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Chapter

Causes of Malnutrition

Tariku Laelago Ersado

Abstract

Malnutrition is defined as deficiency or excess of nutrition consumption. It can be undernutrition and overnutrition. Malnutrition contributed to more than third of child death. There is no single cause of malnutrition. The causes of malnutrition can be categorized as immediate, underlying, and basic. The immediate-level causes of malnutrition comprise inadequate dietary intake and disease conditions. The underlying-level causes include insufficient household food security, inadequate social and care environment and insufficient health service, and unhealthy environment. The basic-level causes of malnutrition consist climate variability and extremes, sociocultural, economic, and political context. Undernutrition is specifically caused by deficiency of energy, vitamin, and minerals. Overnutrition is specifically caused by overconsumption of energy and micronutrients. The causes of overnutrition are not clearly put in many studies. Therefore, studies that focus on cause of overnutrition should be done by incorporating both developed and undeveloped countries.

Keywords: malnutrition, immediate, basic, underlying, causes, overnutrition, undernutrition

1. Introduction

Malnutrition refers to deficiencies or excesses in nutrient intake, imbalance of essential nutrients, or impaired nutrient utilization. Malnutrition can be divided into two types: undernutrition and overnutrition. Undernutrition manifests in four broad forms: stunting/chronic malnutrition, wasting/acute malnutrition, acute and/or chronic malnutrition/underweight, micronutrient deficiencies. Overnutrition consists of overweight and obesity [1, 2].

Wasting is defined as low weight for height. Wasting can be classified as severe acute malnutrition and moderate acute malnutrition. Severe acute malnutrition consists of kwashiorkor, marasmus and marasmic kwashiorkor. Wasting often shows current and severe weight loss, though it can also continue for a long time. It commonly happens when a person has not had food of adequate quality and quantity, and/or they have had frequent or prolonged illnesses. Wasting in children is related with a higher risk of mortality. Stunting is defined as low height for age. Stunting is the result of chronic undernutrition. It is related with poverty, poor maternal health and nutrition, illness, and feeding problems. It is the result of chronic or recurrent undernutrition, usually associated with poverty, poor maternal health and nutrition, frequent illness, and/or inappropriate feeding and care in early life. Stunting precludes children from attainment of their physical and mental potential. Underweight

is defined as low weight for age. A child who is underweight may be stunted, wasted, or both. Micronutrient deficiencies are a lack of vitamins and minerals that are essential for body functions such as producing enzymes, hormones, and other substances needed for growth and development [2].

Malnutrition can be caused by various factors. Unavailability of enough food, having difficulty in eating or absorbing nutrient can cause malnutrition [3]. Health conditions such as vomiting, loss of appetite, mental health disorders, and some medicines can also cause malnutrition [4].

The causes of malnutrition can be grouped into immediate-level cause, underlying-level causes, and basic-level causes [5, 6]. Undernutrition can be particularly caused by consuming inadequate energy, vitamins, and minerals while overnutrition is caused by overconsuming energy and micronutrients [7]. The causes of malnutrition vary from place to place and from time to time. Availing updated information on causes of malnutrition is important to propose appropriate strategies that focus on prevention of malnutrition. The objective of this chapter is providing the best available and updated information on causes of malnutrition. The chapter described the causes of malnutrition by using different conceptual frameworks. The chapter also identified specific causes of malnutrition for common malnutrition types.

2. Causes of malnutrition

There is no single cause of malnutrition. Causes of malnutrition may range from individual, families, district, country, regions, and global level. The causes of malnutrition can be understood from UNICEF's conceptual framework and from conceptual framework developed for dry lands of Africa. Malnutrition causes can be classified as immediate, underlying, and basic (Figures 1 and 2).

