

Post Diploma Graduate (PDG) Course in Human Nutrition and Dietetics in NAIROBI-KENYA School of online and distance learning

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ASSIGNMENT 3

1. Discuss the relationship between nutritional status and immunity

Nutritional status - Refers to the state of a person’s health in terms of nutrients in their body (South Sudan CMAM guidelines, 2017) while immunity is the process in which the body protects itself against disease or infection.

A good nutritional status (having different nutrient types) strengthens the immune system of a human body. There are important nutrients needed in strengthening the immune system of the human body, these include the following:

* Nutrients that support immune function-zinc, vitamin C, protein, vitamin A, vitamin B6 and folate.
* Nutrients that provide antioxidant protection-vitamin C, carotenoids, vitamin E, selenium
* Nutrients that support synthesis of enzymes - amino acids, vitamin B6, fatty acids, selenium
* Nutrients that are involved in tissue synthesis-protein, energy, zinc, vitamin A, vitamin C, Iron

While a poor nutritional status weakens the immune system making the person more susceptible to infections. The following are truth that can happen on the person’s body due to the reduced or weakened immune system.

* Malnutrition weakens immune system
* Insufficient protein intake decreases the body’s defensive mechanisms required for synthesis of proteins
* Total amount and type of fat in the diet negatively affects immune system
* Energy is needed for all the processes

1. Using illustrations, show describe the malnutrition-infection cycle

The malnutrition-infection cycle can be described as follows:

* An individual who is malnourished has a weak or lowered immunity and is prone to infections disease attacks.
* Frequent infections cause nausea, vomiting, and loss of appetite resulting to less food intake and if it is accompanied with fever, this leads to malnutrition.
* Gastrointestinal infections that lead to diarrhea further exacerbate or worsen malnutrition because of dehydration.
* Infections and diseases cause mucosal damage due to lowered immunity and that are the major mechanisms for the body defense.

The figure below shows the illustration of malnutrition-infection cycle.

Inadequate dietary intake

* Weight Loss
* Growth faltering
* Immunity lowered
* Mucosal damage
* Appetite loss
* Nutrient loss
* Mal-absorption
* Altered metabolism

Malnutrition-infection cycle

* Disease
* Incidence Severity
* Longer duration
* Depletion of nutrition store

**Source: Adapted from: Malnutrition and Infection (Tomkins and Watson, 1998)**

1. Suggest some suitable meals for burn patients - children and adults.

A burn child or adult needs a good nutrition to help him or her to maintain body weight, replace lost fluids, fight and prevent infection, and promote wound healing. The child’s or adult’s body uses a lot of extra energy as it works to heal the skin. His or her daily nutrition is very important. How much and what kind of nutrition he or she needs will depend on the type and severity of the burn wounds. He or she is recommended and encouraged to eat a high calorie and high protein foods, including some vitamins and minerals because they can help in healing and preventing infections.

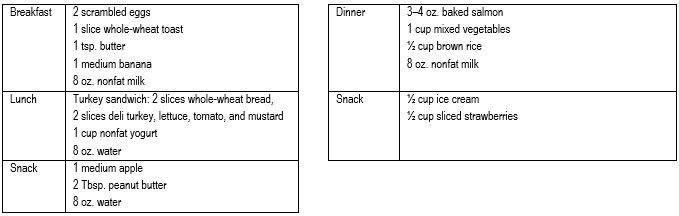
Examples of the food items include the following:

* High Calorie Foods such as cereals, etc.
* Dairy products (milk, cheese, milkshakes, ice cream)
* Meats and fish
* Eggs
* Nuts and nut or seed butters (almond, peanut, walnut, pecan, cashew, sesame, sunflower, etc.)
* Beans and legumes (kidney, white, garbanzo, navy, black, soy and pinto beans; lentils, peas, hummus, etc.)

Examples of vitamins and minerals include the following:

* Vitamin C, zinc, and copper help burns heal.
* Vitamin E, vitamin C, and selenium are antioxidants. They help to reduce the body’s stress response after an injury.
* Vitamin C, vitamin D, and zinc help to prevent and treat infections.

**Sample menu:** This menu provides about 1,750 calories and 103 grams of protein per day.



**Source: Model Systems Knowledge Translation Center (MSKTC) (2016).**

1. Discuss the nutritional management of fevers

A fever is an elevation of body temperature above the normal which results from an imbalance

between the heat produced and the heat eliminated from the body (Nutrition and health module 3). Fevers may occur in response to an infection, inflammation, allergic reactions and metabolic disorder.

Types of fever: These include the following;

1. Acute Fevers: These are usually of short duration and the body temperature may rise as high as 1040C and may last from 1 – 2 weeks. Persons suffering from measles and typhoid will experience these kinds of fevers.

2. Intermittent Fevers: These are fevers, which occur at regular periodic intervals like in the case of Malaria.

1. Chronic Fevers: These take a long duration. The temperature may remain slightly above the normal but continuous for a longer period, even for several months. Patients suffering from Tuberculosis (T.B) will experience chronic fevers.

Effects of fever on the nutritional status of an individual

* Increase in Basal Metabolic Rate
* Glycogen and lipid stores are excessively depleted
* The rate of protein catabolism increases depending upon the severity of the infection and duration of the fever.
* There is accelerated loss of body fluids due to excessive perspiration and excretion of body wastes.
* There is increased loss of minerals like sodium and potassium though sweat, urine and

vomiting leading to water and electrolyte imbalances

* All these changes are accompanied by loss appetite resulting in reduced food intake, precipitating malnutrition.

Nutritional management of fevers

Diet in fever is crucial for the immune system to function properly. Since the body in fever burns more calories, one must have nutrient dense food to give energy to the immune system to function properly.

