

# Biochemistry of Nutrition

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# Unit 5

- Malnutrition (dietary excesses & deficiencies)
- Obesity
- Kwashiorkor
- Marasmus
- Diabetes
- Fiber – importance

# Obesity

- Obesity is a condition where a person has accumulated so much body fat that it might have a negative effect on their health. If a person's bodyweight is at least 20% higher than it should be, he or she is considered obese. If your Body Mass Index (BMI) is between 25 and 29.9 you are considered overweight. If your BMI is 30 or over you are considered obese.



WHAT IS OBESITY AND NUTRITION FOR IT.mp4

- Genetics
- Overeating
- A diet high in simple carbohydrates
- Frequency of eating
- Physical inactivity
- Medications
- Psychological factors
- Diseases
- Social issues
- Ethnicity
- Childhood weight
- Hormones

## Body Mass Index (BMI)

**SI, Metric Units:**

$$\text{BMI} = \frac{\text{mass (kg)}}{\text{height}^2 \text{ (m)}} = \frac{72.57}{1.78^2} = 22.90 \frac{\text{kg}}{\text{m}^2}$$

Underweight: 18.5 or less

Healthy weight: 18.5 - 24.9

Overweight: 25 - 29.9

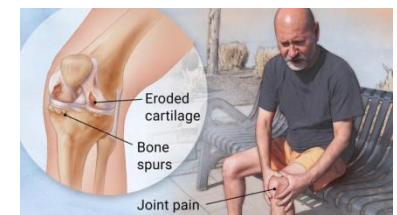
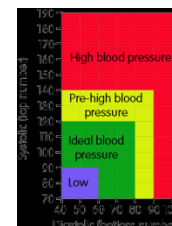
Obese: 30 or greater

<http://www.picknpay.co.za/bmi-calculator>

# Obesity – complications/risks

- High triglycerides and low high-density lipoprotein (HDL) cholesterol
- Type 2 diabetes
- High blood pressure
- Metabolic syndrome — a combination of high blood sugar, high blood pressure, high triglycerides and low HDL cholesterol
- Heart disease
- Stroke
- Cancer, including cancer of the uterus, cervix, endometrium, ovaries, breast, colon, rectum, esophagus, liver, gallbladder, pancreas, kidney and prostate
- Breathing disorders, including sleep apnea, a potentially serious sleep disorder in which breathing repeatedly stops and starts
- Gallbladder disease
- Gynecological problems, such as infertility and irregular periods
- Erectile dysfunction and sexual health issues
- Nonalcoholic fatty liver disease, a condition in which fat builds up in the liver and can cause inflammation or scarring
- Osteoarthritis

<https://www.youtube.com/watch?v=MlGkDDRUC20>



# Obesity treatment – role of diet

## **Diet**

- Eat few calories
- Balanced diet for long-term weight reduction
- Eat food with low energy density
- Eat less energy dense food
- 55% calories of complex carbohydrates
- No soft drinks
- Calories of food
- Consult your doctor

## **Five simple remedies**

- Drink lemon juice
- Olive oil
- Cabbage
- Green tea
- Ginger

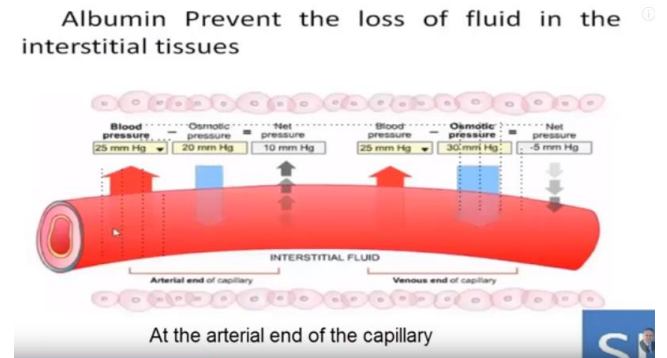
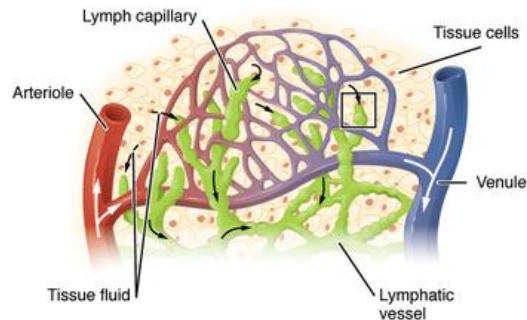
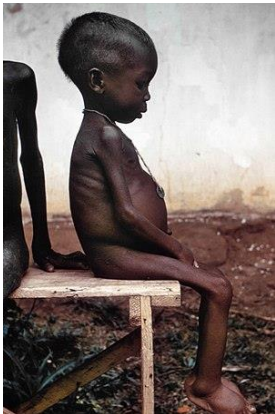
<https://www.youtube.com/watch?v=mIX0gA05SNU>

