**Assessment on Human Nutrition: Module 3**

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ASSIGNMENTS

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

**Types of Carbohydrates**

There are three main types of carbohydrate in food? There are

* Starches (also known as complex carbohydrates)
* Sugars
* Fiber

You will also hear terms like naturally occurring sugar, added sugar, low-calorie sweeteners, sugar alcohols, reduced-calorie sweeteners, processed grains, enriched grains, complex carbohydrate, sweets, refined grains and whole grains.

No wonder knowing what kind and how much carbohydrate to eat can be confusing!

On the nutrition label, the term "total carbohydrate" includes all three types of carbohydrates. This is the number you should pay attention to if you are carbohydrate counting.

**Starches**

Foods high in starch include:

* Starchy vegetables like peas, corn, lima beans and potatoes
* Dried beans, lentils and peas such as pinto beans, kidney beans, black eyed peas and split peas
* Grains like oats, barley and rice. (The majority of grain products in the US are made from wheat flour. These include pasta, bread and crackers but the variety is expanding to include other grains as well.)

The grain group can be broken down even further into whole grain or refined grain.

A grain contains three parts:

* bran
* germ
* endosperm

The bran is the outer hard shell of the grain. It is the part of the grain that provides the most fiber and most of the vitamins B and minerals.

The germ is the next layer and is packed with nutrients including essential fatty acids and vitamin E.

The endosperm is the soft part in the center of the grain. It contains the starch. Whole grain means that the entire grain kernel is in the food.

If you eat a whole grain food, it contains the bran, germ, and endosperm so you get all of the nutrients that whole grains have to offer. If you eat a refined grain food, it contains only the endosperm or the starchy part so you miss out on a lot of vitamins and minerals. Because whole grains contain the entire grain, they are much more nutritious than refined grains.

**Sugars**

Sugar is another type of carbohydrate. You may also hear sugar referred to as simple or fast-acting carbohydrate.

There are two main types of sugar:

* naturally occurring sugars such as those in milk or fruit
* added sugars such as those added during processing such as fruit canned in heavy syrup or sugar added to make a cookie

On the nutrition facts label, the number of sugar grams includes both added and natural sugars.

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.

You may also see table sugar listed by its chemical name, sucrose. Fruit sugar is also known as fructose and the sugar in milk is called lactose. You can recognize other sugars on labels because their chemical names also end in "-ose." For example glucose (also called dextrose), fructose (also called laevulose), lactose and maltose.

**Fiber**

Fiber comes from 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 you 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. Most Americans do not consume nearly enough fiber in their diet, so while it is wise to aim for this goal, any increase in fiber in your diet can be beneficial. Most of us only get about half of what is recommended.

Fiber contributes to digestive health, helps to keep you regular, and helps to make you feel full and satisfied after eating.

Additional health benefits, of a diet high in fiber such as a reduction in cholesterol levels — have been suggested by some so may be an additional benefit.

**Good sources of dietary fiber include:**

* Beans and legumes. Think black beans, kidney beans, pintos, chick peas (garbanzos), white beans, and lentils.
* Fruits and vegetables, especially those with edible skin (for example, apples, corn and beans) and those with edible seeds (for example, berries).
* Whole grains such as:
* Whole wheat pasta
* Whole grain cereals (Look for those with three grams of dietary fiber or more per serving, including those made from whole wheat, wheat bran, and oats.)
* Whole grain breads (To be a good source of fiber, one slice of bread should have at least three grams of fiber. Another good indication: look for breads where the first ingredient is a whole grain. For example, whole wheat or oats.) Many grain products now have "double fiber" with extra fiber added.
* Nuts try different kinds. Peanuts, walnuts and almonds are a good source of fiber and healthy fat, but watch portion sizes, because they also contain a lot of calories in a small amount.

In general, an excellent source of fiber contains five grams or more per serving, while a good source of fiber contains 2.5 - 4.9 grams per serving.

It is best to get your fiber from food rather than taking a supplement. In addition to the fiber, these foods have a wealth of nutrition, containing many important vitamins and minerals. In fact, they may contain nutrients that haven't even been discovered yet!

