Chapter-2; Malnutrition

What is Malnutrition?

According to WHO: "Malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients".

According to GAIN (Global Alliance for Improved Nutrition): "Malnutrition is caused by the interaction of poor-quality diets and poor health environments"

According to Healthline: "Malnutrition refers to getting too little or too much of certain nutrients".



Therefore, Malnutrition is an imbalance in dietary intake. It occurs when a person has too much or too little food or essential nutrients. A person with malnutrition may lack vitamins, minerals, and other essential substances that their body needs to function.

People may become malnourished if they do not eat enough food overall. However, people who eat plenty but do not have enough variation in their diet can also become malnourished.

Malnutrition can lead to:

- short- and long-term health problems
- slow recovery from wounds and illnesses
- a higher risk of infection

World Scenario of Malnutrition: Numbers of people with different forms of malnutrition worldwide.





In case of Bangladesh.....



Stunting affected growth of more than 30% or 4.3 million children under the age of five in Bangladesh last year, according to the latest estimate of child malnutrition.

Although the number of stunted children has been declining from 9.1 million in 2000 accounting for 56% of the children at the time, the prevalence rate is still very high.

In 2020, an estimated 2.1% or 0.30 million children in the country were overweight, meaning they were heavier than what is considered normal for their height, while it was just 0.7% or 0.11 million in 2000.

Symptoms; Some signs and symptoms of malnutrition include:



Symptoms in adults vs. children





UNICEF conceptual framework of Malnutrition Causes:

The UNICEF framework gives three main categories of underlying causes, as shown in the above schema.

1.Household food insecurity, or the lack of food, is a major factor in many humanitarian emergencies. Displaced populations are often separated from their normal source of food. One simple way to crudely estimate the contribution of household food insecurity in a malnourished population is to compare the prevalence of acute protein-energy malnutrition in children less than 2 years of age to the prevalence in children 2-4 years of age.

2.Poor social and care environment often consists largely of poor infant feeding practices, poor home care for ill children, and poor health care seeking behavior. Nutrition surveys will often ask questions about breastfeeding, general feeding practices, and home care and clinic visits during the last episode of illness.

3.Poor access to health care and unhealthy environment can be assessed using disease surveillance data and program data. In nutrition assessments, surveillance data for those diseases which are known to have substantial and rapid impact on nutritional status, such as dysentery and pneumonia, should routinely be analyzed. Many such diseases can produce rapid weight loss even in children and adults with normal pre-

disease nutritional status. The environment can be assessed with standard indicators of sanitation and water supply.

Causes for Malnutrition:

Malnutrition can occur for various reasons. The sections below outline these potential causes in more detail.

a. Low intake of food

Some people develop malnutrition because there is not enough food available, or because they have difficulty eating or absorbing nutrients.

This can happen as a result of:

-cancer

-liver disease

-conditions that cause nausea or make it difficult to eat or swallow

-taking medications that make eating difficult — due to nausea, for example mouth problems etc.

b. Mental health conditions

Undernutrition or malnutrition can affect people with:

-depression

-dementia

-schizophrenia

-anorexia nervosa

-Eating disorders can severely affect the quality of life of people living with these conditions and those close to them.

c. Social and mobility problems

Factors that can affect a person's eating habits and potentially lead to malnutrition include:

-being unable to leave the house or go to a store to buy food

-finding it physically difficult to prepare meals

-living alone, which can affect a person's motivation to cook and eat

-having limited cooking skills

-not having enough money to spend on food

d. Digestive disorders and stomach conditions

If the body does not absorb nutrients efficiently, even a healthful diet may not prevent malnutrition.

-Examples of digestive and stomach conditions that may cause this include:

-Crohn's disease -ulcerative colitis -celiac disease -persistent diarrhea, vomiting, or both

d. Alcohol use disorder

Consuming a lot of alcohol can lead to <u>gastritis</u> or long-term damage to the pancreas. These issues can make it hard to:

-digest food

-absorb vitamins

-produce hormones that regulate metabolism

-Alcohol also contains calories, so a person may not feel hungry after drinking it. Therefore, not eat enough healthful food to supply the body with essential nutrients.

Classification of Malnutrition:

There are various types of malnutrition as shown in the following figure. Basically, Malnutrition can be divided into two types: 1. Under nutrition 2. Over nutrition.



Overnutrition:

Overnutrition is a form of malnutrition (imbalanced nutrition) arising from excessive intake of nutrients, leading to accumulation of body fat that impairs health i.e., overweight/obesity.



Overweight and obesity:

-Overweight and obesity is when a person is too heavy for his or her height.

-Body mass index (**BMI**) is an index of weight-for-height commonly used to classify overweight and obesity. **BMI** is defined as a person's weight in kilograms divided by the square of his/her height in meters (kg/m²).

-In adults, overweight is defined as a BMI of 25 or more, whereas obesity is a BMI of 30 or more.

