Unit 6

Assessment of Nutritional Status

UNIT SUMMARY

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THE IMPORTANCE OF NUTRITIONAL ASSESSMENT

Nutritional Assessment

Nutritional Status: the state of a person's health depending on his or her diet.

Nutritional assessment methods allow medical professionals to assess a person's nutritional status. An **ideal nutritional status** happens when the intake of nutrients matches the nutritional requirements or needs of a person.

Malnutrition (سوء التغذية)

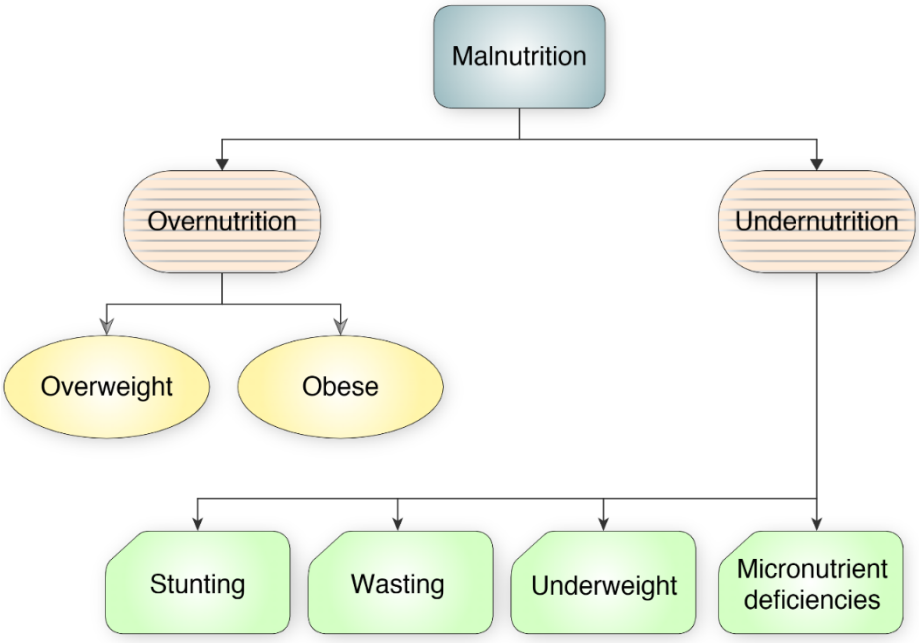
The term **malnutrition** is used to describe someone who has a poor nutritional status. A malnourished person may be:

- underweight,
- overweight
- or obese.

They could also be a 'healthy' weight but have a **deficiency** of nutrients such as vitamins or minerals.

The term **undernutrition** is used when a person does not eat enough food or get enough nutrients from the foods that they consume.

A person who is *malnourished* **is not** always *undernourished*, they may be overweight or obese.



THE IMPORTANCE OF NUTRITIONAL ASSESSMENT

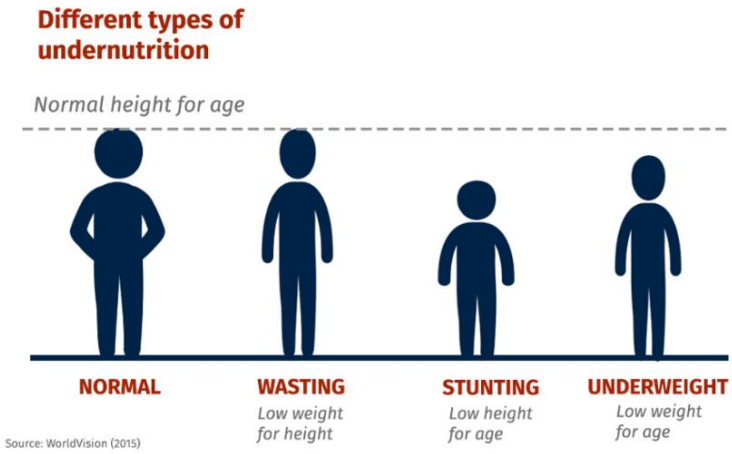
There are **four** main types of undernutrition:

- **Wasting**
  is when someone is a **low weight** for their height. This is usually due to severe weight loss, through lack of food or they have had an infectious disease, such as diarrhoea, which has caused them to lose weight. A young child who is wasted has an increased risk of death.

