

Lecture 12

Obesity; is the most common nutritional disorder especially in developed countries such as in the USA with an increase in prevalence all over the world.

Definition;

Obesity; Is increasing in weight with a fat accumulation of more than 37% of normal body weight according to height, physical activity, age, and sex ----

Overweight; Is increasing in weight that not more than 20% of normal body weight

- May be considered normal as in youth (muscular tissue building),
- Athletes & heavy working (very muscular) but according to this assessment they consider obese.

Types: This may be due to an increasing the cells of the fat tissues (hyperplasia) that occurs in children, an increase in the size of fat cells (hypertrophy) that occurs in adults, or a combination of (hyperplasia) & (hypertrophy).

- Obesity reduces life expectancy by 7.1 years in men and 5.8 years in women amongst non-smokers while 13.7 and 13.3 years respectively amongst smokers.
- For individuals aged between 30-42 years, the risk of death increases by 1% / year for each 0.5 kg increase in weight, while for individuals aged 50-62, this figure is 2% / year for each 0.5 kg increase in weight.
- Coronary heart disease is the major cause of death.

Causes;

1. Energy imbalance - that increases intake rather than the loss that leads to fat deposition (external cause), social factors affect dietary patterns that increase feeding in infancy leading to an increased number & size of fatty cells that cannot be reduced again even with a long starvation method.
- Persons with obesity before they have a higher ability to return to obesity because have more caloric efficiency that needs fewer calories to increase weight than normal people.
 - Persons who intake 2 heavy meals are more liable to have obesity than those who intake 3-4 light meals (starving of cells leads to rapid metabolization of food & accumulation as fat tissue).

2. Physiological disorder due to disturbance of fat metabolism as hypothalamus lesions (satiety center) (internal cause may be due to tumors, accident), or disturbance of hormones secretion as cortisone, growth hormones, and hypothyroidism.

- May be genetic that liability to obesity increases to 70% in the child with both parents obese & 40% in one of the parents obese, they found children with obesity have hyper-insulinemia, hyperglyceridemia & increase of Lipoprotein analysis by Lipase enzyme (increase the analysis of TG, LDLP & change them to free fatty acids which store in cells as fat). They found that android obesity (central obesity) & gynoid (supra iliac & suprascapular obesity) are familial.

3. Behavioral factors; such as diet intake & low physical activities (change in lifestyle) Alcohol intake

4. Dietary pattern; a diet rich with COH, fat & legumes

5. Aging & Sex; Decrease Basal Metabolic Rate, a decrease in lipid utilization, chronic diseases, decrease exercise, female has total fat (t.f) of about 35% & fat storage (f.s) is about 25%, muscular tissue is 40% while the male has (t.f) 25%, (f.s) 20%, muscular tissue is 50%.

Management

Psychological
Genetic
Metabolic factors

Excess energy intake

Decrease physical activity

Over weight

Obesity

Diagnosis; -

Anthropometric measurements; - weight/age, weight/height, height/ age.

- Skin fold thickness as biceps, triceps, supra iliac, sub scapular - example: - 8.1mm

male of age 18-30 years, 12.2 mm > 30 years, the sum of measurement should be less than 40 mm in male than the sum 50 mm means fat tissue is 26% while if its 100 mm means fat tissue is 37%, for female the sum should be 50 mm, unfortunately, in extreme obesity measurement may be impossible.

BMI (kg/m²)	Classification	Risk of obesity comorbidity
18.5-24.9	Normal range	Negligible
25.0-29.9	Overweight	Mildly increased
> 30.0	Obese	
30.0-34.9	Class I	Moderate
35.0-39.9	Class II	Severe
> 40.0	Class III	Very severe

- Broca index: height (cm) minus 100, e.g. if a person height is 160 cm, his ideal weight =60 kg.

-Waist circumference: Is measuring at the midpoint between the lower border of the rib cage and the iliac crest. It is a simple measurement that not related to height. Changes in waist circumference reflect changes in risk factors for cardiovascular diseases and other

metabolic changes for men with waist circumference ≥ 102 cm, and women with waist circumference ≥ 88 cm.

