

Module Name
Introduction to Physiology

Module Guide
Eleni Koutsogeorgou
Noura Mohamed
Module Code
BMHP5003
Student Name
Marinela Ancuta Szeri(1917613)

OBESITY

Obesity can be defined as a medical condition that leads to the accumulation of huge amounts of fat in the body of an individual, which is further responsible for a number of severe negative health conditions. (Blüher et al, 2019)

The proper understanding and explanation related to the pathophysiology of obesity, one must have a sound knowledge regarding the two parallel discussions. These discussions include:

- The first one is from an energetic point of view
- The second one is from a nutritional point of view (Tappia et al, 2020)

A case study presented evaluates the medical condition of obesity that the subject of the case study, who is a 52 year old obese man, is suffering from obesity, can be defined as a medical condition that leads to the accumulation of huge amounts of fat in the body of an individual, which is further responsible for a number of severe negative health conditions. The medical condition of obesity is often a leading contributor to several other severe and chronic health conditions, such as type 2 diabetes, cardiovascular diseases, and certain types of cancer, osteoarthritis, and obstructive sleep apnoea (Chooi et al., 2019).

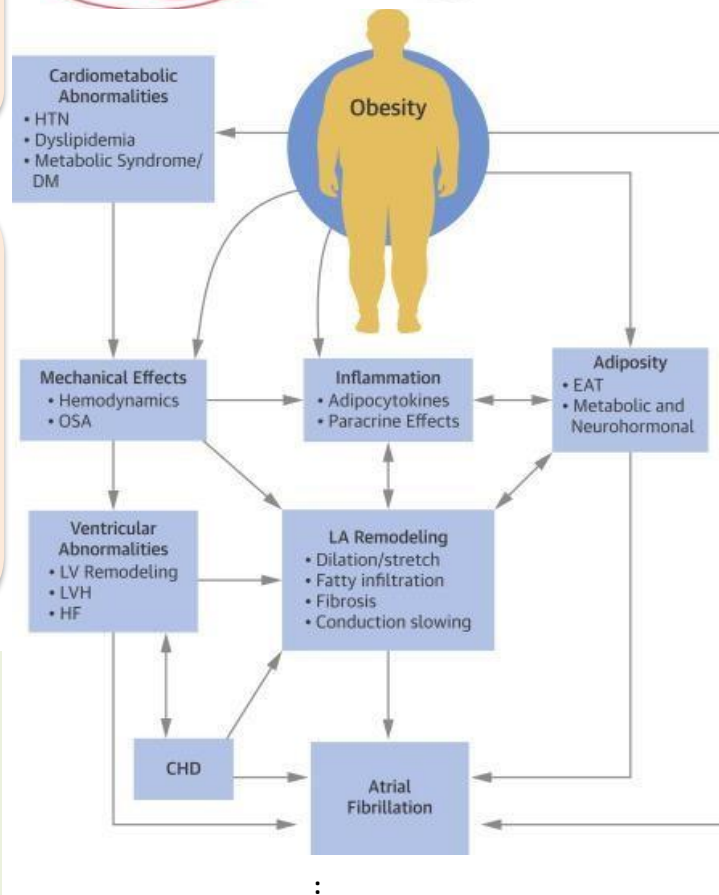
CAUSES

There are a number of factors that influence the body weight.

- Some of these include behavioural, genetic, hormonal, and metabolic.
- The major cause remains the excess amount of calorie intake, which is greater than the calories that you burn through exercising and physical activity.
- This extra calorie is stored in the body in the form of fat.

RISK FACTORS:

The major risk factors that cause and contribute to the problem of obesity. (Tappia et al, 2020)



RECOMMENDATIONS

- Identification of small and measurable goals
- Eating a variety of foods
- Adopting techniques to eat well
- Drink plenty of water
- Managing emotions
- Physical fitness related to Health (Kornet et al, 2018)

REFERENCES:

Chooi, Y.C., Ding, C. and Magkos, F. (2019). The epidemiology of obesity. *Metabolism*, 92, pp.6-10.