- **Stunting**
  is when a child is a **low height** for their age. It is the result of undernutrition over time and is more common in low-income countries. It is also linked to poor nutrition of the mother during pregnancy and poor feeding during infancy.

- **Underweight**
  is when a child is a **low weight** for their age. A child who is underweight may also be stunted or wasted, or both.

- **Deficiencies**
  Micronutrient deficiency is when someone is not getting enough of certain vitamins or minerals. Deficiencies in Iodine, vitamin A, and iron are common and can be very dangerous, particularly for children and pregnant women in low-income countries.



Micronutrients are vitamins and minerals. They are needed for the body to produce enzymes, hormones, and other substances that are essential for proper growth and development.

Measuring Nutritional Status

The purpose of nutritional assessment:

- To identify people who are malnourished or at risk of malnourishment.
- To identify issues or diseases which may be present.
- To develop healthcare programmes to meet the needs of a community.
- To measure how effective nutritional programs and interventions were once they have been completed.

THE IMPORTANCE OF NUTRITIONAL ASSESSMENT

Nutritional Assessment Techniques

Many different techniques are used by medical professionals to assess nutritional status. We will look at some of these techniques throughout this unit. There are **five** main categories of nutritional assessment. These are known as **ABCDE methods** of assessing nutritional status,

- **A**nthropometric methods
- **B**iochemical methods (laboratory)
- **C**linical methods
- **D**ietary assessment
- **E**nvironmental factors

ANTHROPOMETRY

Anthropometric Measurements

'Anthropo' means '**human**' and 'metry' means '**measurement**'. Anthropometry, therefore, is the physical measurements of the body.

Anthropometric measurements include measuring height and weight. It can also include measuring proportions of the hips, waist, legs, arms and skinfolds. Medical professionals analyse the results to find out the physical status of a person.

Anthropometric measures are particularly useful in children as it can show if they are growing and developing at the correct rate and highlight any problems with their nutritional status. These measurements will provide a quick indication of malnutrition such as obesity, stunting and wasting.

Waist Circumference

Waist circumference is the total distance around the waist. A larger waist circumference shows there is more abdominal fat (fat around the middle of the body).

High levels of abdominal fat are linked with non-communicable diseases such as **cardiovascular disease**, **cancer** and **diabetes**. Age, gender and ethnicity will affect the measurement.

Waist circumference - Males	Waist circumference - Females	Classification
Less than 94cm	Less than 80cm	Desirable
94-102cm	80-88cm	High risk
More than 102cm	More than 88cm	Very high risk

How to Measure Waist Circumference

- Place the tape at the mid-point between the top of the hip bone and the lower ribs. It can be measured over thin clothes.
- The tape should not be too tight or too loose.
- Abdominal muscles should be relaxed.
- The measurement should be taken after breathing out.

ANTHROPOMETRY

Measuring Weight

- Make sure the weighing scale is accurate.
- The person should remove heavy items from pockets such as mobile phones.
- The person should stand still with their arms by their sides.
- Measure weight in kilograms (kg).

Measuring Height

- Remove shoes as they can add extra height.
- Make sure the person is standing straight with their back against the measure.
- Make sure the measure is straight.
- The heels, back and head should be touching the measure.
- Look straight ahead.
- Lower the reading bar to the top of the head so a measurement can be taken.
- Measure the height in centimetres (cm).

Growth Charts

The WHO provide growth charts for all children up to nineteen years of age. These charts are used to compare height and weight against people of the same age and gender. They are also used to follow a child's growth and can identify some medical problems at an early age.

Lines or curves on the growth chart show the height of many other children at each age. The WHO growth charts are divided up into age groups. There are charts for babies aged 0-2 years, 2-5 years, and 5-19 years. In general, people do not grow after nineteen years of age.

