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1. **Imagine you have identiﬁed people in your community who are suffering from vitamin A deﬁciency, iodine deﬁciency disorder and iron deﬁciency anaemia. What can you do to address these problems?**

As a nutritionist, there are a number of areas I could do to address the theses problems as follows.

**Vitamin A:** Vitamin A intervention approaches are commonly grouped into two main control strategies: (1) direct increase in vitamin A intake through dietary modification with natural or fortified foods and supplements and (2) indirect public health measures to control disease frequency. Information, education, and communication (IEC), including social marketing and specific vitamin A-oriented nutrition education as the first thing that needs to be addressed to the community.

The following are the types of food that contains vitamin A that the community members should know in order to avoid it’s deficiency carrots, paw-paw, dark green vegetables, like pumpkin leaves, spinach, dodo, green pepper, pumpkin, yellow sweet potatoes, liver, kidney, small fish, breast milk, red palm oil and milk products.

I will also make general community awareness on the functions of Vitamin A as highlighted below;

1. It maintains the immune system function, ensuring normal body resistance to disease.
2. It helps to reduce severity of illness like measles essential for epithelial lining of the eye, digestive, urinary and respiratory systems.
3. Vitamin A is essential for proper maintenance of skin and it removes harmful substances from the body.
4. Essential for health, growth and development and it also maintains good eyesight.

**Treatment of Vitamin A deficiency**

Treatment of Vitamin A deficiency can be undertaken with both oral vitamin A and [injectable](https://en.wikipedia.org/wiki/Injection_(medicine)) forms, generally as [vitamin A palmitate](https://en.wikipedia.org/wiki/Vitamin_A_palmitate). As an oral form, the supplementation of vitamin A is effective for lowering the risk of morbidity.

**Iron**

The body needs iron to make haemoglobin a component of red blood cells that carries oxygen to the brain, muscular system, immune system and other parts of the body to produce energy. It then carries carbon dioxide and water back to the lungs as waste. As such the community should taught on the importance of iron and its sources to avoid iron deficiency in the body

A red blood cell lives for about 120 days. When it dies most of the iron in it is recycled but some is lost through excretion. Therefore, the body needs constant supplies of iron to make new red blood cells. People that have high demands of haemoglobin such as the pregnant women, growing children, adolescents, anaemic people and menstruating women need a lot of iron for replenishment. Iron is stored mainly in the liver, spleen and bone marrow the community can be informed that iron can be got from foods such as millet, dark green vegetables like dodo, and nakatti that are grown from soil iron. Meat and liver too are good sources of iron.

This is a micronutrient that is very essential in the body in minute quantities. Iodine is essential for the production of thyroxine a hormone produced by the thyroid gland and used for a number of vital body functions.

Below is the treatment of iron deficiency in community of people affected.

**Treatment** Oral iron supplementation is effective when intestinal uptake is intact and Intravenous iron is very effective in the treatment of iron deficiency anemia

**Iodine**: Iodine is required for proper functioning of the thyroid gland. It is an essential chemical that is needed by the gland in order to make thyroid hormones. The thyroid hormones travel in the blood to different parts of the body and are responsible for control of many body processes.

The main sources of iodine include Food grown or raised on iodine-rich soils. Iodated salt – salt in which iodine has been added.

**Treatment of iodine deficiency**

Iodine deficiency is treated by ingestion of iodine salts, such as found in food supplements. Mild cases may be treated by using iodized salt in daily food consumption, or drinking more milk, or eating egg yolks, and saltwater fish.

1. **What is the impact of malnutrition on communities? How can you help prevent some of the negative effects of malnutrition?**

Malnutrition is defined as a category of diseases that includes undernutrition and over nutrition eating a diet in which nutrients are not enough or are too much such that it causes health problems. Not enough nutrients is defined as undernutrition or undernourishment while too much is defined as over nutrition. Malnutrition is often used specifically to refer to undernutrition where there is not enough calories, protein, or micronutrients. Malnutrition increases the risk of infection and infectious disease, and moderate malnutrition weakens every part of the immune system. A malnourished person finds that their body has difficulty doing normal things such as growing and resisting disease. Physical work becomes problematic and even learning abilities can be diminished. For women, pregnancy becomes risky and they cannot be sure of producing nourishing breast milk.