Seidler, A.L., Hunter, K.E., Espinoza, D., Mhrshahi, S. and Askie, L.M. (2021). Quantifying the advantages of conducting a prospective meta-analysis (PMA): a case study of early childhood obesity prevention. *Trials*, 22(1), pp.1-8.

GBD 2015 Obesity Collaborators. (2017). Health effects of overweight and obesity in 195 countries over 25 years. *New England Journal of Medicine*, 377(1), pp.13-27.

Blüher, M. (2019). Obesity: global epidemiology and pathogenesis. *Nature Reviews Endocrinology*, 15(5), pp.288-298.

World Health Organization (2020). Overweight and obesity.

Dietz, W. and Santos-Burgoa, C. (2020). Obesity and its implications for COVID-19 mortality. *Obesity (Silver Spring)*, 28(6), p.1005.

Tappia, P.S., Ramjiawan, B. and Dhalla, N.S. eds. (2020). *Pathophysiology of obesity-induced health complications*. Springer.

Yang, C.S., Wang, H. and Sheridan, Z.P. (2018). Studies on prevention of obesity, metabolic syndrome, diabetes, cardiovascular diseases and cancer by tea. *Journal of food and drug analysis*, 26(1), pp.1-13.

Gregory, J.W. (2019). Prevention of obesity and metabolic syndrome in children. *Frontiers in endocrinology*, 10, p.669.

Park, H.J., Jung, E. and Shim, I. (2020). Berberine for appetite suppressant and prevention of obesity. *BioMed research international*, 2020.

Alsahli, M. and Gerich, J.E. (2017). Renal glucose metabolism in normal physiological conditions and in diabetes. *Diabetes research and clinical practice*, 133, pp.1-9.

Sasegbon, A. and Hamdy, S. (2017). The anatomy and physiology of normal and abnormal swallowing in oropharyngeal dysphagia. *Neurogastroenterology & Motility*, 29(11), p.e13100.

Tortora, G.J. and Derrickson, B.H. (2017). *Introduction to the human body*. John Wiley & Sons.

Tortora, G.J. and Derrickson, B.H. (2018). *Principles of anatomy and physiology*. John Wiley & Sons.

VanPutte, C.L., Regan, J.L. and Russo, A.F. (2021). *Seeley's essentials of anatomy & physiology*. University of Iowa.

Preim, B. and Saalfeld, P. (2018). A survey of virtual human anatomy education systems. *Computers & Graphics*, 71, pp.132-153.

Hall, D., Li, A. and Cooke, R. (2020). Biophysics of human anatomy and physiology—a Special Issue in honor of Prof. Cristobal dos Remedios on the occasion of his 80 th birthday. *Biophysical Reviews*, pp.1-9.

Feher, J.J. (2017). *Quantitative human physiology: an introduction*. Academic press.

Kim, J., Koo, B.K. and Knoblich, J.A. (2020). Human organoids: model systems for human biology and medicine. *Nature Reviews Molecular Cell Biology*, 21(10), pp.571-584.

Kornet-van der Aa, D.A., van Randerad-van der Zee, C.H., Mayer, J., Borys, J.M. and Chinapaw, M.J.M. (2018). Recommendations for obesity prevention among adolescents from disadvantaged backgrounds: a concept mapping study among scientific and professional experts. *Pediatric obesity*, 13(6), pp.389-392.

Wolfenden, L., Ezzati, M., Larijani, B. and Dietz, W. (2019). The challenge for global health systems in preventing and managing obesity. *Obesity Reviews*, 20, pp.185-193.

INTRODUCTION

OBESITY - Obesity can be defined as a disease that is characterised by the accumulation of an excessive amount of body fat in an individual. Obesity isn't just an appearance or stress concern, but is also a critical medical condition that also increases the risk of various other chronic diseases and health problems, like diabetes, heart disease, high blood pressure, cancer, etc.

RISK FACTORS:

Family influences and inheritance: The genetic makeup inherited by individuals from the parents has an impact on the quantity of body fat storage and distribution. This genetic makeup is also influential in determining the regulation of the appetite of an individual, the efficiency of the body to convert food into energy, and how the calories are burned by the body through exercises and physical activity. The problem of obesity often runs in generations, not only because of the genes, but also because of similar eating habits and behavioural patterns.