What You Will Need

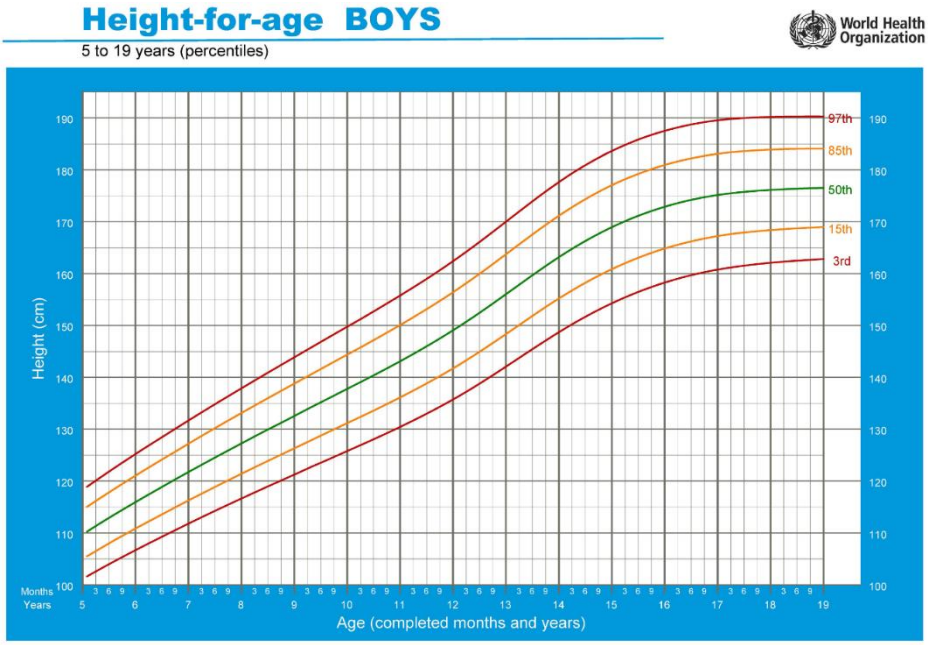
To figure out where someone fits on the growth chart there are a few things you need to know.

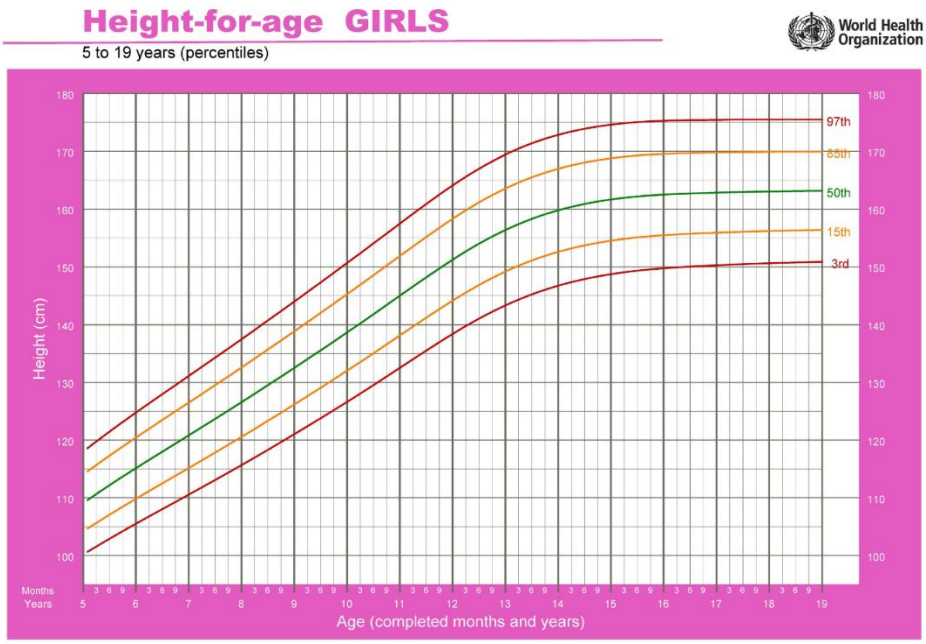
- The person's gender (male or female)
- The person's age (usually in years)
- The person's height (in centimetres)

What You Will Need

The bottom of the chart shows the age of the person. Once you find the age of the person, you then look for their height on the chart. Make a mark on the chart where the age meets the height. The red, yellow, and green lines on the chart are called **percentiles**.

