
UNIT 1 NUTRITION AND MALNUTRITION

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1.1 INTRODUCTION

Nutrition is all about the study of food and how our bodies use it as fuel for growth, reproduction and maintenance of health. Nutrition comprises the process of providing the nutrients needed for health, growth, development and survival. Food is any substance (solid, semi-solid, or liquid) taken into the body to provide one or more nutrients.

Nutrition is a critical part of health and development. Better nutrition is related to improved infant, child and maternal health, stronger immune systems, safer pregnancy and childbirth, lower risk of non-communicable diseases (such as diabetes and cardiovascular disease), and longevity. Healthy children learn better. People with adequate nutrition are more productive and can create opportunities to gradually break the cycles of poverty and hunger.

Malnutrition is an imbalance between the nutrients your body needs to function and the nutrients it gets. Malnutrition, in every form, presents significant threats to human health. Today the world faces a double burden of malnutrition that includes both under nutrition and overweight, especially in low- and middle-income countries. There are multiple forms of malnutrition, including under nutrition (wasting or stunting), inadequate vitamins or minerals, overweight, obesity, and resulting diet-related non-communicable diseases.

After reading this unit, you will be able to-

- Understand nutrition
- Explain types of malnutrition
- Describe effects of malnutrition
- Suggest treatment and prevention of malnutrition

1.2 UNDERSTANDING NUTRITION

Nutrition is the science of food and health. It studies how we obtain nutrients from food and the effect it has on our bodies. Good nutrition is the bedrock of child survival and development. Well-nourished children are better able to grow, learn, play and participate in their communities. They are also more resilient in the face of crisis.

1.2.1 What is a balanced diet?

Balanced eating can be summed up in one word: variety! Not only eating from a variety of food groups, but also a variety of food within those food groups. Each food group provides important and vital macro and micro-nutrients that are essential for growth, development and body function. Balanced diet consists of the following-

a. Proteins

Foods containing protein are an essential part of balanced eating. On a portion plate, the protein comprise 1/4 of the meal. Amino acids found in proteins provide structure for muscle tissue, bone and skin. Protein is essential for life sustaining chemical reactions in the body, internal communication of cells, immune support, and is a source of energy and regulation. Our main dietary source of protein is from meat, eggs, legumes, nuts, and seeds.

b. Vegetables

Vegetables are important in a balanced diet, as they provide essential micronutrients necessary for development and function. Studies repeatedly show people who eat a diet high in vegetables have fewer rates of chronic diseases. Vegetables are plant food such as carrots, broccoli, cauliflower, peppers, squash, string beans, kale, and lettuce. It's important to eat a variety of vegetables as each sub-group of veggies, by color provide different nutrients. You can also increase the variety of veggies by cooking them in a variety of ways. Roasted, sauteed, steamed, baked, or raw can all taste so different and help you to find a way you enjoy a certain vegetable.

c. Fruits

Fruits help make a balanced diet as a healthy, whole food source of carbohydrates, fiber, and micronutrients. Fruit is rich in potassium, vitamin C, and folate. The fiber in fruit is vital for healthy digestive functioning. Fruit includes such foods as bananas, apples, strawberries, blueberries, grapefruit, oranges, watermelon and more.

d. Grains

Grains are considered essential to optimal health. Grains are a great source of energy in the form of carbohydrates, as well as B Vitamins. Whole grains can provide a good source of fiber and can be of benefit by providing a good environment for healthy bacteria to grow.

e. Dairy

Dairy made the list of a food group to have a balanced diet because it still is considered an easy, convenient food group to get essential calcium to build bones. Dairy also includes phosphorus, potassium, magnesium, and vitamins A, B12, and riboflavin. Dairy includes milk, cheese, and yogurt.

Many non-dairy plant based milks on the market today are fortified with calcium and vitamin D, making them also a good source of “dairy” for those who may be lactose intolerant.

