nutrients

The nutrients we get from the food we eat will affect the size and shape of our body. The use of nutrients to build tissues and supply energy at various stages of our life is explained here.

Using nutrients to build tissue

The human body consists of different types of nutrients; it consists of 62% of water, 18% of protein, 14% fat and 6% of minerals. Therefore, besides water, the most important building nutrient is protein. Fat is also important to build cells and energy stores. Some minerals are important, for example calcium, which is necessary to build bones and teeth, and iron which helps to build haemoglobin in the blood. For example, a person who weighs 50 kg consists of 31 kilograms of water, 9 kg of protein, 7 kg of fat and 3 kg of minerals.

Using nutrients to build the body

For growth: A child starts to grow as a single cell inside its mother. The cell absorbs nutrients; it grows and divides into two cells. The cell uses nutrients as building materials for the new cell and other nutrients for energy to do the work of building. Each cell then absorbs more nutrients to grow larger and divide again. The cells continue to absorb nutrients and to grow and divide until there are millions of cells which form different tissues such as skin, muscle and bone. The child's body also makes fluids such as blood, which nourishes and protects the cells.

For pregnancy: During pregnancy, a woman needs body building nutrients to:

- provide the baby and placenta with nutrients to grow
- Increase the size of her uterus and breasts
- Make more blood and stores of fat that can be mobilized during lactation, and other nutrients.



To secrete fluids: The body has to keep making fluids such as saliva, digestive juices, tears and breast milk because they are continually used up.

To replace cells: Most cells live only a short time. The body must build new cells to replace those that die. The need to replace cells continues throughout life. Skin is a good example.

To repair tissues: After injury or illness, the body makes new cells to repair the damaged tissues.

Using nutrients to produce energy

The body 'burns' nutrients to make energy. Starch, sugar and fat are made of the elements carbon, hydrogen and oxygen. When they 'burn' in the cells, they combine with oxygen from the air that we breathe in. They release energy, and they change into carbon dioxide and water, which we breathe out.

The body uses nutrients in food we eat is summarized in table 1.2.

Nutrient	Use
Carbohydrates (starches and sugars)	<ul style="list-style-type: none"> • For energy
Fiber	<ul style="list-style-type: none"> • To keep gut healthy • To help digestion
Fats	<ul style="list-style-type: none"> • For energy • To build cells • Stored for use as energy when needed
Proteins	<ul style="list-style-type: none"> • To build cells • To make fluids • For chemical processes • For energy • To protect against infection



Minerals	<ul style="list-style-type: none"> • To build cells • To make fluids • For chemical processes
Vitamins	<ul style="list-style-type: none"> • For chemical processes • To build cells • To protect against infection
Water	<ul style="list-style-type: none"> • For chemical processes • For building cells • To make fluids

Self-check 1	Written test
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Part I. Say “True” if the statement is Correct or “False” if the Statement is Incorrect (each 2 point 2X2=4% incorrect

1. One nutrient is more important than the others.
2. The majority part of human body consists of water

Part II. Choose the Correct Answer for the Following Multiple Choose Questions (each 2 point 2x2= 4%)

1. _____ is an active chemical component in food that plays a specific
 - A. Food
 - B. Diet
 - C. Nutrition
 - D. Nutrient
2. Which nutrient is incorrectly mismatched with its use?
 - A. Water for energy
 - B. Fiber to help digestion
 - C. Protein to build cells



D. Vitamins to protect against infections

Note: Satisfactory rating - 4 points

Unsatisfactory - below 4 points

Answer sheet True or False

1. _____

2. _____

Answer Sheet Multiple choose Questions

1. _____

2. _____

Score= _____

Rating = _____

Name: _____

Date: _____



2.1. Classification of Essential Nutrients

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.

2.2. Macronutrients

'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.

2.2.1. 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.



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 monosaccharides, disaccharides and polysaccharides.

Monosaccharides 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: Carbohydrate riches foods



2.2.2. 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: Protein riches foods

2.2.3. 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: Fat and oils riches foods

2.2.4. 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.