[https://www.youtube.com/watch?v=C\\_lmLJolbRA](https://www.youtube.com/watch?v=C_lmLJolbRA)

<https://www.youtube.com/watch?v=jPuFqIRgVOg>

# Kwashiorkor

Kwashiorkor, also known as “edematous malnutrition” because of its association with edema (fluid retention), is a nutritional disorder. It is a form of malnutrition caused by a lack of protein in the diet. People who have kwashiorkor typically have an extremely emaciated appearance in all body parts except their ankles, feet, and belly, which swell with fluid.



Oncotic Pressure.mp4



Hydrostatic pressure Vs Oncotic pressure made easy!!!.mp4



Edema\_ Part 1.mp4

# Kwashiorkor : Treatment

- Frequent rations – two to four hours
- First week –
  - hyperglucidic and gradually enriched with protein and essential elements (sweet milk with mineral salts and vitamins)
  - Include lactases : lactose intolerance
  - Antibiotics
- Two to three weeks –
  - Boiled cereals with minerals and vitamins
  - 80% of normal weight
  - Traditional food can be reintroduced
- 85% weight - healed

# Marasmus

- Malnutrition is a condition in which a lack of nutrients in the body causes health problems.
- Marasmus is one form of malnutrition.
- It can occur in anyone with severe malnutrition but usually occurs in children.
- A child with marasmus looks emaciated.
- Body weight is reduced to less than 62% of the normal (expected) body weight for the age.



- Thin face
- Ribs and shoulders clearly visible through the skin
- Very loose skin that sometimes hangs in folds in the upper arms, thighs, and buttocks
- Persistent dizziness
- Sunken eyes
- Diarrhea
- Active, alert, or irritable behavior
- Frequent dehydration
- Frequent infections that don't show external signs like fever or lesions



# Marasmus

## Causes

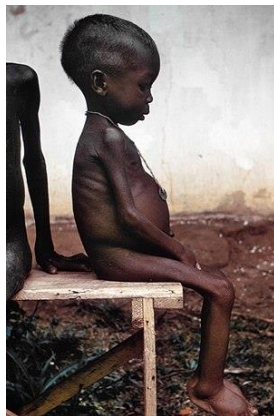
- severe deficiency of nearly all nutrients, especially protein, carbohydrates and lipids
- Poverty and scarcity of food
- Viral, bacterial and parasitic infections can cause children to absorb few nutrients
- Chronic diarrhea

## Treatment

- Not only causes but complications of disorder must be treated (infections, dehydration and circulation of disorders)
- Skim milk powder mixed with boiled water followed by vegetable oils and finally sugar
- Refeeding more slowly
- Once start to recover – more balanced diet
- Antibiotics
- Point of no return – no use

# Kwashiorkor vs Marasmus

Kwashiorkor	Marasmus
Edema is present	Edema is absent
Subcutaneous fat is preserved	Subcutaneous fat is not preserved
Enlarged fatty liver	Fatty liver is absent
Ribs are not very prominent	Ribs are very prominent
Muscle wasting mild or absent	Severe muscle wasting



Marasmus vs kwashiorkor.mp4



# Diabetes

- A group of disorders characterized by an inability of the body to regulate its blood sugar (glucose) levels, either because insulin production is inadequate, or because the body's cells do not respond properly to insulin, or both.
- Patients with high blood sugar will typically experience polyuria (frequent urination); they will become increasingly thirsty (polydipsia) and hungry (polyphagia).