ANTHROPOMETRY





Interpreting the Results

The red, yellow and green lines on growth charts are called **percentiles**. Percentiles show how many other people (of the same age as the person being measured) are taller, shorter and the same height.

Healthcare professionals use growth charts to compare the growth of individuals of the same age. They also help to monitor and track the development of boys and girls over time. Growth charts can be used to identify if there is a growth problem that could be related to malnutrition.

BODY MASS INDEX (BMI) AND BODY FAT PERCENTAGE

Body Mass Index (BMI)

Body mass index (BMI) is a measurement of a person's weight for their height which is used to identify weight status. BMI is calculated using the following equation:

$$\text{BMI} = \frac{\text{Weight (kg)}}{(\text{Height})^2\ (\text{m}^2)}$$

After calculating BMI, the next step is to understand the results. The BMI number will fall into one of four categories;

- **Underweight**
  A BMI result lower than 18.5 is a sign that the person is underweight. The person should speak to a healthcare professional about gaining weight in a healthy way.

- **Normal Weight**
  A BMI between 18.5 and 24.9 is a sign that the person is a healthy weight. They should aim to maintain this weight by eating a healthy, balanced diet.

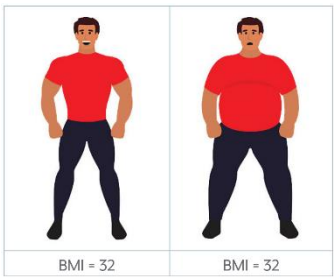
- **Overweight**
  A BMI result between 25 and 29.9 is a sign that the person is overweight. They should consider talking to a healthcare professional about losing some weight in a healthy way.

- **Obese**
  There are different levels of obesity, but any BMI above 30 is classed as being obese. A person with a BMI of more than 30 should seek professional help as they need to reduce their weight.

BMI is a measure of weight for height. It does not consider fat mass or muscle mass. A person could have a lot of muscle which would add to their weight and increase their BMI even though they have a healthy amount of fat.

BODY MASS INDEX (BMI) AND BODY FAT PERCENTAGE

Body Fat Percentage



Sometimes it is useful to use BMI with body fat percentage to assess health. A person could be overweight or obese according to their BMI, but their body fat percentage could be quite low. This happens a lot with sports players and athletes who have a lot of muscle.

We need fat to protect our organs, provide energy, and help our bodies stay warm. Too much fat on the body can increase the risk of developing noncommunicable diseases.

Measuring Body Fat

First measure the amount of fat on the body. The most accurate way to measure body fat is by using a **DEXA scanner**. This is an X-ray that shows an exact breakdown of fat mass, bone density and muscle mass.

Another method for calculating body fat is to measure **skinfold thickness**. Skinfolds are areas of skin that can fold when pinched. Skinfolds are measured using a tool called **callipers** which grip the fat through the skin and can be used at different parts of the body.

Bioelectrical impedance analysis (BIA) is another method of measuring body fat. It sends a weak electrical current through the body. The person does not feel the electrical current. The machine can tell when the electrical current is travelling through fat as opposed to muscle.