**Impact of malnutrition on the communities.**

Malnutrition can affect a person's mental and physical health. People who are experiencing malnutrition are more likely to become ill. In severe instances, they might even die from the effects of malnutrition. Children who are chronically malnourished do not grow to be as tall as they should be - something referred to as, 'stunted growth,' and are underweight as well.

Malnutrition has significant negative consequences for the community, particularly in terms of poor human health, lost human capital, and decreased economic productivity.

Child malnutrition is the single biggest contributor to under-five mortality due to greater susceptibility to infections and slow recovery from illness.

Children who do not reach their optimum height or consistently experience bouts of weight loss during childhood are affected in the long term in numerous ways. They do not reach their optimum size as adults (and so may have less physical capacity for work), their brains are affected (resulting in lower IQs) and they are at greater risk of infection (which kills many children during their early years).

Child malnutrition impacts on education attainment. The degree of cognitive impairments is directly related to the severity of stunting and Iron Deficiency Anaemia. Vitamin A deficiency reduces immunity and increases the incidence and gravity of infectious diseases resulting in increased school absenteeism.

Child malnutrition impacts on economic productivity. The mental impairment caused by iodine deficiency is permanent and directly linked to productivity loss.

Maternal malnutrition increases the risk of poor pregnancy outcomes including obstructed labour, premature or low-birth-weight babies and postpartum haemorrhage. Severe anaemia during pregnancy is linked to increased mortality at labour.

Low-birth-weight is a significant contributor to infant mortality. Moreover, low birth-weight babies who survive are likely to suffer growth retardation and illness throughout their childhood, adolescence and into adulthood. Growth-retarded adult women are likely to carry on the vicious cycle of malnutrition by giving birth to low birth-weight babies.

**Prevention of nutrition**

**Nutritional planning**

This involves political commitment by the government. A well-planned and well-executed long-term project can accelerate the developmental process and the benefits can be rewarding and permanent.

Nutritional planning involves formulation of a nutrition policy and overall long term planning to improve production and supplies of food, ensure its equitable distribution and programs to increase the purchasing power of people. This may include, land reforms, proper guidance in agriculture to help farmers to get better yields from their lands, help in proper marketing of farm produce. To help increasing the capacity of people to buy nutritious food in adequate quantity, income-generating activities for the weaker sections of the community, making available good quality food in affordable prices through proper public distribution system.

**Direct nutrition and health interventions**

**Improved health care system**

Infections like malaria, measles and diarrhea are prevalent in the community and they precipitate acute malnutrition among children and infants. A good health care system that provides immunization, oral rehydration, periodic deworming, early diagnosis and proper treatment of common illnesses can go a long way in preventing malnutrition in the community.

**Nutrition education**

The community members can be educated on the nutritional quality of common foods, importance and nutritional quality of various locally available and culturally accepted low cost foods.

Importance of exclusive breastfeeding for six months and continuing to breast-feed up to two years or beyond.

1. **Describe and explain the digestion and absorption of carbohydrates**

**From the Mouth to the Stomach**

The mechanical and chemical digestion of carbohydrates begins in the mouth. Chewing, also known as mastication, crumbles the carbohydrate foods into smaller and smaller pieces. The salivary glands in the oral cavity secrete saliva that coats the food particles. Saliva contains the enzyme, salivary amylase. This enzyme breaks the bonds between the monomeric sugar units of disaccharides, oligosaccharides, and starches. The salivary amylase breaks down amylose and amylopectin into smaller chains of glucose, called dextrins and maltose. The increased concentration of maltose in the mouth that results from the mechanical and chemical breakdown of starches in whole grains is what enhances their sweetness. When carbohydrates reach the stomach no further chemical breakdown occurs because the amylase enzyme does not function in the acidic conditions of the stomach. However, the mechanical breakdown is ongoing the strong peristaltic contractions of the stomach mix the carbohydrates into the more uniform mixture of chyme.

**From the Stomach to the Small Intestine**

The chyme is gradually expelled into the upper part of the small intestine. Upon entry of the chyme into the small intestine, the pancreas releases pancreatic juice through a duct. This pancreatic juice contains the enzyme, pancreatic amylase, which starts again the breakdown of dextrins into shorter and shorter carbohydrate chains. Additionally, enzymes are secreted by the intestinal cells that line the villi. These enzymes, known collectively as disaccharides, are sucrase, maltase, and lactase. Sucrase breaks sucrose into glucose and fructose molecules. Maltase breaks the bond between the two glucose units of maltose, and lactase breaks the bond between galactose and glucose. Once carbohydrates are chemically broken down into single sugar units, they are then transported into the inside of intestinal cells.