A new conceptual framework developed for dry lands of Africa identified the basic/system, underlying, and immediate causes of acute malnutrition. The new

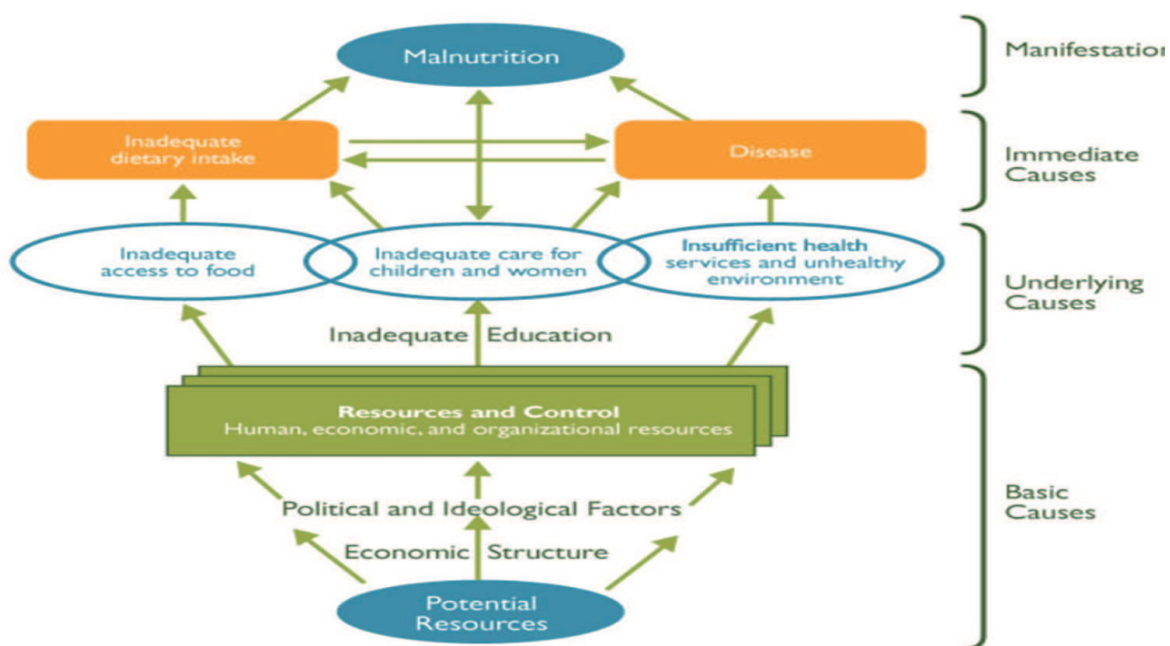


Figure 1. UNICEF's conceptual framework for the cause of malnutrition. Source: Sablah [5].