1.3 MALNUTRITION AND TYPES OF MALNUTRITION

1.3.1 Malnutrition

Malnutrition is an imbalance between the nutrients your body needs to function and the nutrients it gets. It can mean undernutrition or overnutrition. You can be malnourished from an overall lack of calories, or you might have a protein, vitamin or mineral deficiency. You might also have more excess calories than your body knows what to do with.

Your body needs a variety of nutrients, and in certain amounts, to maintain its tissues and its many functions. Malnutrition happens when the nutrients it gets don't meet these needs. You can be malnourished from an overall lack of nutrients, or you may have an abundance of some kinds of nutrients but lack other kinds. Even the lack of a single vitamin or mineral can have serious health consequences for your body. On the other hand, having an excess of nutrients can also cause problems.

1.3.2 What are the types of malnutrition?

Malnutrition can mean under nutrition or over nutrition. It can also mean an imbalance of macronutrients (proteins, carbohydrates, fats) or micronutrients (vitamins and minerals).

i. Under nutrition

Under nutrition is what most people think of when they think of malnutrition. Under nutrition is a deficiency of nutrients. You may be undernourished if you don't have an adequate diet, or if your body has trouble absorbing enough nutrients from your food. Under nutrition can cause visible wasting of fat and muscle, but it can also be invisible. You can be overweight and undernourished.

ii. Macronutrient under nutrition

Also called protein-energy under nutrition, this is a deficiency of macronutrients: proteins, carbohydrates and fats. Macronutrients are the main building blocks of your diet, the nutrients that your body relies on to produce energy to maintain itself. Without them — or even just one of them — your body soon begins to fall apart, breaking down tissues and shutting down nonessential functions to conserve its low energy.

iii. Micronutrient under nutrition

Micronutrients are vitamins and minerals. Your body needs these in smaller amounts, but it does need them, for all types of functions. Many people are mildly deficient in certain vitamins and minerals from a lack of variety in their diet. You might not notice a mild vitamin deficiency affecting you, but as micronutrient under nutrition becomes more severe, it can begin to have serious and lasting effects.

iv. Over nutrition

The World Health Organization has recently added over nutrition to its definition of malnutrition to recognize the detrimental health effects that can be caused by excessive consumption of nutrients. This includes the effects of overweight and obesity, which are strongly associated with a list of non communicable diseases (NCDs). It also includes the toxicity that can result from overdosing specific micronutrients.

v. Macronutrient over nutrition

When your body has an excess of protein, carbohydrate and/or fat calories to use, it stores them away as fat cells in your adipose tissue. But when your body runs out of tissue for storage, the fat cells themselves have to grow. Enlarged fat cells are associated with chronic inflammation and with a host of metabolic disorders that follow. These can lead to NCDs such as diabetes mellitus, coronary artery disease and stroke.

vi. Micronutrient over nutrition

You can actually overdose on vitamin and mineral supplements. In general, micronutrient over nutrition is uncommon and doesn't occur from diet alone. But if you take mega doses of certain supplements, it can have toxic effects.

At least one in three children under 5 is affected by malnutrition in its most visible forms: stunting, wasting and overweight.

- i. **Stunting-** Children affected by stunting are too short for their age, and their brains may never develop to their full cognitive potential, hindering their ability to learn as children, earn as adults, and contribute fully to their societies.
- ii. **Wasting-** Children with wasting are desperately thin, have weakened immune systems, and face an increased risk of death. They require urgent treatment and care to survive.
- iii. **Overweight-** As global food systems shift and the consumption of processed foods high in fat, sugar and salt increases, childhood overweight is on the rise in every region of the world, particularly in middle-income countries.

Less visible forms of malnutrition, such as hidden hunger, can occur when children become deficient in essential vitamins and other micronutrients. Today, many countries are facing a double or triple burden of malnutrition – with concurrent problems of stunting, wasting, micronutrient deficiencies, and overweight. From pregnancy, through childhood, and in adolescence, poor diets are a leading cause of malnutrition in all its forms.