2.2.5. 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:

- Fiber makes food bulky or bigger — this can help a person who is overweight to eat less food
- Fiber makes the feces soft and bulky; this can help prevent constipation
- 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: Fiber Riches Food

2.3. 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.

2.3.1. 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:

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.

Vitamins	Function	Food sources
Vitamin A	<p>Night vision, Healing epithelial cells and Normal development of teeth and bones</p> <p>Note: Epithelial cells form the thin layer of tissue lining the gut, respiratory and genitourinary systems.</p>	Breast milk, tomatoes, cabbage, lettuce, pumpkins Mangoes, papaya, carrots Liver, kidney, egg yolk, milk, butter, cheese cream



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
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.

2.3.2. 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.

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 haemoglobin	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

Self-check 2	Written test
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Part I. Say “True” if the statement is Correct or “False” if the Statement is Incorrect (each 2 point 2X2=4% incorrect

1. The function of Iron to give rigidity and strength of bones and teeth
2. Unsaturated fats are usually liquid at room temperature and healthy fats.

Part II. Choose the Correct Answer for the Following Multiple Choose Questions (each 2 point 2x2= 4%)

1. Which macronutrient is needed in large amounts by the body?
 - A. Carbohydrate
 - B. Protein
 - C. Fat
 - D. Fiber
2. Among the following vitamins which is water soluble vitamin?
 - A. Vitamin A
 - B. Vitamin C
 - C. Vitamin D
 - D. Vitamin K

Note: Satisfactory rating - 4 points

Unsatisfactory - below 4 points

Answer sheet True or False

3. _____



4. _____

Answer Sheet Multiple choose Questions

3. _____

4. _____

Score= _____

Rating = _____

Name: _____

Date: _____



Information sheet-3	Nutritional assessment and screening
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3.1. Definition terms

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.**

3.2. Anthropometric measurements

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

3.2.1. 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.

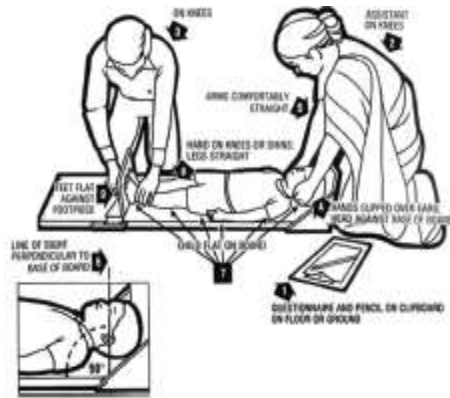


Figure 5.1 Measuring length. (Source: UNICEF, 1986, *How to weigh and measure children: assessing the nutrition status of young children*)

3.2.2. Height

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 millimetre.

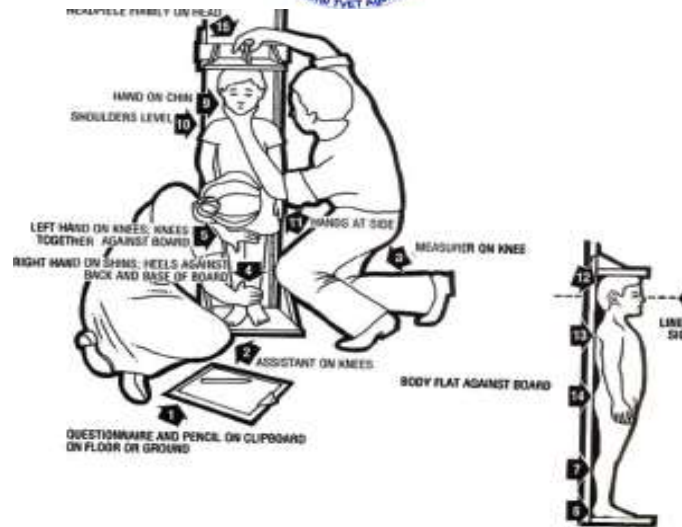


Figure 5.2: Measuring height. (Source: UNICEF, 1986, *How to weigh and measure children: assessing the nutrition status of young children*)