It is also important that you increase your fiber intake gradually, to prevent stomach irritation, and that you increase your intake of water and other liquids, to prevent constipation. (America Diabetes Association March 9, 2015).

**Functions of Carbohydrates**

* Providing energy and regulation of blood glucose
* Sparing the use of proteins for energy
* Breakdown of fatty acids and preventing ketosis
* Biological recognition processes
* Flavor, Sweeteners and Dietary fiber (Spark Notes 2018).

1. **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**

**Important of Nutrients and their Sources: Proteins, Carbohydrates, Fats and Oil**

**Proteins**

Proteins are often called the body’s building blocks. They are used to build and repair tissues. They help you fight infection. Your body uses extra protein for energy. Good sources of protein are seafood, lean meat and poultry, eggs, beans and peas, soy products, and unsalted nuts and seeds. Protein is also found in dairy products. Protein from plant sources tends to be lower in fat and cholesterol and provides fiber and other health-promoting nutrients. Plate of salmon, tomatoes, asparagus, lemon and herbs

**Carbohydrates**

Carbohydrates are the body’s main source of energy. There are two types of carbohydrates: **simple and complex**.

* **Simple carbohydrates** are found in fruits, vegetables, and milk products, as well as in sweeteners like sugar, honey, and syrup and foods like candy, soft drinks, and frosting or icing.
* **Complex carbohydrates** are found in breads, cereals, pasta, rice, beans and peas, and starchy vegetables such as potatoes, green peas, and corn.

Many carbohydrates also supply fiber. Fiber is a type of complex carbohydrate found in foods that come from plants fruits, vegetables, nuts, seeds, beans, and whole grains. Eating food with fiber can prevent stomach or intestinal problems, such as constipation. It might also help lower cholesterol and blood sugar. It is better to get fiber from food than dietary supplements. Start adding fiber slowly. This will help avoid gas.

**Fats and Oil**

Fats also give you energy and help you feel satisfied after eating. Oils, shortening, butter, and margarine are types of fats, and mayonnaise, salad dressings, table cream, and sour cream are high in fat. Foods from animal sources and certain foods like seeds, nuts, avocado, and coconut also contain fat. There are different categories of fats some are healthier than others:

* **Monounsaturated**. These include canola oil, olive oil, peanut oil, and safflower oil. They are found in avocados, peanut butter, and some nuts and seeds.
* **Polyunsaturated.** Some are corn oil, soybean oil, and flaxseed oil. They are also found in fatty fish, walnuts, and some seeds.
* **Saturated.** These fats are found in red meat, milk products including butter, and palm and coconut oils. Regular cheese, pizza, and grain-based and dairy desserts are common sources of saturated fat in our meals.
* **Trans fats (trans fatty acids)**. Processed trans fats are found in stick margarine and vegetable shortening. Trans fats may be used in store-bought baked goods and fried foods at some fast-food restaurants.

You can tell monounsaturated and polyunsaturated fats because they are liquid at room temperature. These types of fat seem to lower your chance of heart disease. But that doesn’t mean you can eat more than the Dietary Guidelines suggest.

Tran’s fats and saturated fats are usually solid at room temperature. (National Institute on ageing June 11, 2017)

Macronutrients are nutrients we need in relatively large quantities and their examples are:-

* Proteins
* Carbohydrate
* Fats and Oil (Christian Nordqvist 2017).

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

Paleness, also known as pale complexion or pallor, is an unusual lightness of skin color compared with your normal complexion. Paleness may be caused by reduced blood flow and oxygen or by a decreased number of red blood cells.

It can occur all over your skin or appear more localized. Localized paleness usually involves one limb. You should see your doctor if you have sudden onset of generalized paleness or paleness of a limb.

**Causes of paleness**

[Anemia](https://www.healthline.com/symptom/anemia) is a condition in which your body doesn’t produce enough red blood cells. It’s one of the most common causes of paleness. Anemia can be acute with a sudden onset or chronic and develop slowly.

