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Introduction to Physiology (BMHP5003_LON)

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Obesity

"Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health."
(Who, 2021)

What causes obesity

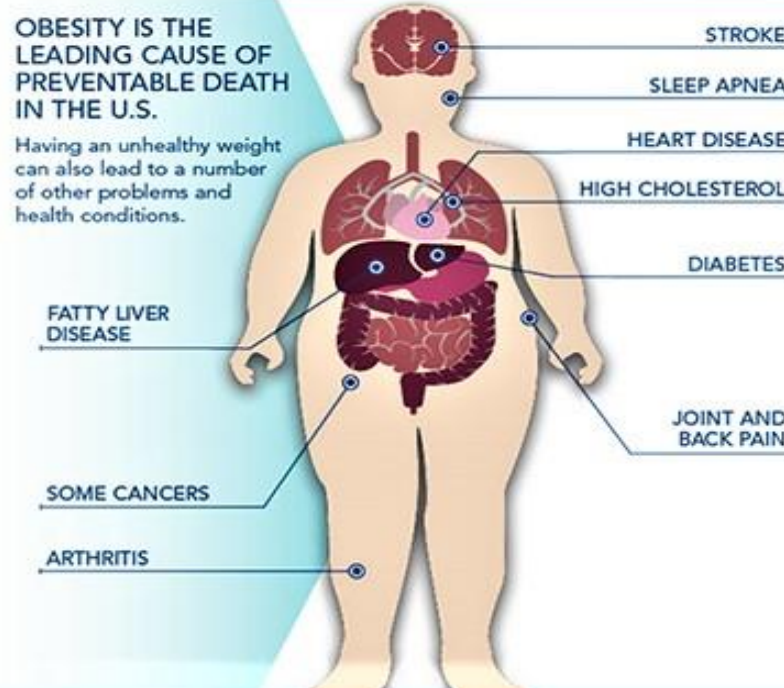
- Unhealthy lifestyle - consuming foods and drinks high in fat, sugar and salt; physical inactivity.
- Genetics – Prader- Willie syndrome.
- Health conditions – Hypothyroidism, Cushing's syndrome.
- Emotional factors – Stress, Depression, Sleep disorder.
- Socioeconomic factors – location, occupation, income, education.

(Beaumont Health, 2021)

Consequences of obesity

- High cholesterol – "too much cholesterol in the blood can create blockages, leading to heart and circulatory diseases." (heartuk.org.uk)
- Cardiovascular diseases – heart diseases ; strokes.
- Diabetes – occurs when blood glucose is too high
- Osteoarthritis – degeneration of joint cartilage and the bone.
- Cancers – bowel cancer, ovarian, prostate, etc.
- Breathing problems – sleep apnoea; asthma.
- Mental illness – depression; anxiety,
- Physical functioning – body pain; difficult moving.

HOW OBESITY AFFECTS YOUR BODY



<https://www.beaumont.org/services/weight-loss/obesity>

Patient A case study

- BMI – 24.2 (based on 170cm height, 70kg weight, 45 age, low activity level, female). Patient A is within the healthy weight range, but on the higher end.
- High blood pressure of 140/90.
- Consumes regularly sugary foods, unhealthy frozen ready meals. Drinks 3 to 6 units a day, smokes.

Patient A obesity risk factors and consequences

- Taking into consideration patient A's unhealthy lifestyle there is a possibility of becoming overweight and possibly obese.
- With high blood pressure and family (sister) history of high cholesterol, Patient A may be predisposed to high cholesterol, diabetes, heart diseases and stroke.

Lifestyle suggestions for patient A

- Replace the frozen ready meals with freshly prepared meals of lean meats, wholegrains and vegetables.
- Substitute the sugary foods with fresh fruits and nuts.
- Stop or limit beer consumption to a minimum by replacing an alcoholic beer with non - alcoholic.
- Stop smoking by using skin patches and chewing gum.
- Engage in regular physical activity 150 minutes spread through the week. (**WHO, 2021**)
- "Limiting television time, screen time, and other "sit time" (hsph.harvard.edu, 2021)

Speaker's Notes

According to the World Health Organization (2021) “overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health”.

The key facts on obesity listed on their website are alarming. Over the last 40 years, worldwide obesity rates have more than tripled. As of 2016, more than 1.9 billion adults over the age of 18 were overweight: of these, 650 million were obese. Among children under the age of 5, 39 million were overweight or obese in 2020. In 2016, the number of overweight or obese children and adolescents aged 5-19 increased by 26 percent, which is more than 340 million (WHO,2021).

What causes obesity

There are a few factors that contribute to gaining and maintaining excess weight such as an unhealthy lifestyle, genetics, health conditions, emotional factors, and socioeconomic factors (NICHD,2021).

Unhealthy lifestyle

Overeating and inactivity are the principal factors leading to weight gain. A sedentary lifestyle combined with diets high in fats, sugars, and salt contributes to an increase in weight. Having a higher calorie intake than your energy expenditure leads to weight gain (NICHD,2021).

Genetics

Widely accepted as the most common genetic cause for death amongst children due to obesity, Prader-Willi Syndrome Association UK defines Prader-Willi syndrome (PWS) as:

- a rare, complex genetic disorder

- affects both males and females from birth and throughout their lives. During childhood, an overwhelming and insatiable chronic appetite usually develops which, without rigorous food management and exercise regimes, leads to food seeking, stealing and life-threatening obesity.