When people do not have enough of the enzyme lactase, lactose is not sufficiently broken down resulting in a condition called lactose intolerance. The undigested lactose moves to the large intestine where bacteria are able to digest it. The bacterial digestion of lactose produces gases leading to symptoms of diarrhea, bloating, and abdominal cramps.

**Absorption: Going to the Blood Stream**

The cells in the small intestine have membranes that contain transport proteins in order to get the monosaccharides and other nutrients into the blood where they can be distributed to the rest of the body. Fructose is absorbed by facilitated diffusion while glucose and galactose are actively transported. The first organ to receive glucose, fructose, and galactose is the liver. The liver takes them up and converts galactose to glucose, breaks fructose into even smaller carbon-containing units, and either stores glucose as glycogen or exports it back to the blood.

1. **What is nutrition? List the main functions of nutrients.**

Nutrition is the science that interprets the interaction of nutrients and other substance in food in relation to maintenance, growth, reproduction, health and diseases of an organism. It includes food intake (ingestion), digestion, assimilation, transportation, utilization and excretion of food substances.

**Main functions of nutrients.**

**Protein:** Protein is the main constituent of the body, making up the muscles, internal organs, skin, and blood, Helps the body to grow and develop well, It maintains body tissues and helps the body to repair and also helps the body to be resistant to diseases.

**Carbohydrates:** Carbohydrates are called as powerhouse of brain. It is necessary for proper functioning of body and gives energy,

**Fat:** Fats are called as source of energy and warmth. These are used to absorb fat-soluble vitamins like Vitamin A, D, E, and K.

**Vitamins:** There are two types of Vitamins. Fat-soluble and water-soluble. Every vitamin has different crucial function in the body to perform.

**Minerals:** Sodium assists to maintain fluid volume outside of the cell and hence responsible for proper cell functioning. Likewise, calcium, being another important mineral in the body, are one of the important constituent of bones. These are responsible for bone health.

**Water:** It has various functions in the body to perform such as transportation of wastes and other useful nutrients in the body.

1. **What is the importance of calcium? Name and explain the two factors that enhance and that interfere with the absorption of iron in the body.**

**Mineral calcium** is needed in the body for the formation of bones and teeth. It also maintains muscles, nerves and blood. Calcium also helps in clotting of blood; it is needed in large quantities for pregnant breast feeding mothers, growing children and adolescents.

1. **Discuss two reasons why it is essential to include carbohydrates in your diet. Why is it necessary for the body to spare protein?**

It is important for the body for moving, working and exercise. Even when resting the heart, kidneys, lungs and other organs continue functioning utilizing carbohydrates.

Carbohydrates also provide stored energy if the body has enough glucose to fulfill its current needs, excess glucose can be stored for later use.

The stored form of glucose is called glycogen and is primarily found in the liver and muscle.

The liver contains approximately 100 grams of glycogen. These stored glucose molecules can be released into the blood to provide energy throughout the body and help maintain normal blood sugar levels between meals.

Consuming at least some carbohydrates in the diet is one way to prevent starvation-related loss of muscle mass. These carbs will reduce muscle breakdown and provide glucose as energy for the brain.

**Protein is crucial to good health.**

Proteins are made up of amino acids that join together to form long chains there are 20 amino acids that help form the thousands of different proteins in the body proteins do most of their work in the cell and perform various jobs.

Here are some of the important functions of proteins in the body, growth and Maintenance of tissues,

People recovering from an injury or surgery, older adults and athletes require more protein as well

Some enzymes require other molecules, such as vitamins or minerals, for a reaction to take place.

Amino acid chains of various lengths form protein and peptides, which make up several parts of the body’s hormones and transmit information between the cells, tissues and organs.

**Balances Fluids**

Proteins regulate body processes to maintain fluid balance.

Proteins in your blood maintain the fluid balance between your blood and the surrounding tissues.