Acute anemia is usually the result of rapid blood loss from trauma, surgery, or internal bleeding, often from your stomach or intestinal tract.

Chronic anemia is common. It can be caused by a lack of iron, vitamin B-12, or folate in your diet. There are also genetic causes of anemia, such as [sickle cell disease](https://www.healthline.com/health/sickle-cell-anemia) and [thalassemia](https://www.healthline.com/health/thalassemia). In these conditions, your body makes ineffective hemoglobin. This is the protein in red blood cells that carries oxygen.

Chronic anemia can also be caused by diseases such as [chronic kidney failure](https://www.healthline.com/health/chronic-kidney-failure) or [hypothyroidism](https://www.healthline.com/health/hypothyroidism/symptoms-treatments-more). Certain cancers that affect your bones or bone marrow can also cause anemia due to poor production of blood cells over a period of weeks to months.

Paleness can be a manifestation of emotions such as fear (“pale as a ghost”), or it can be a sign of serious medical problems such as severe anemia, [bloodstream infection](https://www.healthline.com/health/blood-poisoning), or [frostbite](https://www.healthline.com/health/frostbite).

Paleness in your inner eyelids is a telltale sign of anemia, regardless of race. It is also considered a sensitive indicator of severe anemia. (Alana Biggers MD & Verneda Lights March 30, 2018)

* 1. **Goiter**

A goiter is an abnormal enlargement of the thyroid gland, which is a butterfly-shaped organ located at the base of your neck.

The thyroid gland releases hormones that help control your metabolism and other important processes in your body.

Having a goiter doesn't always mean that your thyroid gland is malfunctioning. Even when your thyroid gland is enlarged, it can produce a normal amount of hormones.

You can develop a goiter if your thyroid gland is producing too much of its hormones, too little (hypothyroidism), or a normal amount of hormones (euthyroidism).

Symptoms of a goiter may include:

* Swelling at the base of the neck
* A tight feeling in the throat
* Hoarseness
* Coughing
* Difficulty breathing
* Difficulty swallowing
* Dizziness when the arms are raised above the head
* Neck vein swelling

Sometimes goiters don't cause any symptoms at all. (Lynn Marks & Sanjai Sinha MD Feb 25, 2016)

* 1. **Bitot’s spots**

Vitamin A deficiency (VAD) can cause a range of ocular manifestations, including night blindness, conjunctival and corneal xerosis and keratomalacia. It is an important cause of preventable blindness. Although usually a result of malnutrition, VAD can accompany malabsorption syndrome. We report a case of VAD as manifested by Bitot's spots and eventually diagnosed to have celiac disease. It is, therefore, important to consider gastrointestinal diseases causing malabsorption in the evaluation of VAD. (A. Sharma 2014).

* 1. **Bilateral pitting oedema**

Common causes of swollen ankles, feet and legs

Swelling in the ankles, feet and legs is often caused by a build-up of fluid in these areas, called oedema. Oedema is usually caused by:

* standing or sitting in the same position for too long
* eating too much salty food
* being overweight
* being pregnant read about swollen ankles, feet and fingers in pregnancy
* Taking certain medicines such as some blood pressure medicines, contraceptive pills, antidepressants or steroids. (NHS 2018).
  1. **Severe visible wasting**

In order to determine the presence of visible severe wasting for children younger than six months, you will need to ask the mother to remove all of the child's clothing so you can look at the arms, thighs and buttocks for loss of muscle bulk. Sagging skin and buttocks indicates visible severe wasting (Figure 5.13).