3.2.3. 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 5.4 Weighing a child using a harness and spring balance. (Photo: UNICEF Ethiopia / Indrias Getachew)



Figure 5.3 Measuring child's weight using the Salter Scale. (Source: UNICEF, 1986, *How to weigh and measure children: assessing the nutrition status of young 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

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 5.5 Improvised way of measuring weight of the child using salter scale. (Source: UNICEF Ethiopia / Indrias Getachew)

2.3.4. 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. Now you have looked at how to take different measurements you are going to learn how the measurements are converted into different indices.



3.3. 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 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.

Stunting is defined as a low height for age of the child compared to the standard child of the same age. Stunted children have decreased mental and physical productivity capacity.

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.

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.

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

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

Birth weight is weight of the child at birth and is classified as follows:

- More than 2 500 grams = normal birth weight
- 1 500–2 499 grams = low birth weight



- Less than 1 500 grams = very low birth weight

3.3.1. What is an indicator?

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).

Index	Cut-off value based on standard deviation (SD)	What it indicates
Weight-forage	Less than 2 and more than 3	Moderate underweight
Weight-forage	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
		Severe acute malnutrition (SAM)

3.4. Anthropometric measurements used to assess body composition

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.

3.4.1. 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. shows you the different categories of nutritional status based on a person's BMI.

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 he BMI increases to over 25 kg/m², the risk of mortality and morbidity increases.

3.4.2. 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).

3.4.3. Measuring the MUAC of children

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.

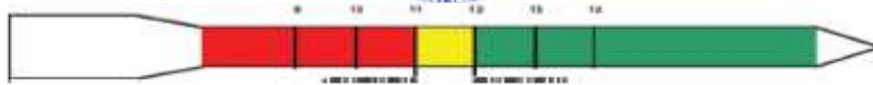


Figure 5.7 MUAC measuring tape.

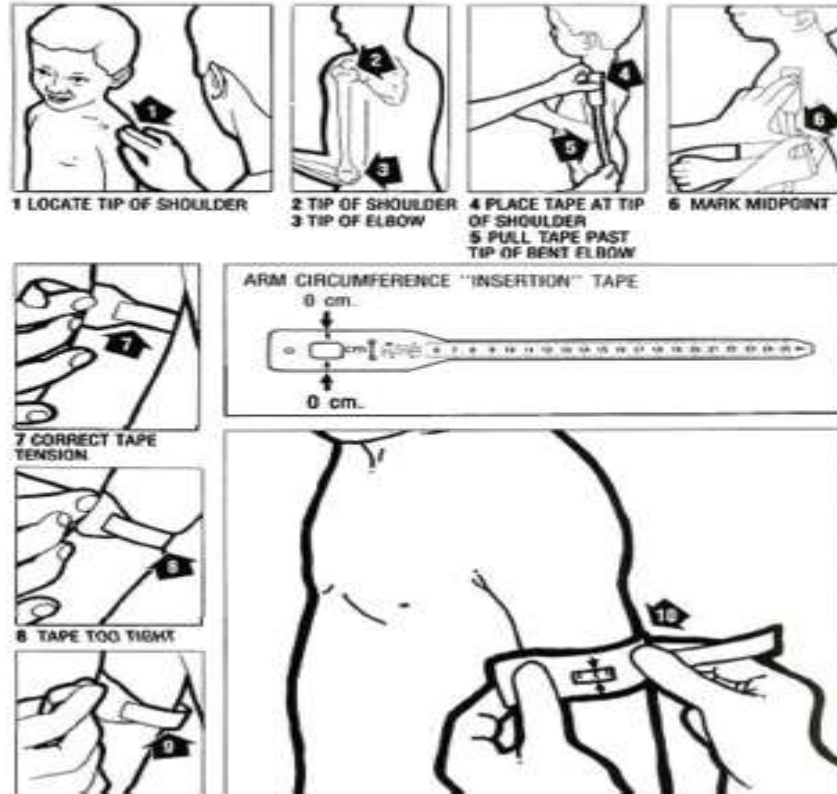


Figure 5.8 Measuring MUAC. (Source: UNICEF, 1986, *How to weigh and measure children: assessing the nutrition status of young children*)



