Diploma in Human Nutrition Assignment 3

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Abstract

There are three main types of carbohydrate in food. These are: Starches (also known as complex carbohydrates), Sugars and Fiber. Carbohydrates: provides our body with energy, provides stored energy, preserve muscle, promote digestive health, influences hearth disease and diabetes.

Carbohydrates provides our body with energy in the form of glucose, the main sources of carbohydrates are wheat, potatoes of all kind and banana.

Proteins are needed in our diets for growth and tissue repair. The main sources of proteins are meats, milk and ground nuts. All animal foods contain more protein than plants.

Fats and oils are sources of energy. Fat is found in meat, milk products and avocado.

Pallor is caused by zinc, vitamin B12, vitamin B16 and folate deficiencies. Goitre is caused by iodine deficiency. Bitot’s spots is caused by vitamin A deficiency. Bilateral pitting oedema is caused by protein deficiency. And Severe visible wasting is caused by low intake of carbohydrates and fats.

Malnutrition has detrimental physiological, psychosocial, and clinical effects impairing quality of life, delaying recovery from illness and surgery, plus increasing morbidity and mortality.

Preschool children and pregnant women are vulnerable to vitamin A deficiency, pregnant women, people living in countries with low iodine in the soil, people who don’t use iodized salt and vegetarians or vegans are vulnerable to iodine deficiency, children and pregnant women are vulnerable to iron deficiency anaemia.

Fiber makes food bulky, makes faeces soft and bulky, slows absorption of nutrients and provides feeling of fullness.

This paper examines the types of carbohydrates and their functions on the human body, explains the importance and sources of carbohydrates, proteins, fats/oils and describes whether they are macro or micronutrients, explains what nutrient deficiencies are presented by Pallor, Goitre, Bitot’s spots, Bilateral pitting oedema and Severe visible wasting, Explains the impact of malnutrition on communities and how to prevent some of the negative effects of malnutrition, describes the individuals most vulnerable to vitamin A deficiency, iodine deficiency disorder, iron deficiency anaemia and explores how to address these deficiencies in the communities, identifies the ways in which Fiber helps us maintain a healthy digestive system.

Keywords

Carbohydrates, Human body, Proteins, Fats, Oils, Macronutrients, Micronutrients, Pallor, Goitre, Bitot’s Spots, Bilateral Pitting Oedema, Severe visible wasting, Malnutrition, Nutrition, Communities, Vulnerable, Deficiency, Vitamin A, Iodine, Iron, Anaemia, Fiber, Healthy, Digestive system.

1. **Introduction**

This coursework;

1. Explains types of Carbohydrates and five functions of Carbohydrates in Human Body
2. For the following nutrients, says why they are important and their three sources? Explains whether these foods are micronutrients or macronutrients: Carbohydrates. Proteins. Fats and oils
3. Explains what nutrient deficiency the following clinical signs/symptoms indicate: (a) Pallor (b) Goitre (c) Bitot’s spots (d) Bilateral pitting oedema (e) Severe visible wasting
4. Examines the impact of malnutrition on communities, how to help prevent some of the negative effects of malnutrition
5. Describes who are the individuals most vulnerable to vitamin A deficiency, iodine deficiency disorder and iron deficiency anaemia in our community. Explores how to address the problem of identified people in our community who are suffering from vitamin A deficiency, iodine deficiency disorder and iron deficiency anaemia.
6. Identifies at least four ways in which Fiber helps us maintain a healthy digestive system.

**Q1. Explain types of Carbohydrates and five functions of Carbohydrates in Human Body**

Carbohydrate**s** are referred to as energy-giving foods. They provide energy in the form of calories that the body needs to be able to work, and to support other functions.

Carbohydrates are needed in large amounts by the body. Indeed, up to 65% of our energy comes from carbohydrates. They are the body’s main source of fuel because they are easily converted into energy. This energy is usually in the form of glucose, which all tissues and cells in our bodies readily use.

For the brain, kidneys, central nervous system and muscles to function properly, they need carbohydrates. These carbohydrates are usually stored in the muscles and the liver, where they are later used for energy.