The following food is beneficial for reducing fever

* Fluid-rich foods: Drink water, hot tea, and fresh fruit juice. Intake of fluid-rich foods is recommended such as poultry broths, thin soups, coconut water.
* Fresh fruits: Fruits like apples, oranges, watermelon, pineapple, kiwi are rich in vitamin C. This contains antioxidants that reduce fever.
* Proper intake of proteins: Scrambled eggs, smoothie with low-fat milk, dal, chana or Indian cottage cheese are rich in protein and beneficial.

However, food items to avoid include; Butter, Ghee, Vegetable oil, Chilies, Spices, fiber rich foods, pastries, fried snacks, deserts, thick cream soups because they increase the chances of prolonged stay of illness. Also, avoid fruits with heavy sugar and fruits canned in syrup because sugar inhibits the immune system.

1. Discuss the dietary management of the following liver diseases
2. Hepatitis

Hepatitis is one of the liver disorders. It is an infectious disease which is caused by a virus. The virus causes inflammation and degeneration of the liver cells. There are two types of Hepatitis; Hepatitis A and B. Hepatitis A is a mild type and rarely progresses to a chronic state while Hepatitis B is more severe and can lead to serious hepatic damage. Type A is infective since the virus is generally transmitted through contaminated food and water while type B is transmitted only through blood transfusion or products contaminated with the virus or through poorly sterilized needles. Patients who suffer from Hepatitis experience nausea, fatigue, vomiting, diarrhea, fever, weight loss, and abdominal pain.

The objectives of dietary management of hepatitis liver disease is to reduce or relief symptoms, regenerate liver cells, and prevent further liver damage. The diet for the Hepatitis patient should be high in energy, reduced proteins, and increased water-soluble vitamins (Vitamin C and Vitamin B complex). There should be reduced protein consumption due to damaged liver because it may not be able to tolerate a high protein since the conversion of ammonia to urea gets affected. Foods that should be avoided for Hepatitis patient are fats and fats soluble vitamins because the impaired liver would not able to absorb them.

1. Liver Cirrhosis

This is a liver disease whereby normal liver cells are destroyed and replaced by the fibrous connective tissues. This disease is believed to have been caused by a prolonged alcohol consumption. Alcohol byproducts during metabolism interfere with liver functions, therefore, it leads to liver damage. Early symptoms of liver cirrhosis include gastro-intestinal disturbances, nausea, and anorexia while severe symptoms are accompanied by jaundice (yellowing of the body and urine), gastrointestinal bleeding, and even anemia.

The nutrition management of liver cirrhosis is by providing a high protein high energy diet in order to correct fluid and electrolyte imbalances, promote regeneration of liver cells and to correct nutritional deficiencies.

1. Liver Failure

Hepatic/heart failure is one of liver disorders that occurs because of decreased number of functioning liver cells and diminished delivery of nutrients to the liver. This therefore affects the ability of liver to convert the toxic ammonia to urea and decreases the breakdown of specific amino acids namely phenylalanine, tyrosine, tryptophan which are basically metabolized in the liver.

The main symptoms include for liver failure include; edema (accumulation of intracellular body fluids), yellowing of the body and urine (jaundice), dysfunction of the central nervous system and weight loss.

The dietary management of liver failure is to minimize the production of ammonia, by this; the diet should be low in proteins and recommendation of simple carbohydrates.

1. a. Explain the differences between Type 1 and Type 2 diabetes mellitus

Diabetes Mellitus is a type of liver metabolic disorder that is chronic.

This type 1 of diabetes mellitus is common among children and is as a result of failure of the pancreas to produce insulin. It is used to be referred to as Insulin Dependent Diabetes Mellitus (IDDM), juvenile diabetes or Autoimmune Diabetes whereas type 2 diabetes mellitus previously referred to as Non-Insulin Dependent Diabetes Mellitus (NIDDM) or adult onset diabetes which results from either failure of the pancreas to produce adequate insulin or failure of body cells to utilize insulin or both.

b. Discuss the dietary recommendations for patients with diabetes mellitus

Diet recommended for diabetes patients should provide adequate energy and preferably from complex carbohydrates as these provide energy and release it more slowly and steadily. Sufficient proteins should be provided from both animal and plant sources. Consumption of high amounts of fruits and vegetables is highly recommended. All these should be accompanied by physical activity. Food not recommended include saturated fats and high intake of salt.

It is also recommended that small frequent meals (the three traditional meals, breakfast, lunch and supper plus at least three snacks) are consumed in a day.

A figure below shows a sample plate for a diabetic patient.

Fruit

Milk/yoghurt

ProteinsVegetables

Starch/cerealsVegetables

**Source: Adapted from Nutrition module 3 , a sample plate for a diabetic patient.**

**Note** the difference in the portion sizes of vegetables.

**References:**

* Nutrition and health Module 3: Nutrition and the Immune System (page 6-7)
* Nutrition and health Module 3: Malnutrition-infection cycle (page 7-8)
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* Diet in fever. Lybrate (internet), available from: <https://www.lybrate.com/topic/diet-in-fever>
* Dietary management of Hepatitis. Management of liver disorders/diseases: Nutrition and infection Module3 (page 35-36).
* Dietary management of Liver cirrhosis. Management of liver disorders/diseases: Nutrition and infection Module3 (page 36-37).
* Dietary management of Hepatic failure. Management of liver disorders/diseases: Nutrition and infection Module3 (page 37).
* Difference between type 1 and type 2 diabetes mellitus. Lecture 8, Nutrition and infection Module3 (page 43).
* Diary management of diabetic patient. Diabetes Mellitus, lecture 8, Nutrition and infection module3 (page 46-47).