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

Midwifery Level III	Vision :01 Sep. 2019:	Page 28 of 56
	Copyright Info/Author: Federal TVET Agency	



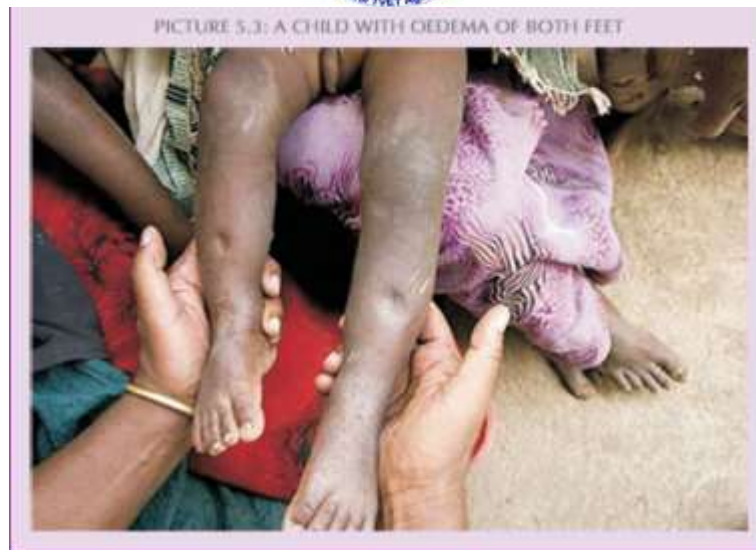
Target Groups	MUAC (in cm)	Malnutrition
Children under five	11-11.9	Moderate acute malnutrition (MAM)
	< 11 cm	Severe acute malnutrition (SAM)
Pregnant women/ adults	17-21 cm	Moderate malnutrition
	18-21 cm with recent weight loss	
	< 17	Severe malnutrition
	< 18 cm with recent weight loss	

3.5. 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.

3.5.1. 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).



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.

3.5.2 Bitot's spots

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

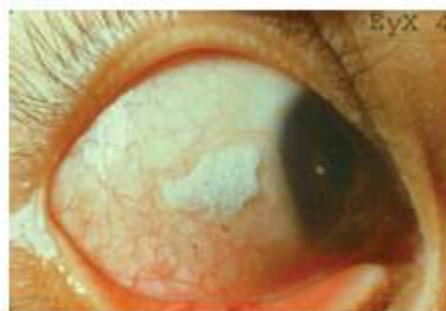
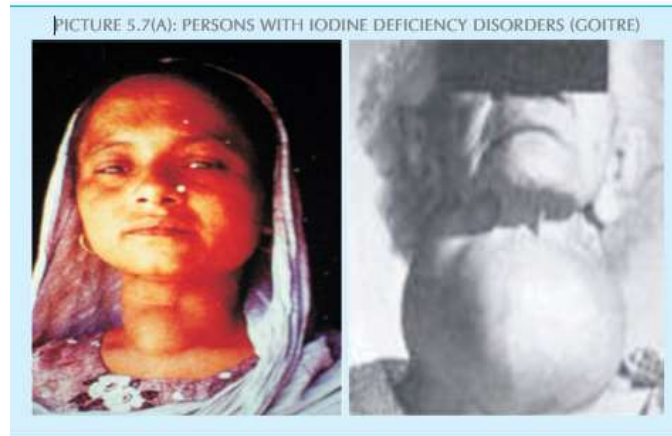


Figure 5.11: Bitot's spots (signs of vitamin A deficiency)



3.5.3. Goiter

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



3.5.4. 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.

Table 5.4 summarizes the main symptoms of nutritional problems and the deficiencies they signal.