The main sources of carbohydrates are bread, wheat, potatoes of all kinds, maize, rice, cassava, pasta, macaroni, banana, sweets, sugar cane, sweet fruits, and honey. Other foods like vegetables, beans, nuts and seeds contain carbohydrates, but in lesser amounts. **(**[**Diabetes Carbohydrate & Fat Gram Guide, 4th Edition)**](http://www.shopdiabetes.org/104-Diabetes-Carbohydrate-And-Fat-Gram-Guide-4th-Edition.aspx?loc=typesofcarbs&source=dorgtypesofcarbs)

**Types of Carbohydrates:**

There are three main types of carbohydrate in food. These are: Starches (also known as complex carbohydrates), Sugars and Fiber

1. Starch

The foods high in starch include:

* Starchy vegetables like peas, corn, lima beans and potatoes
* Dried beans, lentils and peas
* Grains like oats, barley and rice.

1. Sugar

Sugar is another type of carbohydrate. It is also referred to as simple or fast-acting carbohydrate.

There are two main types of sugar:

* Naturally occurring sugars e.g. those in milk or fruit
* Added sugars e.g. those added during processing such as fruit canned in heavy syrup or sugar added to make a cookie

There are many different names for sugar. Examples of common names are table sugar, brown sugar, molasses, honey, beet sugar, cane sugar, confectioner's sugar, powdered sugar, raw sugar, turbinado, maple syrup, high-fructose corn syrup, agave nectar and sugar cane syrup.

1. Fiber

Fiber is found in plant foods so there is no Fiber in animal products such as milk, eggs, meat, poultry and fish.

Fiber is the indigestible part of plant foods, including fruits, vegetables, whole grains, nuts and legumes. When we consume dietary Fiber, most of it passes through the intestines and is not digested. For good health, adults need to try to eat 25 to 30 grams of Fiber each day.

**Five functions of Carbohydrates in Human Body**

1. Carbohydrates provide our body with energy. Our cells convert carbohydrates into the fuel molecule ATP (Adenosine Triphosphate) through a process called cellular respiration.
2. Carbohydrates provides stored energy: Our body can transform extra carbohydrates into stored energy in the form of glycogen. One hundred grams can be stored in our liver and Five hundred grams can be stored in our muscles.
3. Carbohydrates helps preserve muscles: During periods of starvation when carbohydrates aren’t available, the body can convert amino acids from muscle into glucose to provide the brain with energy. Consuming at least some carbs can prevent muscle breakdown in this scenario.
4. Carbohydrates promote digestive health: Unlike sugars and starches, dietary fiber is not broken down into glucose. Fiber is a type of carbohydrate that promotes good digestive health by reducing constipation and lowering the risk of digestive tract diseases.
5. Carbohydrates influences heart health and diabetes: Excess refined carbohydrates can increase the risk of heart disease and diabetes. Fiber is a type of carbohydrate that is associated with reduced “bad” LDL cholesterol levels, a lower risk of heart disease and increased glycemic control.

**Q2. For the following nutrients, can you say why they are important and name three sources? Are these foods micronutrients or macronutrients? Carbohydrates. Proteins. Fats and oils**

Carbohydrates, Proteins, Fats and oils are Macronutrients and are important to our body in the following ways:

**Carbohydrates:**

Carbohydrates are referred to as energy-giving foods. They provide energy in the form of calories that the body needs to be able to work, and to support other functions.

Carbohydrates are needed in large amounts by the body. Up to 65% of our energy comes from carbohydrates. They are the body’s main source of fuel because they are easily converted into energy. This energy is usually in the form of glucose, which all tissues and cells in our bodies readily use.

For the brain, kidneys, central nervous system and muscles to function properly, they need carbohydrates. These carbohydrates are usually stored in the muscles and the liver, where they are later used for energy.