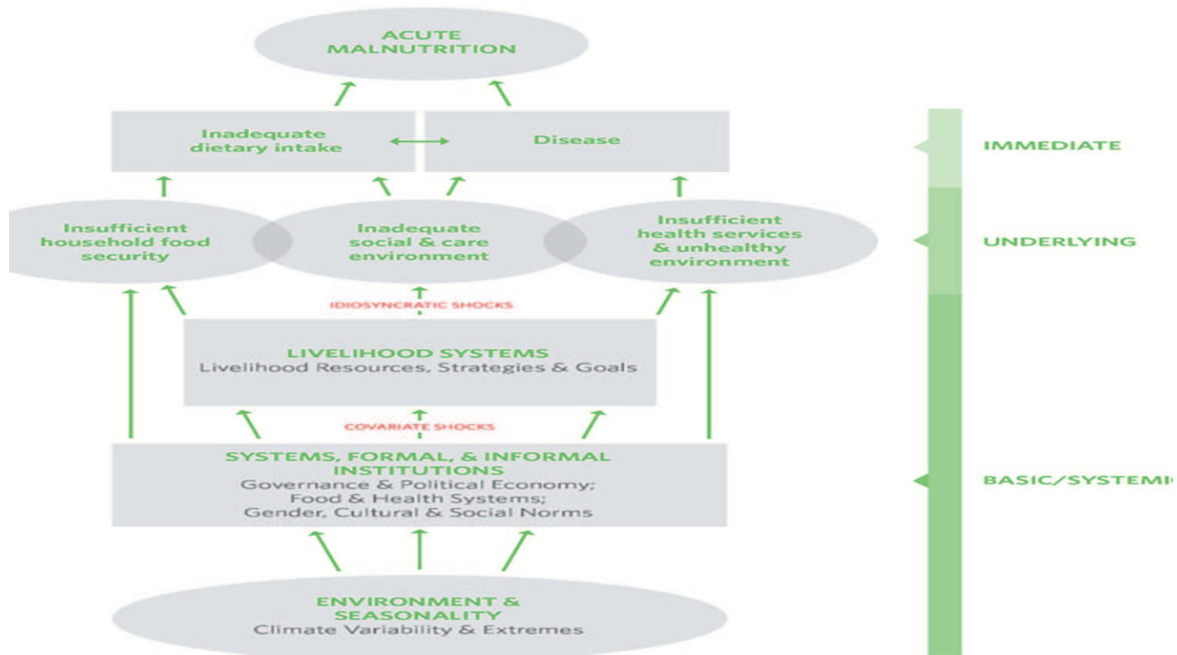


Figure 2. Acute malnutrition in African dry land: a new conceptual framework for cause of malnutrition. Source: Young [6].

framework deals with acute malnutrition in African dry land [6]. The new conceptual framework focuses on the importance of climate and environment in dry lands in influencing livelihood systems. The conceptual framework also recognizes the deadly and often transformative impact of conflict and climate shocks on systems and institutions, livelihood resilience and adaptation, and the underlying causes of malnutrition. In reducing vulnerability and building resilience, the role of social and political systems, including governance, and within these systems, formal and informal institutions, is given renewed emphasis [6]. The manifestation of the new conceptual framework is acute malnutrition. This is because severe acute malnutrition is a public health problem throughout the developing countries, mainly in Sub-Saharan Africa and South Asia.

2.1 Immediate-level causes of malnutrition

The immediate-level causes of malnutrition include inadequate dietary intake and diseases. On an immediate level, malnutrition results from an imbalance between the required amount of nutrients by the body and the actual amount of nutrients introduced or absorbed by the body. Inadequate dietary intake and diseases are caused by food insecurity, inadequate care for women and children, insufficient health services, and unsanitary environments [5]. Reduced dietary intake, reduced absorption of macro- and/ or micronutrients, increased losses or altered requirements, and increased energy expenditure (in specific disease processes) can be a cause for immediate malnutrition [8].

Dementia can cause a person to neglect their health and forget to eat. This in turn causes immediate malnutrition. Ulcerative colitis or Crohn's disease can also be a reason for malnutrition. People who have difficulty in eating due to painful teeth or lesions of mouth, dysphagia are also at risk of malnutrition. Loss of appetite that may be caused by cancers, tumors, mental illness, liver or kidney disease, chronic infections can also be included in immediate causes of malnutrition [9]. Diseases such as