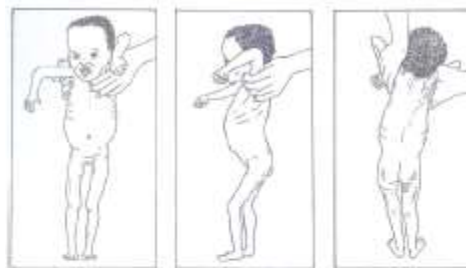


Figure 5.13 A child with severe visible wasting. (Source: Ethiopian Federal Ministry of Health, 2010, *Training course of the out patient treatment programme of severe acute malnutrition*)

Table 5.4 summarises the main symptoms of nutritional problems and the deficiencies they signal.

3.6. 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.

Dietary diversity is a measure of the number of food groups consumed over a reference period, usually 24 hours. Generally, there are six food groups that our body needs to have every day. These can be represented in the food guide pyramid.

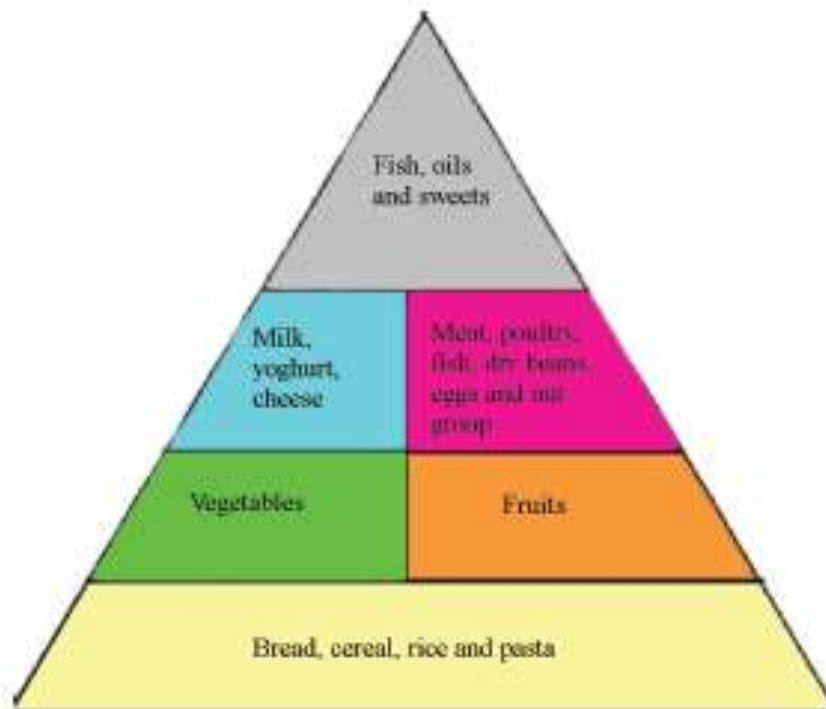


Figure 5.14 Food guide pyramid.

The base or widest part of the pyramid indicates the need for higher quantities of consumption of carbohydrate source foods, while the tip is narrow, indicating the need for eating only small amounts of fats and sweet things. If a person consumes any examples of the food type from each of the six groups in 24 hours, we can say that their dietary diversity score is six. Dietary diversity score is an indicator of both the balance of nutrient consumption and the level of food security (or insecurity) in the household. The



higher the dietary diversity score in a family, the more diversified and balanced the diet is and the more food-secure the household.

As part of the dietary assessment you should also check the salt iodine level of households using the single solution kit (SSK). This enables you to determine whether the salt iodine level is 0, more than 15 parts per million (PPM) or less than 15 PPM.

Normally, an iodized salt should have iodine level of more than 15 PPM to be effective in preventing iodine deficiency and its consequences.



Figure 5.15 Testing salt iodine level using an SSK. (Photo: UNHCR/Dr Tewoldberhan Daniel)

Self-check 3

Written test

Part I. Say “True” if the statement is Correct or “False” if the Statement is Incorrect (each 2 point 3X2=6% incorrect

1. Measuring the child lying down always gives readings greater than the child’s actual height by 1-2 cm.
2. Head circumference is useful in assessing chronic nutritional problems in children under two years old.
3. Stunting is defined as a low weight for the height of the child compared to the standard child of the same height.