The main sources of carbohydrates are wheat, potatoes of all kind and banana. Other

**Proteins:**

About 10–35% of calories should come from protein. Proteins are needed in our diets for growth (especially important for children, teens and pregnant women) and to improve immune functions. They also play an important role in making essential hormones and enzymes, in tissue repair, preserving lean muscle mass, and supplying energy in times when carbohydrates are not available.

Pregnant women need protein to build their bodies and that of the babies and placentas, to make extra blood and for fat storage. Breastfeeding mothers need protein to make breastmilk.

The three main sources of proteins are meats, milk and ground nuts. All animal foods contain more protein than plants and are therefore usually better sources of body building foods.

**Fats and oils:**

Fats and oils are concentrated sources of energy and so are important nutrients for young children who need a lot of energy-rich food. Fats can also make meals tastier and satisfying. Fat is found in meat, milk products and avocado.

**Q3. What nutrient deficiency do the following clinical signs/symptoms indicate? (a) Pallor (b) Goitre (c) Bitot’s spots (d) Bilateral pitting oedema (e) Severe visible wasting**

1. **Pallor**

Pallor results from decreased oxyhemoglobin in the skin and it is likely that severe anaemia can lead to skin pallor. While anaemia is a result of numerous nutrient deficiencies including iron deficiency, zinc deficiency, vitamin B12 deficiency, vitamin B16 deficiency and folate deficiency.

1. **Goitre**

Goitre is a nutrient deficiency disorder seen by swelling on the front of the neck and is caused by iodine deficiency.

1. **Bitot’s spots**

Bitot’s spots is some whitish patchy triangular lesions on the side of the eye. It is caused by vitamin A deficiency.

1. **Bilateral pitting oedema**

Oedema is the retention of water in the tissues of the body. Bilateral pitting oedema is a sign of kwashiorkor, a form of severe acute malnutrition. Children mostly present oedema and is caused by protein deficiency.

1. **Severe visible wasting**

Severe visible wasting is presented by pale: palms, conjunctiva, tongue, the person gets tired easily, loss of appetite, and shortness of breath. Visible wasting is caused by low intake of energy (Carbohydrates and fats/oils). **(Kaushansky K, et al, 2016)**

**Q4. What is the impact of malnutrition on communities? How can you help prevent some of the negative effects of malnutrition?**

**Impact of malnutrition on communities**

Malnutrition matters. Too little, too much or an incorrect energy, protein, and micronutrient balance not only affects anthropometry, but impacts on function, disease risk, and clinical outcomes. The majority at risk or affected by malnutrition live in the community, the growth of our older population suggests that the burden of community malnutrition will increase.

Disease-related malnutrition has detrimental physiological, psychosocial, and clinical effects impairing quality of life, delaying recovery from illness and surgery, plus increasing morbidity and mortality. Malnutrition is costly, triggering more GP (General Practitioners) contacts than well-nourished individuals, and correlating directly with increased length of hospital stay, treatment costs, time to return to usual life, and rates of hospital readmission. Overall, malnutrition leads to socioeconomic dysfunction due to lack of productivity. **(Richmond Vale, June 2007)**

**Preventing some of the negative effects of malnutrition**

To promote cost-effective prevention and improvements to the care of those needing nutritional support, there is need to:

1. Preventing people from dying prematurely;
2. Enhancing quality of life and positive care experiences for people with chronic conditions; and Hastening recovery from episodes of illness or following injury.
3. Screen for the risk of malnutrition in care settings using a validated screening tool;
4. Provide those affected with a management care plan addressing nutritional requirements;
5. Ensure that screening information and nutrition support goals are documented and communicated between healthcare settings; and
6. Train people and/or their carers who manage their own nutritional support. **(Briss P.A et al)**

**Q5. Who are the individuals most vulnerable to vitamin A deficiency, iodine deficiency disorder and iron deficiency anaemia in your community? 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?**

**Vitamin A deficiency:**

**Vulnerability to vitamin A deficiency**

Vitamin A deficiency (VAD) affects ocular tissue in two ways: by slowing the regeneration of the visual pigments following exposure to bright light and by disrupting epithelial integrity.