(PWSAUK, 2021)

Health conditions

Health conditions such as Hypothyroidism and Cushing's syndrome can cause people to gain weight quickly, keep it on, and even become obese.

Underactive thyroid glands cause hypothyroidism. The thyroid is not generating enough thyroid hormone for the body to use, resulting in a mental and physical slowdown (British Thyroid Foundation, 2018).

Cushing's syndrome is a condition in which the body's organs are affected by elevated levels of the hormone cortisol (AANS, 2021). Cortisol plays a significant role in regulating blood sugar levels, decreasing inflammation, enhancing memory, and balancing metabolism. Tumors on the adrenal and pituitary glands contribute to the development of Cushing's syndrome. "Individuals with Cushing syndrome will experience rapid weight gain in the face, abdomen, and chest" (Hormone Health Network, 2021).

Emotional factors

Emotional factors are a big contributor to weight gain. Stress, depression, and low mood can cause people to eat more. Also, according to some studies" the less people sleep, the more likely they are to have overweight or obesity "(NICHD,2021).

Socioeconomic factors

Location, low income, education, culture, and upbringing play a significant role in increasing the risk of obesity. In some urban areas, people might find it difficult to have access to fresh fruits and vegetables. Lack of education and low-income occupation lead to a poor choice of diet. Cultural upbringing can limit how a healthy diet is viewed and understood (Beaumont,2021).

Consequences of obesity

High Cholesterol

Heart UK (2021) describes Cholesterol as "a type of blood fat (lipid). We all need some cholesterol in our blood to stay healthy, but too much can lead to health problems, including heart attacks and strokes".

Cardiovascular disease

Cardiovascular disease (CVD) is one of the leading causes of mortality in the UK. In most cases, it is linked with the build-up of fat in the arteries called (atherosclerosis), damage to arteries in the heart and brain, and developing life-threatening blood clots (NHS,2018).

Diabetes

Diabetes is a condition that occurs when blood glucose (sugar) levels are elevated. This happens when the pancreas cannot produce or is not producing enough of the hormone insulin to break the glucose. The most common types of diabetes are type 1 and 2. The complications individuals with diabetes face, are life-threatening. To name some of them: nerve damage, heart attack, stroke, kidney problems, foot problems, etc. (The British Diabetic Association, 2021).

Osteoarthritis

The gradual degeneration of joints cartilage is called Osteoarthritis. Cartilage is the smooth cushion-like tissue covering the bone's ends, making simple tasks such as walking and running effortless and pain-free. When damaged, the affected area gets painful and swells up. Osteoarthritis is most common in middle-aged people, especially women. Obesity is a leading cause of this disease (Arthritis Foundation, 2021).

Cancers

One of the main causes of cancer UK is overweight and obesity. According to Cancer Research UK (2021),“ Fat cells increase inflammation and make extra hormones and growth factors.” which can “ cause cells in our body to divide more often and cause a tumor”.

Breathing problems

In some cases, obesity leads to a condition of the respiratory system called Obstructive Sleep Apnoea (OSA). People who suffer from OSA cannot sleep adequately. The upper airway is obstructed which causes them to snore and breath difficult, to the point of stopping to breathe for a few seconds. As this can happen numerous times during the night, individuals who experience OSA during the night, often fall asleep daytime behind the wheel or on the job (Sleep Apnoea Trust, 2021).

Asthma

Asthma is difficult to control in cases of obese adults and children. Obese individuals are at an elevated risk of developing asthma attacks. Keeping within a healthy BMI range of under 25 lessens the chances of an asthma attack (Asthma UK, 2019).

Mental Illness

A link between obesity and depression was confirmed, after a 10-year long study was conducted in France, on more than 9000 obese adults. “Obesity affects the parts of the brain that regulate your mood. When you're depressed, low energy and motivation can translate into less activity and exercise” (Harvard Health Publishing, 2013).

Patient A case study

Patient A is a 45-year-old female, with a high blood pressure of 140/90, height 170cm, weight 70kg, with a low activity level, smokes, and drinks 3 to 6 units of alcohol a day. Food high in fat, sugar, and salt is consumed on daily basis. Family history – sister with high cholesterol.

Patient A's BMI is 24.2 which is calculated based on age, height, weight, activity level, and sex. Her BMI is within the normal range, but on the high end (WHO,2021).

Taking into consideration patient A's unhealthy lifestyle there is a possibility of becoming overweight and even obese, which can increase the risk of developing osteoarthritis, some types of cancers such as bowel cancer, have breathing problems, and even depression.

Having high blood pressure and a family history of high cholesterol, patient A could be predisposed to high cholesterol, diabetes, and cardiovascular diseases. Lifestyle suggestions for patient A: replacing frozen ready meals with some freshly prepared meals of lean meats, whole grains, and vegetables. Replace sugary food with fresh fruits and nuts. Stop or limit beer consumption to a minimum or replace alcoholic beer with non-alcoholic. Use skin patches or chewing gum to stop smoking. Exercise a minimum of 150min a week (Who,2021). Cut to a minimum sitting time and be more active.

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