Part II. Choose the Correct Answer for the Following Multiple Choose Questions (each 2 point 3x2= 6%)

1. _____ is an index used for assessing stunting (chronic malnutrition in children).
A. Weight-for-age



- B. Height-for age
 - C. Weight-for-height
 - D. Body mass index
2. _____ 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
3. Bitot's spots are a sign of _____ deficiency.
- A. Vitamin A
 - B. Iodine
 - C. Vitamin C
 - D. Calcium

Note: Satisfactory rating - 6 points

Unsatisfactory - below 6 points

Answer sheet True or False

- 1. _____
- 2. _____
- 3. _____

Answer Sheet Multiple choose Questions

- 1. _____
- 2. _____
- 3. _____

Score= _____

Rating = _____

Name: _____

Date: _____



Techniques for Measuring Length of a children

You need an assistant to help you measure a child using this method.

1. Both assistant and measurer are on their knees.
2. The assistant holds the child's head with both hands and makes sure that the head touches the base of the board.
3. The assistant's arms should be comfortably straight.
4. The line of sight of the child should be perpendicular to the base of the board (looking straight upwards).
5. The child should lie flat on the board.
6. The measurer should place their hands on the child's knees or shins.
7. The child's foot should be flat against the foot piece.
8. Read the length from the tape attached to the board.
9. Record the measurement on the questionnaire.



Techniques of measuring height of a children

You need to have another person helping you.

1. Both the assistant and measurer should be on their knees.
2. The right hand of the assistant should be on the shins of the child against the base of the board.
3. The left hand of the assistant should be on the knees of the child to keep them close to the board.
4. The heel, the calf, buttocks, shoulder and occipital prominence (prominent area on the back of the head) should be flat against the board.
5. The child should be looking straight ahead
6. The hands of the child should be by their side.
7. The measurer's left hand should be on the child's chin.
8. The child's shoulders should be levelled.
9. The head piece should be placed firmly on the child's head.
10. The measurement should be recorded on the questionnaire.



Techniques of measuring weight of children using a Salter Scale

1. Adjust the pointer of the scale to zero level.
2. Take off the child's heavy clothes and shoes.
3. Hold the child's legs through the leg holes.
4. Hold the child's feet.
5. Hang the child on the Salter Scale.
6. Read the scale at eye level to the nearest 0.1 kg.
7. Remove the child slowly and safely.



Techniques of Measuring MUAC

1. Ask the mother to remove any clothing that may cover the child's left arm. If possible, the child should stand erect and sideways to the measurer.
2. Estimate the midpoint of the left upper arm.
3. Straighten the child's arm and wrap the tape around the arm at the midpoint. Make sure the numbers are right side up. Make sure the tape is flat around the skin.
4. Inspect the tension of the tape on the child's arm. Make sure the tape has the proper tension and is not too tight or too loose.
5. Repeat any step as necessary.
6. When the tape is in the correct position on the arm with correct tension, read the measurement to the nearest 0.1 cm.
7. Immediately record the measurement.



Lap Test	Practical Demonstration
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Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 40 minute

Task 1. Measuring Length of a children

Task 2. Measuring height of a children

Task 3. Measuring weight of children using a Salter Scale

Task 4. Measuring MUAC



4.1. 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).

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.

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.

Underweight is an indicator of both acute and chronic malnutrition. Underweight is a highly useful indicator when examining nutritional trends.

Ethiopia has a high rate of stunting (chronic malnutrition). Forty seven percent of children under five years of age are considered to be stunted and this is the fourth highest percentage in Africa.

Thirty-eight percent of

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).

4.2. Common forms of malnutrition



Malnutrition is a major public health problem in many developing countries. It is one of the main health problems facing women and children in Ethiopia. Ethiopia faces the four major forms of malnutrition:

- Acute and chronic malnutrition
- Iron deficiency anemia (IDA)
- Vitamin A deficiency (VAD), and
- Iodine deficiency disorder (IDD).