Calculating Body Fat Percentage

After you have measured body fat, you need three things to calculate the body fat percentage:

- Total body weight (TBW) in kilograms (kg)
- Body fat in kilograms (kg)
- Age

The formula for calculating body fat percentage:

$$\frac{\text{Body fat}}{\text{TBW}} \text{ X100}$$

BODY MASS INDEX (BMI) AND BODY FAT PERCENTAGE

Understand the Results

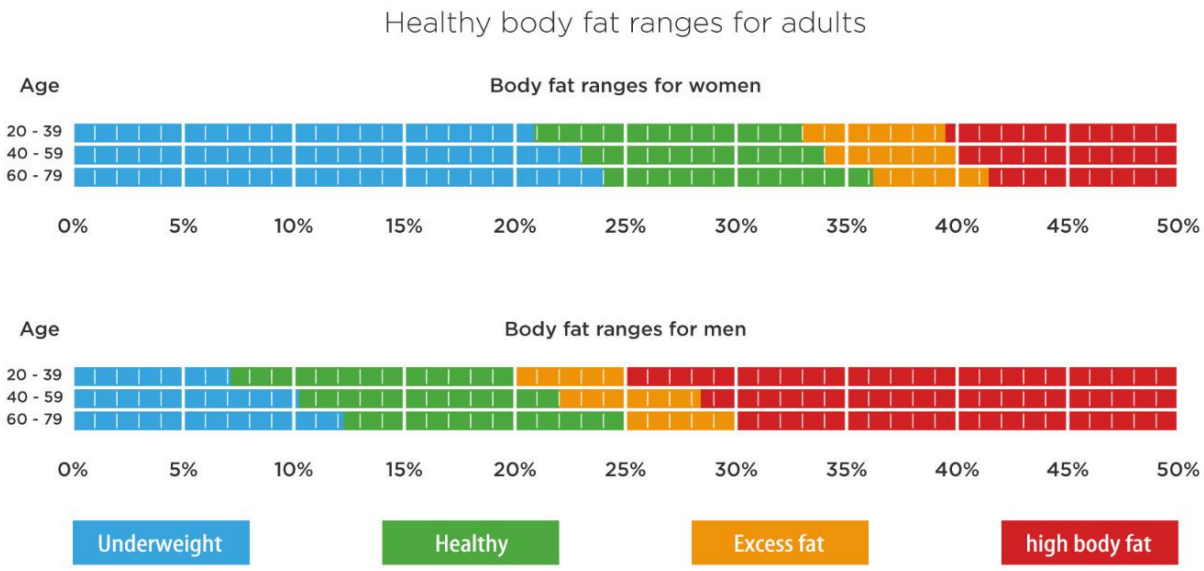
Body fat percentages change as people get older. Therefore it is important to know the person's age, so you can accurately identify which category they are in. There are four possible category that a person can be in:

- **Blue**
  This category shows that the person has too little body fat for their age.

- **Green**
  This category shows that the person has a healthy amount of body fat for their age.

- **Amber**
  This category shows that the person has gone above the healthy body fat for their age and they should try to reduce it.

- **Red**
  This category shows that the person has so much body fat for their age that it could have a negative impact on their health by putting them at a higher risk of certain conditions. They need to reduce it.



Biochemical Methods

The B in ABCDE of nutritional assessment stands for biochemical methods. These can also be called **laboratory measurements** of nutritional assessment.

Biochemistry: a part of science that explores the chemistry of living things.

Biochemical methods of assessment involve testing samples of **blood** and **urine**. Samples are taken and tested in a lab facility.

When your body digests the food you eat, chemicals and nutrients are released into your bloodstream. These travel around your body and are either stored, used up as energy or exit through your urine.

Therefore, blood and urine are good ways find out the nutrients that are present in someone's body.

The Results

To have accurate results of biochemical measurements, the laboratory specialist who interprets the results needs to know certain things about the patient who is being tested. The information they need to know includes:

- previous medical history.
- current medications.
- a clinical examination report.

Biochemical methods of assessing nutritional status are the **most accurate** as they show exactly how much of a certain nutrient or enzyme is present in the body.

It is easy to see if someone is deficient in any nutrients by looking at their biochemical markers. Sometimes deficiencies and nutrient-related diseases are identified before symptoms develop.

Biochemical methods do not require the patient to remember what foods they have eaten, or how much of a certain food they have eaten.

Clinical Methods

The letter C in ABCDE stands for **clinical methods** of nutritional assessment. Clinical methods are a **physical examination**. Medical professionals look for physical clues of nutrition-related health problems on the body.