Waist to hip ratio:

0.9 For males

0.85 For females

OR

Waist circumference:

Males: > 102 cm

Females > 88 cm



Android

Gynoid

Complication;

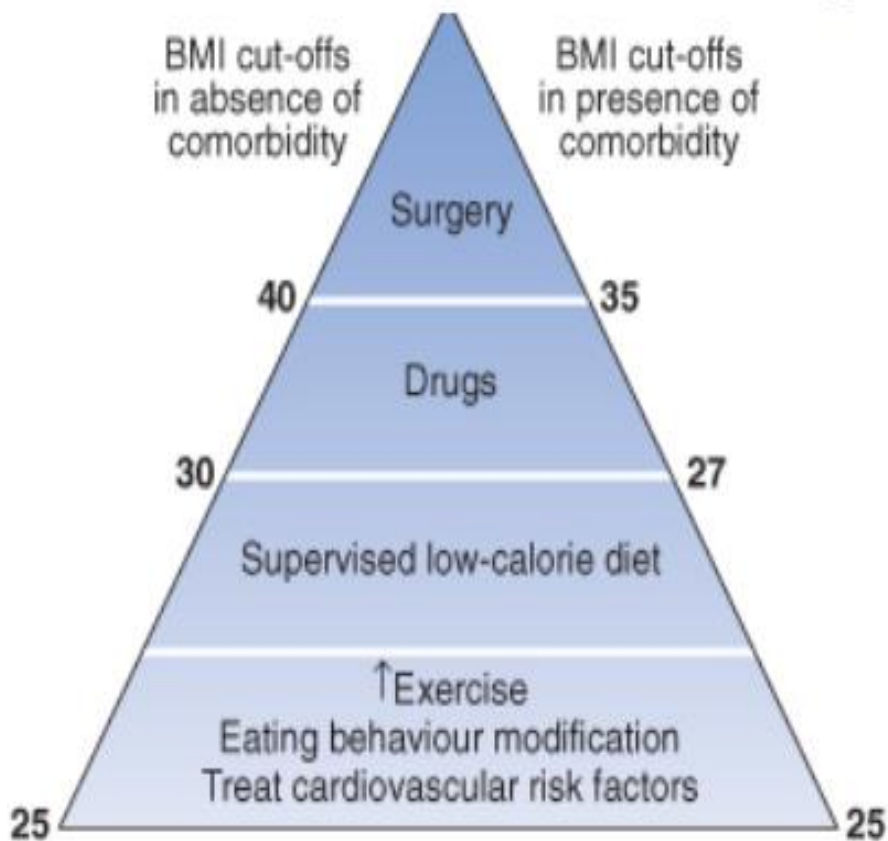
- a. Decrease physical activity, accidents, joints pain, infection of skin folds
- b. Increase chance of having diseases such as coronary heart disease, hypertension, DM, hyperlipidemia, gall stones, abdominal hernia, cancers that 40% increase than normal weight, varicose veins, flat feet, O. O -----
- c. Decrease of vital capacity of lung leads to difficulty in respiration due to decrease of diaphragm movement in severe cases lead to respiratory failure.
- e. Psychological disturbances as depression, isolation, inability to work
- d. -f. Increase rate of death to 50% due to heart diseases, metabolic disorders, and respiratory complications.

Medical management and nutritional management

- Life style - exercise - psychological support
- food choice change - education
- Drug (reduce lipase enzyme& cholesterol, satiety center)
- maintain micronutrient intake

Treatment: - Need to reduce weight according to age, sex, height, body built.

- **Need to maintain ideal weight Concepts;**
- **Proper diet regime- exercise - Doctor Consultant**
- **Psychological support**



Diet regimes

1. Negative balance of energy: Decrease dietary intake to 800- 1000 kcal (loss of 3-4 kg/month) for a Period of time & use fat storage of cells, can intake vegetables, brown bread, Low-fat diet (2cup of skimmed milk), a diet rich with fibers, low intake of CHO & legumes, can give protein (1g -1.5 / kg) that gives the feeling of satiety.