According to the DHS (2016), the prevalence of low birth weight (LBW) in Ethiopia is one of the highest in the world, and has been estimated to be 13%. One major contributing factor for LBW is the poor nutritional status of women both before and during pregnancy, made worse by inadequate weight gain during pregnancy (DHS 2016).

4.3. Types of malnutrition

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

- Protein-energy malnutrition
- Micronutrient malnutrition or deficiency.

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).

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.



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

Self-check 4	Written test
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Part I. Say “True” if the statement is Correct or “False” if the Statement is Incorrect (each 2 point 2X2=4% incorrect

1. A child whose diet lacks the recommended amounts of essential vitamins and minerals can develop micronutrient malnutrition.
2. Chronic protein-energy malnutrition is the term used to cover both moderate and severe wasting and nutritional oedema.

Part II. Choose the Correct Answer for the Following Multiple Choose Questions (each 2 point 2x2= 4%)

1. 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
2. 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).

Note: Satisfactory rating - 4 points

Unsatisfactory - below 4 points

Answer sheet True or False



1. _____

2. _____

Answer Sheet Multiple choose Questions

1. _____

2. _____

Score= _____

Rating = _____

Name: _____

Date: _____



6.1. Number of eligible from the catchment areas

Priority nutrition targets and indicators

The World Health Organization (WHO) adapted six global nutrition targets adopted at the World Health Assembly (WHA) 2012. Selection criteria for global nutrition targets and related indicators include scientific robustness, a strong track record of extensive measurement experience, and use by countries in monitoring of national plans and programs. The six global targets for maternal and child nutrition endorsed by the 65th World Health Assembly (WHA) fulfil these criteria. All six are based on credible evidence of human benefit and it is strongly recommended that the entire suite be included as targets with relevant indicators as part of the staired Development Goals (SDGs). The WHA targets are as follows:

1. Reduce the number of children under-five who are stunted by 40%;
2. Reduce and maintain childhood wasting to less than 5%;
3. No increase in childhood overweight (children under 5 years of age);
4. Reduce anaemia in women of reproductive age (pregnant and non-pregnant) by 50%;
5. Increase the rate of exclusive breastfeeding in the first six months to at least 50%;
6. Reduce low birth weight by 30%.

Priority list of recommended nutrition targets and indicators with their definitions includes

1. 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

2. 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.

3. 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.

4. 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.

5. 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

6. 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.

6.2. Implementation of standard statistical method

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;

$$\begin{aligned} \text{Total number of } < 5 \text{ children} &= \frac{\text{total number of population} \times 14.7\%}{100\%} = \\ &= \frac{10,000 \times 14.7\%}{100\%} = 1470 \end{aligned}$$

1470 of the total population is < 5

- 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.

$$\text{Total number stunted under 5 age} = \frac{\text{total No of } < 5 \text{ age children} \times 38\%}{100\%}$$

- Considering that Prevalence of children under age 5 are stunted (short for their age); is 38% DHS 2016.

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

Self-check 5

Written test

Give short and correct answer for the following Essay item questions

1. List and define the six recommended nutrition targets and indicators (6 point)
2. Given the following samples and determine the number of wasted children (low weight-for-height) in Y catchment area use. (2 point)
 - Total population of Y is 40,000
 - Prevalence of children under 5 are wasted (thin for their height); is 10% at the national level DHS 2016.
 - So determine the number of wasted children in Y catchment area

Note: Satisfactory rating - 4 points

Unsatisfactory - below 4 points



7.1. Definition of nutrition intervention

Nutrition interventions 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:

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

7.2. Methods of nutrition intervention

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

7.3. Mechanisms of nutrition interventions

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

7.4. 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 in Africa:

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 antihelminthic 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 6	Written test
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Give short and correct answer for the following Essay item questions

1. List the five principal mechanisms through which all nutrition



3.

Score= _____

Rating = _____

Name: _____

Date: _____

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