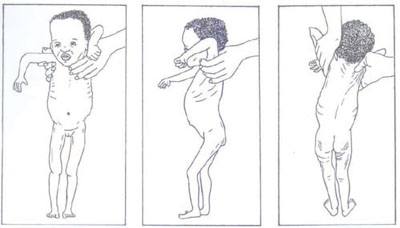


Figure 5.13 A child with severe visible wasting. (Source: Ethiopian Federal Ministry of Health, 2010, *Training course of the outpatient treatment programmed of severe acute malnutrition*)

**Table 5.4 Clinical signs and symptoms of nutritional problems.**

|  |  |
| --- | --- |
| **Sign/symptom** | **Nutritional abnormality** |
| Pale: palms, conjunctiva, tongue  Gets tired easily; loss of appetite shortness of breath | Anaemia: may be due to the deficiency of iron, folic, vitamin B12, acid, copper, protein or vitamin B6 |
| Bitot's spots (whitish patchy triangular lesions on the side of the eye) | Vitamin A deficiency |
| Goiter (swelling on the front of the neck) | Iodine deficiency disorder |

**Aster is a one-year-old girl who was brought to your health post by her mother, with a complaint of body swelling and poor appetite for one month.**

**Upon anthropometric assessment her weight-for-height was less than 3 SD and on examination, she has bilateral pitting oedema. What is the nutritional problem Aster is suffering from and what are the indicators?**

Aster's weight-for-height index is an indicator of severe underweight and this, combined with the bilateral pitting oedema, tells you that she has severe acute malnutrition. (Ethiopian Federal Ministry of Health May 20, 2014).

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

**Impact of Malnutrition**

Pregnant and lactating women and young children less than three years are most vulnerable to malnutrition.

Scientific evidence has shown that beyond the age of 2-3 years, the effects of chronic malnutrition are irreversible. This means that to break the intergenerational transmission of poverty and malnutrition, children at risk must be reached during their first two years of life.

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 Anemia. Studies show that stunted children in the first two years of life have lower cognitive test scores, delayed enrolment, higher absenteeism and more class repetition compared with non-stunted children. 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. The loss from stunting is calculated as 1.38% reduced productivity for every 1% decrease in height while 1% reduced productivity is estimated for every 1% drop in iron status (source Haddad and Bouis, 1990).

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

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. (Mother and child nutrition 2017).

**Improved ways to prevent negative effects of malnutrition**

* **Encourage healthier food choices**. The best foods are those that are full of nutrients, such as fruits, vegetables, whole grains, and lean meats. Help your loved one limit his or her intake of solid fats, sugars, alcoholic beverages, and salt. Suggest ways to replace less healthy foods with healthier choices.
* **Snacking on healthy foods** is a good way to get extra nutrients and calories between meals. It may be especially helpful for older adults who quickly get full at mealtimes.
* **Make food taste good again**. If your loved one is on a restricted diet, herbs and spices can help restore flavor to bland foods. Just remember to avoid herb or spice blends that are heavy in salt.
* **Consider adding supplements to one’s diet**. He or she may benefit from a supplement shake or other nutritional supplements. Talk to their doctor about these options.
* **Encourage exercise**. Even a little bit of exercise can help improve one’s appetite and keep his or her bones and muscles strong.
* **Plan social activities**. Make mealtimes and exercise a social activity. Take your loved one on a walk around the block. Encourage him or her to meet a neighbor or friend for lunch. Many restaurants offer discounts for seniors. (Family doctor staff December 6, 2017)

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

Vitamin A, iodine and iron deficiencies in South Sudan

Iodine deficiency is the primary cause of preventable brain damage in children. Its most devastating impacts occur during foetal development and in the first few years of a child’s life. Globally, 30 per cent of the world’s population live in areas with iodine deficiency.

Vitamin A deficiency affects about one third of children living in low and middle income settings, mainly in sub-Saharan Africa and South Asia2. Vitamin A deficiency weakens the immune system and increases a child’s risk of contracting and dying from infections like measles, and diarrheal illnesses.

Iron deficiency can lead to anemia, which increases the risk of hemorrhage and bacterial infection during childbirth and is implicated in maternal deaths. In turn, babies may be born prematurely and suffer from infections, learning disabilities, and delayed development. Almost 40 per cent of pregnant women and more than 40 per cent of children under 5 in developing countries are anemic. About half of these cases are estimated to result from iron deficiency. (UNICEF 2018).