- Decrease 1 kg/week need vitamins & minerals supplement

- Person needs 30 kcal/k, decrease to 10 - 15 kcal / 1kg to reduce weight (example 70 kg --10 x 70 = 700, 15 x 70 = 1050 ---- need to reduce calories 700 – 1050 to be reduced from Total Energy Requirement to decrease 1 - 4 kg/month.

- Age over 30 – for every 5 years should reduce 10% of calories (300 k cal),

Age over 70 should reduce 500 kcal.

2. Total starvation: – Give only vitamins, minerals & water for 2-3 weeks & should do under medical supervision that maybe leads to renal failure & uremia, and heart failure (need to reduce 3500 kcal/ day to reduce 250 g of weight/day)

3. Ketogenic diet: This is a very low CHO, moderate protein, and a higher-fat diet that can help to burn fat more effectively. It has many benefits for weight loss, health, and performance.

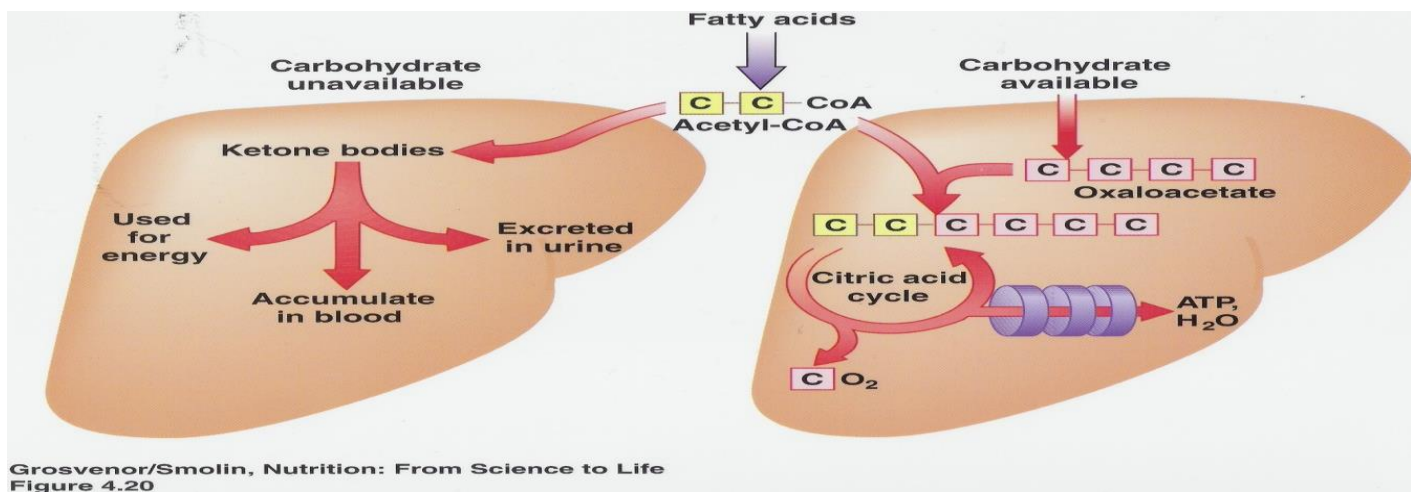
A keto diet can be especially useful for losing excess body fat without hunger and for improving type 2 diabetes.

Since glucose is used as a primary energy, fats not need and are therefore stored.

Typically, on a normal, higher carbohydrate diet, the body will use glucose as the main form of energy. By lowering the intake of carbs, the body induces a state known as ketosis, which produces from the breakdown of fats in the liver by starvation of carbohydrates. With fats and taking away carbohydrates, it will begin to burn ketones as the primary energy source. Optimal ketone levels offer many health, weight loss, and physical and mental performance benefits.

The ketogenic diet is a very low-CHO, high-fat diet that involves reducing carbohydrate intake and replacing it with fat. This reduction in carbs puts the body into a metabolic state called ketosis. It lowers blood sugar and insulin levels and shifts the body's metabolism away from CHO towards fat and ketones.