-Overweight and obesity result from an imbalance between energy consumed (too much) and energy expended (too little).

Undernutrition and its types:



1. Growth Failure consists of:

(a) Acute Malnutrition (Wasting):

Also commonly known as wasting, acute malnutrition refers to the rapid loss of weight or inability to gain weight by a child in comparison to his/her height. It can be calculated as **weight-for-height** of an individual.

Based on clinical classification, acute malnutrition can be categorized into 3 forms-(i)Marasmus, (ii)Kwashiorkor and (iii)Marasmic-Kwashiorkor

Based on severity, acute malnutrition) can be classified as- (i) Moderate Acute Malnutrition (MAM), (ii) Severe Acute Malnutrition (SAM) and (iii) Global Acute Malnutrition.



(b). Chronic Malnutrition (Stunting): Also commonly known as stunting, chronic malnutrition refers to the malnutrition which occur due to inadequate nutrition intake for a long period of time. It can be calculated as **height-for-weight** of an individual.

(c). Acute and/or chronic Malnutrition (Underweight): This form of malnutrition is a result of either wasting or stunting or combined effect of both of them. It is commonly known as underweight and can be calculated as weight-for-age of a child.

2. Micronutrient malnutrition consists of:

Inadequacies in intake of vitamins and minerals often referred to as micronutrients. Micronutrients enable the body to produce enzymes, hormones, and other substances that are essential for proper growth and development.

lodine, **vitamin A**, and **iron** are the most important in global public health; their deficiency represents a major threat to the health and development of populations, particularly children and pregnant women in low-income countries.

Protein-energy Malnutrition: Marasmus & Kwashiorkor

Marasmus is a type of protein-energy malnutrition that can affect anyone but is mainly seen in children if have a severe deficiency of nutrients like calories, proteins, carbohydrates, vitamins, and minerals.

Kwashiorkor, also known as "edematous malnutrition" because of its association with edema (fluid retention), is a nutritional disorder most often seen in regions experiencing famine. It is a form of malnutrition caused by a lack of protein in the diet. People who have kwashiorkor typically have an extremely emaciated appearance in all body parts except their ankles, feet, and belly, which swell with fluid.

Symptoms of Marasmus and kwashiorkor:

Thin and brittle hair Simian facies Loss of muscle mass Marasmus	VS	Thin and brittle hair Moon face Bulging abdomen (ascites) Kwashiorkor
Severe deficiency of all nutrients and inadequate caloric intake		Severe protein deficiency but normal caloric intake
Peripheral edema is absent		Peripheral edema is present
Hair changes absent		Hair changes common (sparse and easily pulled out)
Skin is dry and wrinkled		Dermatosis, flaky paint
but no dermatosis		appearance of skin
Voracious appetite		Poor appetite
Absent subcutaneous fat		Reduced subcutaneous fat
Fatty liver uncommon		Fatty liver common
Better prognosis		Worse prognosis

Diagnosis of Marasmus and kwashiorkor

Doctor can diagnose marasmus by physically examining of body. They generally check height and weight are appropriate for age or not. In children, doctors measure the girth of the middle-upper arm to check for malnutrition. To rule out kwashiorkor, doctor may also check whether you have edema.

It may have to undergo lab tests to check your hemoglobin, blood cell count, blood glucose levels, and so on. This is done to confirm whether you have any infection or disease that can cause marasmus.

Treatments

If severe marasmus is left untreated, it can cause death due to infection, electrolyte imbalance, heart failure, or hypothermia. Clinical treatment for marasmus includes the following steps:

Resuscitation. This step involves <u>rehydration</u>. This can be done by injecting a rehydrating solution into your vein or by orally feeding it to you. You may also be given antibiotics and medicines to treat underlying infections or diseases.

Children are generally nursed in a warm room as they may be cold due to hypothermia.

Stabilization. This step involves gradual feeding to improve the levels of nutrients in your body. Your doctor will start by feeding you some milk or formula mixed with water. You will also receive a rehydrating solution containing electrolytes, amino acids, glucose, vitamins, and minerals by mouth or by vein.

Nutritional rehabilitation and follow-up. This step involves increasing your nutrient intake through a protein and energy-rich diet. The nutrients help your body repair and grow normally. It also helps you restore your optimal weight and height over time.

Kwashiorkor can be corrected by eating more protein and more calories overall, especially if treatment is started early.

It may first be given more calories in the form of carbohydrates, sugars, and fats. Once these calories provide energy, you will be given foods with proteins. Foods must be introduced and calories should be increased slowly because you have been without proper nutrition for a long period. Your body may need to adjust to the increased intake. Doctor will also recommend long-term vitamin and mineral supplementation to your diet.

Diagnosis of Malnutrition: When to contact a doctor?