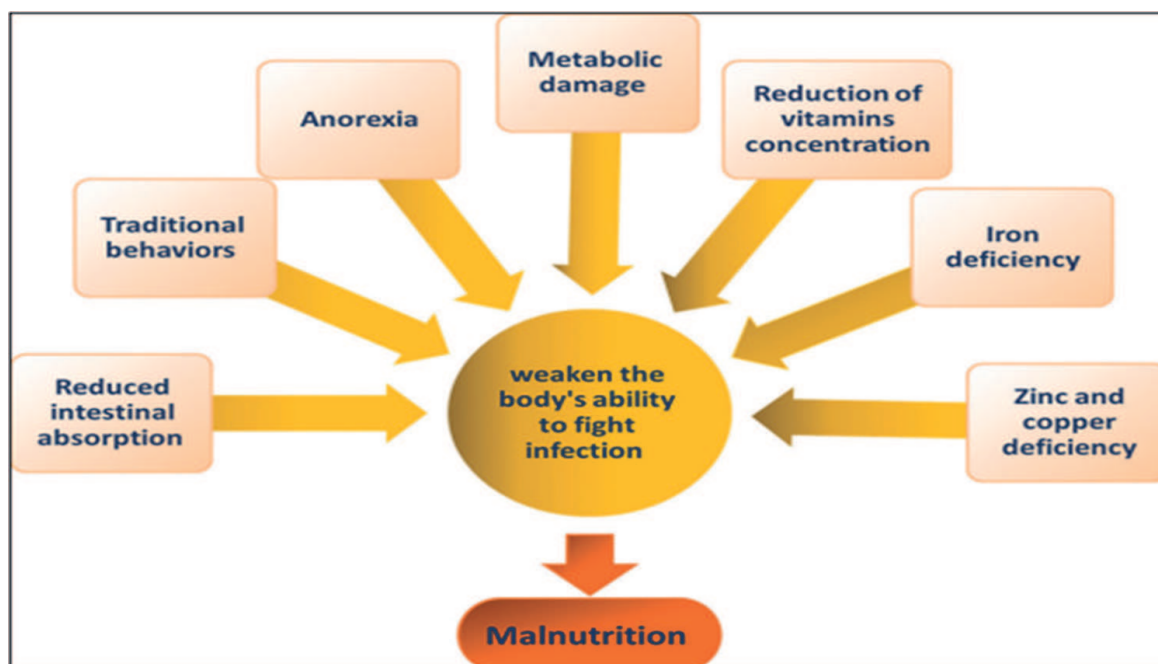


Figure 3. The factors that weaken the body's ability to fight infection and cause malnutrition. Source: Farhadi and Ovchinnikov [11].

measles, diarrhea, AIDS, respiratory infection, malaria, renal failure, and intestinal worms can breakdown the nutritional status [10].

Anorexia, traditional behaviors, reduction of intestinal absorption, metabolic damage, disorder metabolism of lipids and carbohydrates, reduction of vitamins, iron, zinc, and copper can weaken the ability to fight infection and cause malnutrition. A large number of studies have illustrated a bidirectional interaction of malnutrition and infection (**Figure 3**) [11].

Health and nutrition are closely related in a “malnutrition-infection cycle” in which diseases contribute to malnutrition, and malnutrition makes an individual more vulnerable to disease. Malnutrition is the result of insufficient dietary intake, disease, or both. Disease contributes through loss of appetite, malabsorption of nutrients, and loss of nutrients through diarrhea or vomiting. If the body's metabolism is altered, greater the risk is of malnutrition (**Figure 3**).

In some circumstances, such as enterocutaneous fistulae or burns, patients may have excessive and/or specific nutrient losses; their nutritional requirements are usually very different from normal metabolism [8].

The pharmacological and pharmaceutical properties of drugs can affect the intake, digestion, absorption, storage, metabolism, and elimination of nutrients, causing imbalance in the amount of nutrients required in the body [12].

2.2 Underlying-level causes of malnutrition

Household (HH) food insecurity, poor social and care environment and poor access to health care, and unhealthy environment are included in underlying causes of malnutrition. The underlying issues are caused by conflict, inadequate education, poverty, gender inequality, inadequate infrastructure, and other basic issues [5].

HH food insecurity or the lack of food is a main factor that causes under nutrition. HH food insecurity is a problem specifically for displaced people [13]. Food insecurity

happens when people are frequently concerned about accessing adequate amount of safe, affordable, and nutritious foods. Lack of income to meet the expenses of safe food can cause food insecurity [14].

Poor infant feeding behaviors, poor home care for ill children, and poor health-seeking behaviors are included in poor social and care environment [13, 15]. The social and care environment within the HH and local community also can directly influence malnutrition.