- However, in the low-insulin state of severe starvation fuels are liberated from stores initially in glycogen (in the liver and muscle), then in triglyceride (lipolysis in adipose tissue, with excess free fatty acid supply to the liver leading to ketosis) and finally in protein (proteolysis in muscle).



When eats high CHO, body will produce glucose and insulin. Glucose is the easiest molecule for body to convert and use as energy so that it will be chosen over any other energy source. Since the glucose is being used as a primary energy, fats are not needed and are therefore stored. By lowering the intake of CHO, the body is induced into a state known as ketosis from the breakdown of fats in the liver due to starvation of carbohydrates.

Different Types of Ketogenic Diets

There are several versions of the ketogenic diet, including:

- 1. Standard ketogenic diet (SKD):** This is a very low-carb, moderate-protein and high-fat diet. It typically contains 75% fat, 20% protein and only 5% CHO.
- 2. Cyclical ketogenic diet (CKD):** This diet involves periods of higher-carb refeeds, such as 5 ketogenic days followed by 2 high-carb days.
- 3. Targeted ketogenic diet (TKD):** This diet allows you to add carbs around workouts.
- 4. High-protein ketogenic diet:** This is similar to a standard ketogenic diet, but includes more protein. The ratio is often 60% fat, 35% protein and 5% carbs.

5. A typical keto diet: This is comprised of 80% fat, 15% protein, and a mere 5% of calories from carbohydrates. If you consume 2,000 calories a day, that means just 100 of them are coming from CHO—including healthy carbs like fruits and vegetables.

The standard (SKD) version is the most researched and most recommended.

Side Effects:- Drop in libido, CHO withdrawal and keto flu, headaches, fatigue, muscle aches, nausea, and diarrhea.

Chemical Diet: This is an easy way to lose up to 14 pounds (6.4 kg) in 1 week. It's popular among some dieters looking for fast results. The Chemical Diet is a fad diet that people claim helps kick-start weight loss, the diet is based on the chemical constituents of specific food combinations, which are thought to amplify results and boost fat burning. Proponents also say the diet reduces blood sugar levels and supports better long-term blood sugar control. (CONTRAINDICATED IN KIDNEY FAILURE, HEART AND LIVER FAILURE).

How to follow it

The Chemical Diet is a 7-day meal plan that proponents suggest you repeat once per month. It involves following a strict regimen that consists of three meals per day. It doesn't permit snacking between meals. 1.5-1.7g/kg of protein in the day. Although there are several variations of the diet with slight differences, it generally encourages eating a very limited selection of foods, including fruit, whole grain toast, eggs, and [tomatoes](#).

Here's an example of what people eat on the diet:

Day 1

- **Breakfast:** 1 slice of whole grain toast with 1 grilled tomato or canned tomatoes
- **Lunch:** fresh fruit
- **Dinner:** 2 hard-boiled [eggs](#), 1 grapefruit, and salad with lettuce, tomatoes, cucumber, and celery

Day 2

- **Breakfast:** 1 hard-boiled egg and 1 grapefruit
- **Lunch:** grilled or roasted chicken with 2 large tomatoes
- **Dinner:** 1 slice of whole-grain toast, grilled steak, and salad with lettuce, tomatoes, cucumber, and celery

Day 3

- **Breakfast:** 1 hard-boiled egg and 1 grapefruit
- **Lunch:** fresh fruit
- **Dinner:** 2 grilled lamb chops, 1 grapefruit, and salad with lettuce, tomatoes, cucumber, and celery

Day 4

- **Breakfast:** 1 slice of whole grain toast
- **Lunch:** fresh fruit
- **Dinner:** 2 hard-boiled eggs and salad with lettuce, tomatoes, cucumber, and celery

Day 5

- **Breakfast:** 1 slice of whole grain toast with 1 grilled tomato or canned tomatoes
- **Lunch:** fresh fruit
- **Dinner:** fish and salad with lettuce, tomatoes, cucumber, and celery

Day 6

- **Breakfast:** 1 glass of fresh grapefruit juice
- **Lunch:** fresh fruit
- **Dinner:** grilled chicken, 1 grapefruit, and carrots

Day 7

- **Breakfast:** 2 scrambled eggs with 1 grilled tomato
- **Lunch:** 2 poached eggs with spinach
- **Dinner:** grilled steak and salad with lettuce, tomatoes, cucumber, and celery

Note that the diet plan permits only the foods listed above. It doesn't allow snacks or substitutions.