**Iron**

* Iron is an essential mineral critical for motor and cognitive development. Children and pregnant women are especially vulnerable to the consequences of iron deficiency.
* Low hemoglobin concentration (anemia) affects 43% of children 5 years of age and 38% of pregnant women globally.
* WHO recommends iron and folic acid supplements for reducing anemia and improving iron status among women of reproductive age.
* Flour fortification with iron and folic acid is globally recognized as one of the most effective and low-cost micronutrient interventions.
* Classroom with children and teacher
* Preventing iron deficiency helps improve children's learning ability and cognitive development.

**Iodine**

* Iodine is one of the most important minerals required by a fetus for brain and cognitive development, though the iodine content in most foods and beverages is low.
* 18 million babies are born mentally impaired because of maternal iodine deficiency and 38 million are born at risk of iodine deficiency. Globally it is estimated that 2 billion people have insufficient iodine intake.
* Fortification of salt with iodine has been one of the most successful nutrition interventions to date–71% of global households have access to iodized salt11.
* Salt iodization has led to an increase in IQ points and significant decline in the prevalence of iodine deficiency disorders, such as goiters, piles of salt

**Vitamin A**

* Vitamin A is necessary to support healthy eyesight and immune system functions; children who are deficient face an increased risk of blindness and death from infections such as measles and diarrhea7.
* Globally, 1 in 3 pre-school aged children and 1 in 6 pregnant women are vitamin A deficient due to inadequate dietary intake.
* Vitamin A supplementation of children 6-59 months has been shown to be highly effective in reducing mortality from all causes in countries where vitamin A deficiency is a public health concern,(CDC April 30, 2018)

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

Your digestive system breaks down the foods you eat into the nutrients your body needs. If you neglect your digestive health, your body could run into problems absorbing those nutrients.

**Improving and Maintaining Your Digestive Health**

Your digestive health is directly impacted by the foods you eat and the lifestyle you live. By taking steps to improve your digestive health, you will help your digestive system to function more efficiently, improving your overall health and sense of well-being.

1. **Eat a high-fiber diet**. According to Maria Adams, RD, MPH, a nutrition consultant in Marblehead, Massachusetts, consuming a diet that's high in fiber and rich in whole grains, vegetables, legumes, and fruits can improve your digestive health. "A high-fiber diet helps to keep food moving through your digestive tract, making you less likely to get constipated," Adams says, adding that a high-fiber diet can also help you prevent or treat various digestive conditions, such as diverticulosis, hemorrhoids, and irritable bowel syndrome (IBS). In addition, it can help you achieve or maintain a healthy weight.

2. **Get both insoluble and soluble fiber**. It's important to consume both types of fiber, since they help your digestive system in different ways. "Insoluble fiber, also known as roughage, can't be digested by the body and therefore helps add bulk to the stools," says Adams. "Soluble fiber draws in water and can help prevent stools that are too watery." Good sources of insoluble fiber include wheat bran, vegetables, and whole grains; get soluble fiber from oat bran, nuts, seeds, and legumes.

3. **Limit foods that are high in fat**. "In general, fatty foods tend to slow down the digestive process, making you more prone to constipation," says Adams. But since it's important to get some fat in your diet, Adams says that pairing fatty foods with high-fiber foods can make them easier on your digestive system.

4. **Choose lean meats.** Protein is an essential part of a healthful diet, but fatty cuts of meat can lead to uncomfortable digestion. When you eat meat, select lean cuts, such as pork loin and skinless poultry.

5. **Eat on schedule**. Adams says that consuming your meals and snacks on a regular schedule can help keep your digestive system in top shape. Aim to sit down for breakfast, lunch, dinner, and snacks around the same time each day.

6. **Exercise regularly**. "Regular exercise helps keep foods moving through your digestive system, reducing constipation," says Adams. Exercise can also help you maintain a healthy weight, which is good for your digestive health. Make it a point to work regular exercise into your weekly schedule.

What you eat and the quality of your digestive health are intertwined. Following these ten strategies will help make sure it’s always a happy relationship. (Krisha McCoy & Lynn Grieger RDN 2017).

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