These clues may be seen or felt in different parts of the body. Tissues of the body that can show nutrient deficiencies include the following:

- Skin
- Eyes
- Gums (اللثة)
- Hair
- Nails
- Mouth

If a person has a sore mouth and bleeding gums, it could suggest they are deficient in some vitamins and minerals.

If a person's hair can be pulled out very easily, it could mean they are low in protein, iron of vitamin D.

If a person's nails are thin and indented, it could suggest they have an iron deficiency.

What is Checked in a Physical Exam?

Medical professionals need to know the patient's medical history when completing a physical exam. The following will be checked:

- Diarrhoea (إسهال) and other digestive issues
- Medications
- Previous or current medical conditions
- Physical appearance
- Signs of infection
- Nutritional supplement use

Other factors including the person's ability to prepare meals, financial resources, and social resources are considered.

Completing out a physical examination and taking a medical history can help a doctor to identify malnutrition. If a doctor thinks there is some form of malnutrition, they may send the patient for biochemical testing to check which exact nutrients are causing problems.

Rickets is a disease that causes the bones of children to become soft. Their bones do not grow or develop properly. The development of rickets is usually due to a deficiency in vitamin D and calcium.

DIETARY METHODS

Dietary Intakes

The letter D in ABCDE stands for dietary intakes. This is where the patient must record their eating patterns or the food and drinks that they consumed in a given period of time.

Nutritional assessment is completed by healthcare professionals who consider the foods eaten, and patterns of consumption. This method of dietary assessment relies on the honesty of the patient to accurately record the correct foods, the correct cooking methods and amounts eaten.

Recording Dietary Intakes

Three of the most common ways to measure dietary intake are:

#1 Twenty-Four-Hour Dietary Recall

This is done over a period of twenty-four hours. Patients must remember what they ate within a twenty-four-hour period (usually from midnight on one day until midnight the next day).

A medical professional will interview the patient and ask questions such as "***Did you eat anything after breakfast?***" The patient should give as much information as they can about the foods and drinks they consumed.

It is an **open-ended method** of nutritional assessment. This means the questions are open for the patient to answer in as much detail as they want to. The patient needs to recall:

- the ingredients used.
- the cooking method used.
- the time of day they had it.
- the amount of food eaten.
- if they had any leftovers.

Advantages

- The information is easy to collect.
- Most patients can remember what they ate on the previous day.
- Recalls do not take a large amount of time to complete and can be done over the phone or in person.
- The information provided can estimate regular food and nutrient intake.

Disadvantages

- This method depends on memory only. Some people may have difficulties recalling the portion size of their food, or how much they had leftover.
- If a patient ate in a restaurant, they may not know the cooking methods or ingredients used.
- It only gives an overview of one day's eating pattern. This may not show that patient's regular eating habits.
- Some patients will not give honest responses because of fear of being judged by the medical professional that is interviewing them.

#2 Three-day Food Diary

The three-day food diary is similar to the twenty-four-hour dietary recall as it is an **open-ended** method of nutritional assessment. However, patients must record food intake for three days: two weekdays and one weekend day. They should record the same information as on a twenty-four-hour diet recall.

However, this is a diary that they must **complete**, rather than a recall. Information should be recorded in **real-time** and not from memory. Weights of foods should be measured using scales. Because of this, it is expected to be more accurate than a 24-hour recall where portion sizes are not expected to be as accurate.

Advantages

- The level of detail provided will allow for **accurate** estimates of regular dietary intake.
- Diary entries are done in real-time, so it does not depend on memory.

Disadvantages:

- It requires a high level of **commitment** to weigh and record every item of food eaten.
- People may change their normal eating habits because they know they must record all their food. They may also become lazy and not record some smaller items of food or ingredients added to meals for example, salt or butter.

#3 Food Frequency Questionnaire

A food frequency questionnaire (**FFQ**) has a set number of questions with multiple-choice answers. It is **not an open-ended method** of nutritional assessment.