Although there are no guidelines for which foods you should eat during the 3 weeks you're not following the diet, proponents recommend eating a healthy, well-rounded diet rich in nutrient-dense whole foods.

The Chemical Diet is a strict 1-week regimen that involves eating three meals per day consisting of only certain foods, including grapefruit, whole grain toast, tomatoes, and eggs.

The Chemical Diet sets strict guidelines on which foods to eat and avoid.

Foods to eat: The ingredients listed on the meal plan are the only foods you can consume while following the Chemical Diet.

This includes fresh fruits, eggs, and certain types of vegetables, grains, and meat.

Here are some of the foods the diet includes:

- **Fruits:** grapefruit, apples, bananas, oranges, pears, peaches, plums
- **Vegetables:** tomatoes, spinach, carrots, cucumbers, celery, lettuce
- **Grains:** whole grain toast
- **Meat:** steak, lamb chops, chicken, fish
- **Eggs:** hard-boiled, poached, and scrambled eggs
- **Beverages:** water, black coffee, unsweetened tea, grapefruit juice

Foods to avoid: Only the foods listed on the meal plan are allowed while you're following the Chemical Diet. All other foods are prohibited, including dairy products, grains, legumes, snack foods, and vegetables besides those listed above.

- **Vegetables:** sweet potatoes, broccoli, cauliflower, asparagus, and all other vegetables not listed above
- **Dairy products:** milk, yogurt, cheese, butter
- **Grains:** quinoa, couscous, barley, rice, oats, buckwheat
- **Legumes:** beans, chickpeas, lentils
- **Nuts:** almonds, pistachios, walnuts, macadamia nuts, cashews
- **Seeds:** chia seeds, flax seeds, pumpkin seeds, sunflower seeds
- **Snacks:** chips, pretzels, candy, trail mix, popcorn, crackers
- **Oils:** olive oil, vegetable oil, coconut oil
- **Sweeteners:** sugar, honey, maple syrup, stevia
- **Beverages:** alcohol, soda, sports drinks, fruit juice, sweet tea

2. Physical activity: As - Walking, swimming

- Using the stairs instead of the elevator
- Getting off the bus or train and walking the rest of the way

- Doing gardening, and housework.

Physical activity	Energy reduced / kcal/ minuet
Washing dishes	1
Car driving	0.9
Eating of food	0.4
Mild sport	1.4
Moderate sport	3
Sever sport	5.4
Cleaning of house / hand	2.5
Running	7
Walking	2
Cycle riding (moderate speed)	2.5
swimming	8

3. Drugs; -

a - Inhibit satiety center & decrease the feeling of hunger as Amphetamine sulfate, Reduct.

b - Local effect that reduces fat absorption (Orlistat) reduces lipase secretion from the pancreas & decreases 30% of fat absorption.

c- Herbal; - causes diarrhea & rapid pass of food through the Intestine that causes malabsorption of vitamins & minerals.

d - Fiber capsules

e- Sacs Anda injection

4. Surgery: Weight loss, surgery involves removing or changing a part of a person's stomach or small intestine so that they do not consume as much food or absorb as many calories as before.

This can help an individual lose weight and also reduce the risk of high blood pressure, type 2 diabetes, and other aspects of metabolic syndrome that can occur with obesity.

- Surgery can make the stomach smaller, or it can bypass part of the digestive system.

- Gastric sleeve or gastric bands: Uses a gastric sleeve or a gastric band to make the stomach smaller.

5. Hormonal treatment

Hormonal treatment might one day help people with obesity.

The researchers suggest combining certain hormones might provide an effective therapy with non-surgical options.