**Bolsters Immune Health.**

Proteins help form immunoglobulins, or antibodies, to fight antibodies are proteins in the blood that help protect the body from harmful invaders like bacteria and viruses.

**Transports and Stores Nutrients**

Proteins carry substances throughout the bloodstream into cells, out of cells or within cells.

The substances transported by the proteins include nutrients like vitamins or minerals, blood sugar, cholesterol and oxygen for example hemoglobin is a protein that carries oxygen from the lungs to body tissues. Glucose transporters move glucose to the cells, while lipoproteins transport cholesterol and other fats in the blood.

1. Discuss the role of lipids in our diet and their critical functions in the body.

Lipids perform the building blocks of cellular membranes. Other functions include energy storage, insulation, cellular communication and protection

Insulating and Protecting

Up to 30 percent of body, weight is comprised of fat tissue some of this is made up of visceral fat or adipose tissue surrounding delicate organs such as the heart, kidneys, and liver are protected by visceral fat. The composition of the brain is outstandingly 60 percent fat, demonstrating the major structural role that fat serves within the body. Lipids also gives the body the extra padding required when engaging in physically demanding activities such as ice- or roller skating,

Aiding Digestion and Increasing Bioavailability

The dietary fats in the foods break down in the digestive systems and begin the transport of precious micronutrients.

1. **Explain the importance of fats to the bioavailability of other nutrients.**

Fat is present beneath the skin as an insulation against cold, and it forms a supporting tissue for many organs such as the heart and intestines. Fat in the body is not necessarily derived from fat that has been eaten.

1. **Discuss the role of fats as an energy source for the body**.
2. **Why are dietary fats important?**

The basic describes the role of fats in taste perception and the importance of fats in a number of food technology applications. From a nutritional point of view, dietary fats are important for several health related aspects and for optimal functioning of the human body. Dietary fats are not just a source of energy; they function as structural building blocks of the body, carry fat-soluble vitamins, are involved in vital physiological processes in the body, and are indispensable for a number of important biological functions including growth and development. The importance of dietary fats is explained in more detail below.

**Provision of energy.**

Fats are a source of energy in the human diet, together with carbohydrates and proteins, the other two main macronutrients. Fat is the most concentrated source providing 9 kcal per 1 gram consumed, which is more than double the energy content of protein or carbohydrate (4 kcal per gram) and more than quadruple the energy content of fibre (2 kcal per gram). Fat can be stored in the body’s fat tissue, which releases fatty acids when energy is required.

**Structural component**.

The membranes around the cells in our body physically separate the inside from the outside of the cell, and control the movement of substances in and out of the cells. They are mainly made of phospholipids, triglycerides and cholesterol

The brain is very rich in fat and has a unique fatty acid composition; docosahexaenoic acid (DHA) is the major brain fatty acid.

Carrier of vitamins

In the diet, fat is a carrier for the fat-soluble vitamins A, D, E and K, and supports their absorption in the intestine. Consuming sufficient amounts of fatty foods that contain these vitamins is thus essential for adequate intake of these micronutrients.

1. **Define chylomicron. Describe the role of bile salts in the digestion of triacylglycerols and phospholipids.**

Chylomicron: A small fat globule composed of protein and lipid (fat). Chylomicrons are found in the blood and lymphatic fluid where they serve to transport fat from its port of entry in the intestine to the liver and to adipose (fat) tissue.

**Role of bile salts** in the digestion of triacylglycerols and phospholipids.

The role of bile and bile salts in the body is to aid digestion by breaking down fats. Help absorb fat-soluble vitamins.

**From the Mouth to the Stomach**

The first step in the digestion of triglycerides and phospholipids begins in the mouth as lipids encounter saliva. Next, the physical action of chewing coupled with the action of emulsifiers enables the digestive enzymes to do their tasks. The enzyme lingual lipase, along with a small amount of phospholipid as an emulsifier, initiates the process of digestion. These actions cause the fats to become more accessible to the digestive enzymes. As a result, the fats become tiny droplets and separate from the watery components.

In the stomach, gastric lipase starts to break down triglycerides into triglycerides and fatty acids. Within two to four hours after eating a meal, roughly 30 percent of the triglycerides are converted to triglycerides and fatty acids. The stomach is churning and contractions help to disperse the fat molecules, while the triglycerides derived in this process act as further emulsifiers.