It causes night blindness or xerophthelimia (Blindness) and It involves drying (xerosis) and thickening of the conjunctivae and corneas. Superficial foamy patches composed of epithelial debris and secretions on the exposed bulbar conjunctiva (Bitot spots) develop. In advanced deficiency, the cornea becomes hazy and can develop erosions, which can lead to its destruction (keratomalacia). **(Bryce, J., 2008).**

The population most vulnerable to vitamin A deficiency are preschool children and pregnant women

***Management and prevention of vitamin A deficiency***

Promoting behavior modification through dietary counseling and nutrition education.

Treatment for subclinica**l** VAD with encouraging the consumption of vitamin A–rich foods, such as liver, beef, chicken, eggs, fortified milk, carrots, mangoes, sweet potatoes, and leafy green vegetables.

For VAD syndromes, treatment includes distribution of daily oralsupplements, as follows: Children aged 3 years or younger - 600 mcg (2000 IU). **(Barbara. A, National Eye Institute)**

**Iodine deficiency disorder:**

**Vulnerability iodine deficiency disorder**

* Iodine is essential component of the hormones produced by the thyroid gland.
* Thyroid hormones regulate many key biochemical reactions, especially protein synthesis and enzymatic activity.
* Major target organs are the developing brain, muscle, heart, pituitary, and kidney.

Iodine deficiency disorder is caused by lack of iodine in natural food and presents consequences including: goiter, birth defects, increased risk for abortions and stillbirths, retarded physical growth, impaired mental functioning, cretinism and hypothyroidism

The population most vulnerable to iodine deficiency in the community includes: pregnant women, people who live in countries where there is very little iodine in the soil, people who don’t use iodized salt and people who follow vegetarian or vegan diet.

***Management and prevention of vitamin A deficiency***

* Promoting behavior modification through dietary counseling and nutrition education.
* Salt iodization is the most cost effective intervention to prevent iodine deficiency disorders
* By eating foods high in iodine, particularly dairy products, seafood, meat, some breads and eggs, and by taking a multivitamin containing iodine
* Iodine Supplementation. **(Bruno de Benoist, 2009).**

**Iron deficiency anaemia**

**Vulnerability to iron deficiency anaemia**

Iron deficiency anaemia is caused by a lack of the mineral iron which is a necessary component of the blood and is lost during each menstrual period. Much iron is needed during childbirth and pregnancy due to the child growth.

The population most vulnerable to iron deficiency anaemia in the community are children and pregnant women.

***Management and prevention of vitamin A deficiency***

* Promoting behavior modification through dietary counseling and nutrition education.
* Educate victims to seek treatment of the cause of blood loss.
* Encourage victims to talk to the doctor if they have heavy menstrual periods or if have digestive system problems, such as frequent diarrhea or blood in stool.
* Promote eat of foods with iron. Good sources of iron include lean meat and chicken, dark, leafy vegetables, and beans.
* Promote eating and drinking foods that help our body absorb iron, like orange juice, strawberries, broccoli, or other fruits and vegetables with vitamin C.
* Educate communities to make healthy food choices. Most people who make healthy, balanced food choices get the iron and vitamins their bodies need from the foods they eat.
* Avoiding drinking coffee or tea with meals. These drinks make it harder for our body to absorb iron. **(Kaushansky K, et al, 2016)**

**Q6. Identify at least four ways in which fiber helps us maintain a healthy digestive system.**

Fiber is a mixture of different carbohydrates which are not digested like other nutrients but pass through the gut nearly unchanged. Foods rich in fiber are vegetables like cabbage, carrots, cassava; fruits like banana and avocado; peas and beans; whole-grain cereals like wheat flour and refined maize or sorghum.

**Four ways in which fiber helps us maintain a healthy digestive system include the following:**

* Fiber makes food bulky or bigger; this can help a person who is overweight to eat less food
* Fiber makes the faeces soft and bulky; this can help prevent constipation
* Fiber slows the absorption of nutrients, so it helps nutrients to enter the blood stream slowly. This is important for patients with diabetes mellitus.
* Fiber helps provides a feeling of fullness without adding calories.

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