It includes questions about portion size and how often food is eaten. FFQs may ask how often a portion of food is eaten over the course of a week, a month, several months or a year.

DIETARY METHODS

FFQs have an interviewer who is trained in how to ask the questions to the patient, so there is no impact on the result. They are useful when medical professionals want to analyse the intake of a small number of foods or one single food group.

Advantages

- It can be used on large groups of people.
- It is quick and easy to complete.

Disadvantages:

- Specific foods are listed. Sometimes a food could be forgotten or missed out.
- Some people's eating patterns of certain food items are not consistent.
- It requires a good level of memory, especially for longer timeframes.

FOODS AND AMOUNTS	AVERAGE USE LAST YEAR								
BREAD AND SAVOURY BISCUITS (one slice or biscuit)	Never or less than once/month	1-3 per month	Once a week	2-4 per week	5-6 per week	Once a day	2-3 per day	4-5 per day	6+ per day
White bread and rolls						✓			
Brown bread and rolls				✓					
Wholemeal bread and rolls	✓								
Cream crackers, cheese biscuits		✓							
Crispbread, eg. Ryvita		✓							
CEREALS (one bowl)									
Porridge, Readybrek				✓					
Breakfast cereal such as cornflakes, muesli etc.					✓				

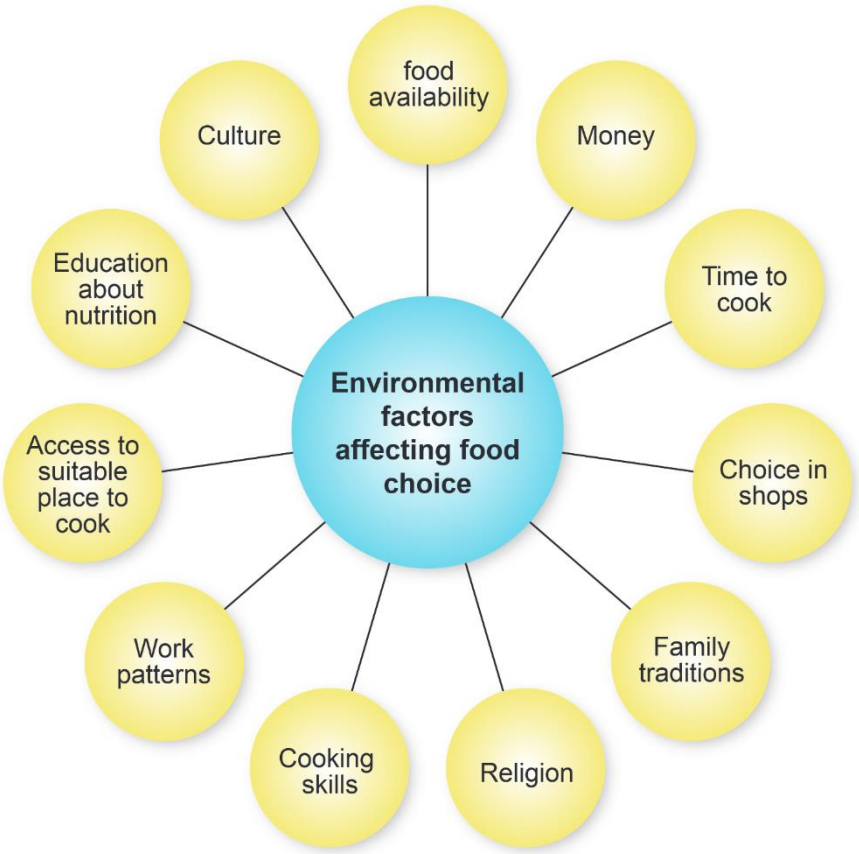
ENVIRONMENTAL FACTORS

How can Environmental Factors Effect Nutritional Status?

Different environmental factors can have a significant impact on a person's nutritional status. This includes a person's access to healthy food, ability to cook healthy meals and cultural factors that may affect their food choice.