Infant and young child feeding practice is vital component of good nutrition and health. Appropriate childcare, which includes infant and young child feeding practices, is an essential element of good nutrition and health. Cultural factors and resources such as income, time and knowledge also influence caring practices as well as attitudes to modern health services, water supplies, and sanitation [13, 16].

Access to affordable health service, availability of safe water, adequate sanitation, and good housing condition are prerequisites for adequate nutrition [13, 15, 17]. Study conducted in different countries showed that poverty is the most important factor of malnutrition. In an area where poverty is prevalent, children do not obtain balanced diet [13].

2.3 Basic-level causes of malnutrition

The causes of malnutrition identified in UNICEF conceptual framework on causes of malnutrition included potential resources and resources and control (human, economic, and organizational resources). However, a new conceptual framework developed by Young [6] to address acute malnutrition in Africa's dry lands encompasses: environment and seasonability, system, formal and informal institutions, and livelihood system. In this conceptual framework, system, formal and informal institutions included governance and political economy, food and health system, gender, cultural and social norms. Livelihood system comprises livelihood resources, strategies, and goals [6].

In basic causes, there are three essential parts of resources: human resource (people, knowledge, skill, and time), economic resource (assets, lands, income, and others), and organizational resources (formal and informal institutions, extended families, and child care organizations) [18].

The formal national institutions that make up the system of governance are centrally essential. It includes civic, political, and economic institutions. Informal institutions include markets, traditional institutions, and wider social customs and rules. These informal social systems determine power relations and resource distribution between different social groups in society, which in turn determine disaster risk and risk of malnutrition [6].

The basic causes of malnutrition are poverty, lack of information, political and economic insecurity, war, lack of resources at all levels, unequal status of women, and/or natural disasters [15].

2.4 Causes of malnutrition in children

Malnutrition in children is caused when the demand of nutrient and calories is deficient. Increased demand for nutrients and calories that may be deficient in a normal diet.

Preterm babies have more chance of becoming malnourished than other babies. Preterm babies are at a higher risk of malnutrition as are infants at the time of

weaning. Congenital heart disease, childhood cancers, cystic fibrosis, and other long-term diseases are the major risk factors for malnutrition. Neglected children, orphans, and those living in care homes are prone to malnutrition [9]. Some children may become malnourished because of an eating disorder or a behavioral or psychological condition that means they avoid or refuse food.

2.5 Causes of overnutrition

The conceptual framework developed by UNICEF and the new conceptual frame developed for dry lands of Africa focus on the causes of undernutrition. However, currently double burden of malnutrition became an international agenda. Therefore, dealing with causes of overnutrition is mandatory.

Energy overnutrition is common in developed countries. Sometimes, people with this type of overnutrition may also experience micronutrient undernutrition if their foods are high in calories but low in micronutrients.

There are many causes of overnutrition. Overnutrition is caused by consuming too much energy than a person needs every day. Consuming too much energy will causes weight gain over time unless a person increases physical activity. It does not matter if those extra calories come from macronutrients (fat, carbohydrates, or protein) because the body takes whatever it does not need and stores it as fat. Overnutrition is associated also with eating too much food and hence having an excessive intake of many nutrients rather than of a single one.

Types of malnutrition	Caused by deficiency of	Diseases and abnormal conditions caused by malnutrition
Protein energy malnutrition	Protein	Kwashiorkor
	Protein	Marasmus
Micronutrient deficiency	Iodine	Goiter
	Vitamin A	Bitot's spots, Night blindness
	Iron deficiency	Anemia
	Thiamine (Vitamin B1)	Beriberi
	Niacin (Vitamin B3)	Pellagra
	Folic Acid (Vitamin B9)	Several birth defects.
	Vitamin C (Ascorbic Acid)	Scurvy
	Vitamin D	Rickets, Muscle diseases, osteoporosis
	Vitamin E	Hemolytic anemia in premature infants and children
	Vitamin K	Abnormal blood clotting,
	Calcium	Osteoporosis, Osteomalacia,
Zinc	Growth retardation	
Selenium	Keshan's disease	
Overnutrition	Caused by consumption of over-energy and micronutrients	Cardiovascular disease. Cancer. Type II diabetes

Table 1.
Common malnutrition and their causes.