LIFESTYLE CHOICES: The unhealthy lifestyle choices include:

An unhealthy diet: Eating meal that lack fruits and vegetables, and are high in calories such as fast foods and consuming large amounts of high-calorie beverages play a major role in gaining weight.

Liquid calories: The drinks high in calories are often consumed undetectable and in large amounts, like the sugared soft drinks.

Physical inactivity: A sedentary lifestyle often leads to more intakes of calories than one burn through regular exercise. Spending too much time in front of TV, computer, mobile phones, etc. is

RELATED DISEASES AND MEDICATIONS

There are also some medical causes that lead to obesity. These include the Cushing syndrome, the Prader-Willi syndrome, and a number of other conditions. Problems such as arthritis lead to decreased physical activity, which in turn leads weight gain.

Medications such as diabetes medications, antidepressants, antipsychotic medications, steroids, anti-seizure medications, and beta blockers also contribute to weight gain and obesity.

SOCIAL AND ECONOMIC ISSUES

For the people who lack appropriate ways to exercise and walk, those who lack the knowledge of healthy cooking and eating practices, or lack efficient and nutrient-rich healthy foods, the risk of obesity is quite high. Also, the social interaction an individual engages in is also influential on the weight, along with the other economic factors (Blüher, 2019).

Age: There are no age-barriers to obesity as such, and can happen at any age. But aging is associated with some major hormonal changes, along with some unhealthy life choices makes you prone to obesity. Aging also results in a decreased amount of muscles in the body, which further leads to a decreased amount metabolism. The calorie needs also decrease with age. Hence, one must control the food intake both in relation to quality and quantity, thus reducing the risk of obesity.

OTHER FACTORS: The other factors related to obesity include:

Lack of sleep: Too much sleep or not sleeping for enough hours is linked with hormonal changes, which further lead to an increased appetite. Individuals with unhealthy sleep patterns tend to crave high-calorie foods and beverages, which are rich in fats and carbohydrates and can cause weight gain.

Quitting smoking: People often suffer from weight gain which further leads to obesity as an aftermath of quitting their smoking habit. This might be a result of the people using food as a coping mechanism for dealing with the withdrawal syndrome.

Stress: The external factors affecting mood of the individual also contribute to weight gain and obesity. When in a stressful situation, people are inclined towards foods high in calories.

Pregnancy: Women tend to gain much weight during pregnancy, which is often difficult to shed even after the baby is born. This weight gain is often a major contributor to the development of problem of obesity in these women.

Micro biome: The bacteria in the stomach are affected by the food one eats, often contributing to weight gain and obesity.

COMPLICATIONS: Obesity is often associated with a number of additional chronic health issues. These include Type 2 diabetes, Stroke and heart diseases, Cancer, Osteoarthritis, Problems in digestion, Sleep apnoea, Severe COVID-19 symptoms, ETC.

QUALITY OF LIFE

The overall quality of life can be adversely affected because of the problem of obesity. The individuals suffering from obesity might not be able to take part in various physical activities that they really enjoy. Also, they tend to avoid public places due to embarrassment and suffocation. They may even face discrimination.

Some other issues associated with obesity that have an adverse effect on the quality of life of an individual include Social isolation, Shame and guilt, Lower work achievement, Disability, Depression (Dietz and Santos-Burgoa, 2020).

RECOMMENDATIONS:

There are also some lifestyle changes that the subject can implement to treat his problem of obesity. These include:

Identification of small and measurable goals: With making the decision of changing their eating habits for good, the subject can initiate a number of health improvements. He must focus on these overall improvements rather than just reducing weight. He must not just implement the latest diet plan prevalent, instead, he must start with small and measurable goals that he can easily implement, be encouraged by, and can achieve within time.

Adopting techniques to eat well: Keeping a food log for monitoring everything that a person eats or drinks for a certain time period helps him/her to make the required nutritional changes. These techniques involve utilising smartphones for keeping a schedule, taking care of your body and tending to its needs, and also enjoying some foods that are beneficial. Also, eating at regular intervals of time helps in maintaining the stable blood glucose levels for helping metabolism.