Environmental factors affecting food choice:

- Religion
- Culture
- Family traditions
- food availability
- Choice in shops
- Access to suitable place to cook
- Money
- Time to cook
- Work patterns
- Cooking skills
- Education about nutrition



ENVIRONMENTAL FACTORS

Socioeconomic Status

Socioeconomic: relating to people's background or social status and income.

A person's socioeconomic status can impact their eating habits and food choice. If someone has limited income, they may not be able to spend much money food. Healthier foods are generally more expensive than unhealthy foods.

Where someone lives can impact their ability to cook healthy meals, for example if their home does not have suitable cooking facilities or if there is no access to healthy affordable food near their home.

Although unhealthy eating may be cheaper in the short-term, the consequences of lack of healthy food long-term can have severe effects on health and result in obesity, type 2 diabetes, cardiovascular disease, and other non-communicable diseases.

Nutrients Available

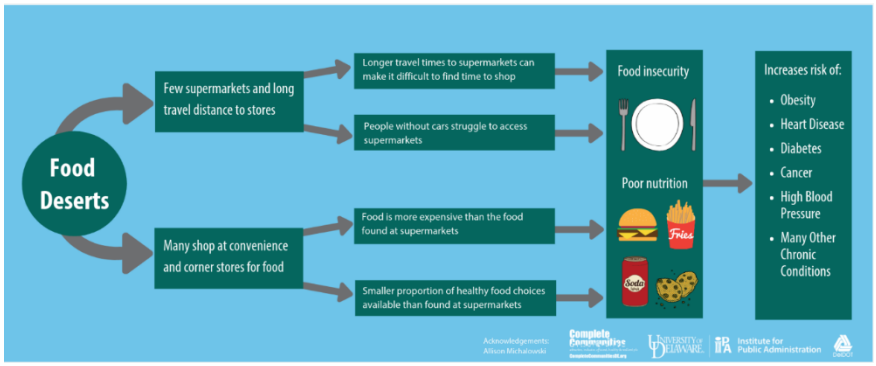
In certain countries food availability will depend on weather and seasons. There could be other reasons that good food is not able to get to certain areas, such as war or natural disasters.

Food Deserts

Food deserts are areas where people don't have easy access to affordable, healthy food options. This is usually because there is no grocery store within convenient traveling distance.

This is more common in low-income areas, where people do not have access to a car to travel easily for food shopping. The nearest hypermarket may be a long way away and not easy to access via public transport.

Studies have found that wealthy areas have **three times** as many grocery stores as poor ones. People's choice about what they eat is therefore limited by the options available to them and what they can afford. Food deserts may not have a grocery store to buy healthy options but could have a large number of **fast-food** restaurants and convenience stores selling **unhealthy** processed foods.



ENVIRONMENTAL FACTORS

Other dietary restrictions should also be considered, such as **allergies** and **intolerances** like lactose intolerance and gluten allergies as this will limit food choice, especially of those who do not have access to larger hypermarkets that have more selection.

Cultural Factors

People from different background and cultures consume different types of food. This is sometimes due to tradition and sometimes due to religion. Traditional foods from certain cultures may not be very healthy, so it is important consider the types of foods that people may be eating when assessing nutritional status.

Religious practises may have certain food rules or restrict certain foods, this should also be considered, especially if someone lives in an areas where it is not easy to access certain foods.

Vegan and Vegetarian Diet

People may choose to have a certain diet for reasons other than culture or religion. An example of this is a vegetarian or vegan diet. There are a number of reasons why people may choose to have a vegan or vegetarian diet, but the most common are related to animal welfare and environmental reasons.

A vegan diet is sometimes referred to as a '**plant based diet**'.

Although a vegan diet can be very healthy, as it is low in saturated fat, it is also important to ensure that someone following a vegan diet is getting enough of certain nutrients.

A vegan diet may be lower in **protein**, **iron** and **B12** than a traditional diet so it is important to consider this when assessing someone's nutritional status.

UNIT 6

ASSESSMENT OF NUTRITIONAL STATUS

UNIT SUMMARY

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