In this section, you have studied understanding nutrition, malnutrition and types of malnutrition. Now, answer the question given in check your progress 1.

Check Your Progress 1

Note: a) Answer the following questions in about 50 words.

- b) Check your answer with possible answers given at the end of the unit.

1. What do you understand by nutrition and malnutrition?

2. Explain briefly anyone type of malnutrition?

1.4 EFFECTS OF MALNUTRITION

In its broadest sense, malnutrition can affect anyone. Lack of knowledge of nutrition, lack of access to a variety of foods, sedentary modern lifestyles and economic disadvantages are all common contributors to malnutrition. Certain populations are more at risk of certain types of malnutrition. Malnutrition in children, adolescents, and women can impair health, educational attainment, and increase the likelihood of low birth weight children. For example, insufficient iron can cause anaemia, particularly in pregnant women, and can lead to pregnancy complications.

1.4.1 Populations more at risk of under nutrition include:

- **Poor and low income-** Whether in a developed country like the U.S. or in developing countries with fewer resources overall, poorer communities have less access to adequate nutrition.
- **Children-** Children have greater nutritional needs than adults in order to grow and develop. Disadvantaged children are especially at risk of under nutrition and its consequences.
- **Chronically ill-** Many chronic illnesses can directly affect appetite and/or calorie absorption. Some increase your caloric needs. Spending time in the hospital is also a risk factor for under nutrition.
- **Elderly-** As adults advance in age, their nutrition can deteriorate for several reasons, including reduced mobility, institutionalization, reduced appetite and reduced absorption of nutrients.

1.4.2 Populations more at risk of over nutrition include:

- **Poor and low income-** In developed countries, poorer communities often have easier access to fast foods, which are high in calories but low in nutritional value, than they have to nutritious whole foods. This can lead to macronutrient over nutrition with micronutrient under nutrition.
- **Sedentary-** Desk jobs, family obligations, health and social factors that keep people sitting all day instead of out and moving about can lead to significant weight gain.

1.4.3 What happens to the body during malnutrition?

Macronutrient under nutrition (protein-energy under nutrition) deprives your body of energy to sustain itself. To compensate, it begins breaking down its own tissues and shutting down its functions. This begins with its

body fat stores and then proceeds to muscle, skin, hair and nails. People with protein-energy under nutrition are often visibly emaciated. Children may have stunted growth and development. One of the first systems to begin to shut down is the immune system. This makes undernourished people highly prone to illness and infection and slower to recover. Wounds take longer to heal. Cardiac activity also slows down, leading to low heart rate, low blood pressure and low body temperature. People may feel faint, weak and apathetic about life. They may lose appetite, and parts of their digestive system can atrophy.

People who have macronutrient under nutrition are likely to also have micronutrient under nutrition. When overall calories are lacking, that affects vitamin and mineral levels too. Some of the complications of severe under nutrition conditions, such as marasmus and kwashiorkor, result from particular vitamin deficiencies. For example, vitamin A deficiency can cause vision problems, and vitamin D deficiency can cause soft bones.

Some people may consume a lot of calories, but not enough vitamins and minerals. In these cases, the effects of malnutrition may be less obvious. People may be overweight from macronutrient over nutrition but may have symptoms of anemia — weakness, faintness and fatigue — due to the lack of minerals or vitamins. People who have over nutrition may show symptoms of metabolic syndrome, such as insulin resistance and high blood pressure.