Eating a variety of foods: Unless there is a medical necessity, no foods or groups of food should be avoided because one has decided to follow a balanced diet rich in nutrients. An individual suffering from obesity can eat many foods in order to meet the nutritional needs of the body. Every food or groups of food provided a number of nutrients to the body, thus, they must be consumed in healthy amounts so that the individual doesn't miss out on these nutrients.

Drink plenty of water: An individual must make sure that his/her fluid intake is adequate, as it plays a crucial role in ensuring the overall health of the individual. This fluid amount must also be aligned with the medical needs and conditions, the body weight of the individual, and also his/her level of physical activity. There are zero calories present in plain water, thus, it helps in managing the weight of the body and also reduces the intake of calories when it is consumed in place of high calorie drinks such as soda.

Managing emotions: Food is often a source of managing emotions by a number of individuals. The emotions such as happiness, sadness, excitement, loneliness, boredom, stress, etc. might make the individuals consume food even when they are not hungry. In order to prevent this, the patients are advised to take a pause and introspect, assessing their hunger. Dealing with emotions by eating often requires attention of various medical health professionals.

Physical fitness related to Health: The individuals suffering from obesity are required to improve their fitness surrounding cardiorespiratory factors, the composition of their body, and also their muscular fitness. They can do so by indulging in various aerobic activities such as swimming, walking, riding a bike, etc. (Yang et al., 2018).

ENHANCING OUTCOMES OF HEALTHCARE RELATED TO PATHOPHYSIOLOGY OF OBESITY

The better understanding of the pathophysiology of obesity plays a major role in the treatment and prevention of the condition of obesity, as stated by a number of health care professionals. In order to achieve this, the team of inter-professional healthcare professionals is important. They deal with the management of patients. These teams comprise of various doctors or physicians, nurses, dieticians, nutritionists, and physiologists concerned with exercise. In addition, obesity is also believed to be an autoimmune disease related to a chronic inflammation that is lowgrade. It is also believed to be a major contributor and risk factor for a number of other chronic diseases such as diabetes, hypertension, certain types of cancers, dyslipidaemia, etc. As is known, prevention is always better than cure. Hence, in order to prevent obesity in the individuals, this team of inter-professional healthcare professionals is responsible for educating individuals and patients about various healthy diet plans and exercise and other physical activities, along with some other healthier lifestyle changes. In order to achieve this, the team of inter-professional healthcare professionals such as the doctors or physicians, nurses, dieticians, nutritionists, and physiologists concerned with exercise, and even pharmacists are required to have a sound knowledge and understanding regarding the pathophysiology of obesity and also the consequences one might have to face. This enhances the treatment and health outcomes of the individuals (Tappia et al., 2020).

HEALTH ASSESSMENT: ABNORMAL PHYSIOLOGICAL CONDITIONS

The abnormal physiological conditions are characterised by the presence of some or the other physiological disorder, in which the organs and organ systems of the body may malfunction, leading to various illnesses. For example, diabetes, obesity, asthma, glaucoma, etc.

With regard to the case study presented above, the individual suffers from an abnormal physiological condition of obesity, which in turn adversely affecting his overall health and lifestyle. It has increased the risk of the patient developing chronic diseases such as diabetes, chronic heart diseases, etc.

CONCLUSION

The present case study evaluates the medical condition of obesity that the subject, who is a 52 year old obese man, is suffering from. Obesity can be defined as a medical condition that leads to the accumulation of huge amounts of fat in the body of an individual, which is further responsible for a number of severe negative health conditions. The individuals are categorised as being obese if their body mass index (BMI), which is used to measure the mass of the body of an individual, is over 30 kg/m², which lies within the range of 25–30 kg/m², which is considered to be an overweight category. This body mass index (BMI) is obtained by dividing the weight of the individual by the square of the height of the person, often resulting in allometric inaccuracies. The medical condition of obesity is often a leading contributor to several other severe and chronic health conditions, such as type 2 diabetes, cardiovascular diseases, and certain types of cancer, osteoarthritis, and obstructive sleep apnoea (Chooi et al., 2019).