Diabetes Type 1 and Type 2, Animation.mp4



Diabetes \_ Causes,Types & Treatment ! (Award Wining Presentation).mp4



What is diabetes mellitus\_\_ Endocrine system diseases \_ NCLEX-RN \_ Khan Academy.mp4



Diabetes During Pregnancy What is Gestational Diabetes.mp4

# Diabetes : Types & Syptoms

- **Types & causes**
  - **Type 1** – the body does not produce insulin. Approximately 10% of all diabetes cases are type 1. Type I diabetes is a multifactorial autoimmune disease, which is characterized by T cell mediated destruction of the insulin secreting  $\beta$  cells of the islets of Langerhans in the pancreas.
  - **Type 2**- the body does not produce enough insulin for proper function or the cells in the body do not response to insulin (insulin resistance). Approximately 90% of all cases of diabetes worldwide are of this type.
  - **Gestational Diabetes** - this type affects females during pregnancy. Gestational diabetes is a temporary type of diabetes and is one of the most common health problems for pregnant women. Some women have very high levels of glucose in their blood, and their bodies are unable to produce enough insulin to transport all of the glucose into their cells, resulting in progressively rising levels of glucose.
- **Symptoms**
  - The most common diabetes symptoms include frequent urination, intense thirst and hunger, weight gain, unusual weight loss, fatigue, cuts and bruises that do not heal, male sexual dysfunction, numbness and tingling in hands and feet.

# Diabetes : Treatment

- **Type 1** – must take insulin. Insulin is injected just under the skin or You can also use an insulin pump, which is a device worn outside your body that can be programmed to release a specific dose. You'll need to monitor your blood sugar levels throughout the day. If necessary, you may also need to take medication to control cholesterol, high blood pressure, or other complications.
- **Type 2**- Type 2 diabetes is managed with diet and exercise, and can also be treated with a variety of medications to help control blood sugar. The first-line medication is usually metformin (Glumetza, Glucophage, Fortamet, Riomet). This drug helps your body use insulin more effectively. Metformin (Metformin hydrochloride) is a type of medicine known as a biguanide. This works to lower the amount of sugar in the blood of people with diabetes. It does this by lowering the amount of sugar produced in the liver, and also increasing the sensitivity of muscle cells to insulin. If metformin doesn't work, your doctor can add other medications or try something different. You'll need to monitor your blood sugar levels. You may also need medications to help control blood pressure and cholesterol.
- **Gestational Diabetes** - The majority of gestational diabetes patients can control their diabetes with exercise and diet. Between 10% to 20% of them will need to take some kind of blood-glucose-controlling medications.

# Dietary fiber

- Dietary fibre is a type of carbohydrate that cannot be digested by our bodies' enzymes. Unlike other food components, such as fats, proteins or carbohydrates — which your body breaks down and absorbs — fiber isn't digested by your body. Instead, it passes relatively intact through your stomach, small intestine and colon and out of your body.
- **Soluble**
- **Insoluble**
- **Benefits of a high-fiber diet**
  - Normalizes bowel movements
  - Helps maintain bowel health
  - Lowers cholesterol levels
  - Helps control blood sugar levels
  - Aids in achieving healthy weight
- **Tips for fitting in more fiber**
  - Jump-start your day
  - Switch to whole grains
  - Bulk up baked goods
  - Lean on legumes
  - Eat more fruit and vegetables
  - Make snacks count
- **Constipation**
- **Irritable bowel syndrome**



What is Dietary Fiber\_.mp4



Insoluble and Soluble Fiber Dietary Needs.mp4



Dietary fibre lesson.mp4

# Sources

- Thanks to students for providing excellent information as part of their assignments

## Video sources

<https://www.youtube.com/watch?v=1rQ9V260wfo>

Oncotic Pressure: <https://www.youtube.com/watch?v=gpzchYTMPO4>

MARASMUS KWASHIORKOR: <https://www.youtube.com/watch?v=hQvfVrebcgc>

Diabetes Type 1 and Type 2, Animation: <https://www.youtube.com/watch?v=XfyGv-xwjl>

Diabetes :- Causes,Types & Treatment ! (Award Wining Presentation)

<https://www.youtube.com/watch?v=Pe1f9vbdrq0>

What is diabetes mellitus? | Endocrine system diseases | NCLEX-RN | Khan Academy

<https://www.youtube.com/watch?v=ulxyWZf7BWc>

Insoluble and Soluble Fiber Dietary Needs : <https://www.youtube.com/watch?v=ccN4Nw0qiyQ>

What is Dietary Fiber?: <https://www.youtube.com/watch?v=qmS4mce5Zn0>

Dietary Fibre Lesson: <https://www.youtube.com/watch?v=Mil824w6Aqs>

## Textual source

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