1.5 TREATMENT AND PREVENTION OF MALNUTRITION

1.5.1 Treatment of Malnutrition

a. Under nutrition is treated with nutritional supplements. This might mean individual micronutrients, or it might mean refeeding with a custom, high-calorie nutritional formula designed to restore everything your body is missing. Severe under nutrition can take weeks of refeeding to correct. But refeeding can be dangerous, especially in the first few days. Your body changes in many ways to adapt to under nutrition. Refeeding asks it to change back to its old way of operating, and sometimes that change is more than it's prepared to handle. It's best to begin refeeding under close medical observation to prevent and manage the complications of refeeding syndrome, which can be serious and even life-threatening.

b. Over nutrition is generally treated with weight loss, diet and lifestyle changes. Losing extra weight can help reduce your risk of developing secondary conditions such as diabetes and heart disease. Weight loss treatment may include diet and exercise plans, medications or medical procedures. You may also need to treat an underlying condition, such as thyroid disease, or a mental health disorder. Weight loss can be rapid or it can be long and gradual, depending on the path you take. But after you lose weight, it's the lifestyle changes you stick with that will help keep it off. This may involve long-term support systems such as counseling, behavioral therapy, support groups and education in nutrition.

1.5.2 Prevention of Malnutrition

Malnutrition is a global problem. In both the developed world and the developing world, poverty and a lack of understanding of nutrition are the leading causes. We can help control the disease of malnutrition with better worldwide education and support for the disadvantaged, including access to clean water, nutritious whole foods and medicine. Children and elders who may not be able to advocate for themselves are especially at risk and may need closer attention paid to their diet and health condition. The best way to prevent malnutrition is to eat a well-balanced diet with a variety of nutritious whole foods in it. If you have enough of all the nutrients your body needs, you will be less likely to overeat trying to satisfy those needs. Some micronutrient deficiencies are common even with a fairly standard diet. A blood test is one way to find out if you could benefit from micronutrient supplements. Your healthcare provider can help you determine the correct dose to take.

In this section, you have studied effects of malnutrition and treatment and prevention of malnutrition. Now, answer the question given in check your progress 2 .

Check Your Progress 2

Note: a) Answer the following questions in about 50 words.

b) Check your answer with possible answers given at the end of the unit.

1. Briefly explain the effects of malnutrition?

2. Explain anyone way to prevent malnutrition?

1.6 LET US SUM UP

Nutrition is about healthy eating. This means regularly choosing healthy foods and beverages. A healthy eating plan should give your body the energy and nutrients that you need every day. Nutrients include proteins, carbohydrates, fats, vitamins, minerals, and water. Malnutrition refers to deficiencies or excesses in nutrient intake, imbalance of essential nutrients or impaired nutrient utilization. The double burden of malnutrition consists of both under nutrition and overweight and obesity, as well as diet-related non communicable diseases. One should take every measure to have enough nutrition so that problems of malnutrition does not occur.

1.7 REFERENCES AND SELECTED READINGS

<https://my.clevelandclinic.org/health/diseases/22987-malnutrition>

<https://www.unicef.org/nutrition>

1.8 CHECK YOUR PROGRESS–POSSIBLE ANSWERS

Check Your Progress 1

1. What do you understand by nutrition and malnutrition?

Answer: Nutrition is all about the study of food and how our bodies use it as fuel for growth, reproduction and maintenance of health. Malnutrition is an imbalance between the nutrients your body needs to function and the nutrients it gets.

2. Explain briefly anyone type of malnutrition?

Answer: Under nutrition is what most people think of when they think of malnutrition. Under nutrition is a deficiency of nutrients. You may be undernourished if you don't have an adequate diet, or if your body has trouble absorbing enough nutrients from your food. Under nutrition can cause visible wasting of fat and muscle, but it can also be invisible. You can be overweight and undernourished.

Check Your Progress 2

1. Briefly explain the effects of malnutrition?

Answer: Malnutrition in children, adolescents, and women can impair health, educational attainment, and increase the likelihood of low birth weight children. For example, insufficient iron can cause anaemia, particularly in pregnant women, and can lead to pregnancy complications.

2. Explain anyone way to prevent malnutrition?

Answer: The best way to prevent malnutrition is to eat a well-balanced diet with a variety of nutritious whole foods in it. If you have enough of all the nutrients your body needs, you will be less likely to overeat trying to satisfy those needs.