A few key signs of malnutrition indicate that it is time for a person to seek care from a doctor. These signs include:

- unexplained, unintentional weight loss of more than 5% in the last 3–6 months
- presence of other malnutrition symptoms
- a worry that someone else may be showing signs of malnourishment

• if a person experiences signs of an eating disorder, or sees these in someone else

Diagnosis:

If a doctor suspects Crohn's disease, celiac disease, or another condition, they may evaluate the patient's condition by:

-asking about medical history

-conducting a physical exam

-ordering testing

A healthcare professional may also carry out the following:

- blood tests for general screening and monitoring
- tests for specific nutrients, such as iron or vitamins
- prealbumin tests, as malnutrition commonly affects levels of this protein
- albumin tests, which may indicate liver or kidney disease

A tool to identify risk

Some tools can help identify people who have or are at risk of malnutrition. One way to assess adults is by using the **Malnutrition Universal Screening Tool** (**MUST**). has shown this to be a reliable tool.

It is a five-step plan to help healthcare professionals diagnose and treat these conditions.

The five steps are as follows:

-Measure a person's height and weight, calculate their body mass index (BMI), and provide a score.

-Note the percentage of unplanned weight loss and provide a score. For example, an unplanned loss of 5–10% would give a score of 1, while a 10% loss would score a 2.

-Identify any mental or physical health conditions and provide a score. For example, if a person has been acutely ill and taken no food for over 5 days, this would lead to an additional 2 points.

-Add the scores from steps 1, 2, and 3 to obtain an overall risk score. -Use local guidelines to develop a care plan based on the score.

The score will be one of the following: **low risk:** 0

medium risk: 1 high risk: 2 or more

*Note. The test will not identify specific nutritional imbalances or deficiencies.

Malnutrition Criteria

Healthcare professionals use different tools to diagnose malnutrition. Which tool is used will vary depending on specific circumstances such as the patient's age and the clinical setting in which the patient is seen.

EAT-26

The Eating Attitudes Test (**EAT-26**) is a self-administered quiz used to identify the presence of "eating disorder risk" based on attitudes, feelings, and behaviors related to eating. The test includes 26 questions that assess general eating behavior, with five additional questions assessing risky behaviors.

1.	ls on a diet
2	Eats diet foods
3.	Uncomfortable eating sweets
4.	Eats fattening foods
5.	Avoids sugar
6.	Avoids carbohydrates
7.	Preoccupied with thinness
8.	Likes stomach to be empty
9.	Exercises to burn calories
10.	Guilty after eating
11.	Scared about being overweight
12.	Preoccupied about body fat
13.	Aware of caloric content
16.	Engages in binge episodes
17.	Thinks a lot about eating
18.	Preoccupied with food
19.	Feels that food controls life
20.	Cuts food into small pieces
21.	Takes long time to eat
22.	Others think subject is too thin
23.	Others would prefer if subject ate m
24.	Others pressure subject to eat
25.	Avoids eating when hungry
26.	Controls food intake

The EAT-26 is not designed to make a diagnosis of an eating disorder.

DSM-5

The <u>Diagnostic and Statistical Manual of Mental Disorders, (DSM-5)</u> is the standard for classifying and diagnosing mental disorders used by mental health professionals. Specific criteria are defined for each mental disorder which must be met in order to make a diagnosis. Even if all the DSM-5 criteria for a particular disorder are not met, another condition may still be present.

NRS-2002

One of the nutritional risk screening tools used most often in hospitals worldwide is the **Nutritional Risk Screening 2002** (NRS-2002). This tool is meant to be a generic tool in the hospital setting. It is useful in detecting most of the patients who would benefit from nutritional therapy.

The NRS-2002 is a simple and well-validated tool that first incorporates a pre-screening with four questions. If one of these is answered positively, a second screening follows which includes additional questions regarding nutritional status.

When administered by trained staff, the NRS-2002 has been shown to be very reliable. Its validity has been assessed in hundreds of studies, including randomized clinical controlled trials.

Treatment of Malnutrition:

If a doctor diagnoses malnutrition, they will make a treatment plan for the person. The person may also need to meet with a dietician and other healthcare professionals. Treatment will depend on the severity of the malnutrition and the presence of any other underlying conditions or complications.

It may include:

-ongoing screening and monitoring

-making a dietary plan, which might include taking supplements

-treating specific symptoms, such as nausea

-treating any infections that may be present

-checking for any mouth or swallowing problems

-suggesting alternative eating utensils

-In severe cases, a doctor may administer nutrients intravenously.

-The person's healthcare team will continue to monitor them to ensure they get the nutrition they need.

Prevention of Malnutrition:

To prevent malnutrition, people need to consume a range of nutrients from various food types.

Older adults, young children, people with severe or chronic illness, and others may need additional care to obtain the nutrients they need.

Anyone who starts to show signs of malnutrition or undernutrition should see a doctor for a diagnosis and treatment.

In the U.S., effective treatment is usually available, although the outlook and time needed for recovery will depend on the cause of the malnutrition.