Consuming energy above 1587 Cal/day, protein above 41–57 g/day, and fat above 19–32 g/day increases overweight/obesity both in men and women [19].

Per-capita per day consumption of milk/milk products, fats, and oils (including meat and meat products), sugars and jiggery (including condiments, biscuits, *etc.*), and salts/sodium showed a significant dose-response relationship with overweight/obesity prevalence [19].

Micronutrient overnutrition occurs when a person consumes too much of any certain nutrients. It's possible to get too much of most vitamins or minerals, but usually this happens when you take mega doses of dietary supplements [20]. Micronutrient overnutrition can cause acute poisoning, such as taking too many iron pills at once [21]. Micronutrient overnutrition often results from the use of self-prescribed over-the-counter vitamin and mineral supplements. For example, it can also be chronic, taking large doses of vitamin B6 over several weeks or months [22].

The study also displayed that eating habit while watching television and not having close friend, educational status, sweet food preference, fat consumption more than 3 days per week, eating habit while reading and vigorous-intensity sports were associated with overnutrition [23].

2.6 Common malnutrition and their causes

The specific causes of malnutrition are different for different types of malnutrition. In **Table 1**, the common types of malnutrition, diseases, and their specific causes are described (**Table 1**).

3. Conclusion

Malnutrition is not getting enough energy or getting too much of nutrients. There are two forms of malnutrition: undernutrition and overnutrition. Malnutrition can be caused by various factors. The causes of malnutrition can be classified as immediate, underlying, and basic causes. Insufficient dietary intake and diseases can cause immediate malnutrition. HH food insecurity, inadequate social and care environment and insufficient health service, and unhealthy environment are classified in underlying causes of malnutrition. Basic-level causes of malnutrition include: potential resource and resource control, environmental factors, reasonability, system, institutions, and livelihood system.

Energy, vitamin, and mineral deficiency causes undernutrition. Overnutrition is caused by overconsumption of energy and micronutrients. Hence, there is double burden of malnutrition around world, great emphasis should be given for undernutrition and overnutrition. The causes of overnutrition are not clearly indicated in several studies. Therefore, studies that focus on cause of overnutrition should be done by including both developed and undeveloped countries.

3.1 Terminology

Anorexia: Persistent loss of appetite.

Beriberi: A degenerative disease of the nerves caused by a deficiency of the vitamin thiamine and marked by pain, inability to move, and swelling.

Condiments: A preparation (a sauce or relish or spice) to enhance flavor or enjoyment.

Crohn's disease: A serious chronic and progressive inflammation of the ileum producing frequent bouts of diarrhea with abdominal pain and nausea and fever and weight loss.

Cystic fibrosis: A genetic disorder, characterized by a tendency to develop chronic lung infections and an inability to absorb fats and other nutrients from food.

Dementia: Mental deterioration of organic or functional origin.

Dysphagia: Condition in which swallowing is difficult or painful.

Keshan's disease: A fatal heart disease found in children living in certain sections of China.

Osteomalacia: Abnormal softening of bones caused by deficiencies of phosphorus or calcium or vitamin D.

Osteoporosis: Abnormal loss of bony tissue resulting in fragile porous bones attributable to a lack of calcium; most common in postmenopausal women.

Pellagra: A disease caused by a dietary deficiency of niacin and marked by dermatitis, diarrhea, and disorder of the central nervous system.

Rickets: A disease, especially of children, caused by a deficiency in vitamin D that makes the bones become soft and prone to bending and structural change.

Scurvy: A disease caused by insufficient vitamin C, the symptoms of which include spongy gums, loosening of the teeth, and bleeding into the skin and mucous membranes.

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