

A PROSPECTIVE OBSERVATION STUDY ON OBESITY BASED ON BMI AMONG COLLEGE STUDENT**Ashtami M. J.¹, Fathima S.², Fesna S. B.³, Merlin Joy⁴, Varsha A.⁵ and Sruthy S. A.^{6*}**^{1,2,3,4,5,8th} Semester B. Pharm Students of the Dale View College of Pharmacy and Research Center, Punalal, Thiruvananthapuram.⁶Associate Professor, Department of Pharmacy Practice, the Dale View College of Pharmacy and Research Center, Punalal, Thiruvananthapuram.***Corresponding Author: Sruthy S. A.**

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Article Received on 02/07/2024

Article Revised on 23/07/2024

Article Accepted on 13/08/2024

ABSTRACT

Globally, the prevalence of overweight and obesity poses a serious threat to the prevention of chronic diseases and to people's health throughout their lives. The measurement that is currently used to define adult anthropometric height and weight features and to classify them into groups is called body mass index (BMI).

KEYWORDS: Obesity, BMI.**INTRODUCTION**

The accumulation of excess body fat causes obesity, a complicated multifactorial disease with detrimental effects on health. Long-term energy imbalance between calories taken and calories burned is the primary cause of obesity. A person is considered obese if their body mass index (BMI, which is calculated by dividing their weight by the square of their height) is greater than or equal to 30. The World Health Organisation defines "obesity" as a BMI of ≥ 30.0 and "overweight" as a BMI of 25.0 to 29.9. Three categories of severity are further distinguished for obesity: class I (BMI 30.0-34.9), class II (BMI 35.0-39.9), and class III (BMI > 40.0) (12). Being obese raises the risk of a number of illnesses and ailments that are associated with a higher death rate. These comprise non alcoholic fatty liver disease (NAFLD), depression, obstructive sleep apnea, osteoarthritis, cardiovascular diseases (CVD), metabolic syndrome, chronic kidney disease, hyperlipidemia, and hypertension. Obesity can be caused by a number of chromosomal, neuroendocrine, and genetic antecedents.^[1]

CHILDHOOD OBESITY

Childhood obesity is a serious public health concern. The past several years have seen an upsurge in the prevalence of childhood obesity. It results from an imbalance between calories burned and calories consumed. Childhood obesity is brought on by one or more of the following: genetic, behavioural, and environmental.

Childhood obesity contributes to issues with physical, psychological, and social health.^[2]

OBESITY AND TYPE 2 DIABETES

Type 2 diabetes can be caused by an excess of body fat, and the risk increases linearly with body mass index. As a result, as the global prevalence of obesity has increased, so has the incidence of type 2 diabetes. Obesity and type 2 diabetes are linked by complex cellular and physiological mechanisms, including alterations in β -cell function, adipose tissue biology, and multi-organ insulin resistance. Losing weight can often improve or normalise these effects.^[3]

OBESITY AND HYPERTENSION

A rising body of research supports the idea that obesity is a risk factor for hypertension. This review summarises the known pathophysiological pathways that link excess adiposity to increased blood pressure (BP) and discusses therapeutic methods for treating obesity-related hypertension, with a focus on metabolic surgery. The potential processes behind obesity-related hypertension are complicated and involve interactions across renal, metabolic, and neuroendocrine pathways.^[4]

DYSLIPIDEMIA AND OBESITY

Cardiovascular disease, hypertension, type 2 diabetes mellitus, respiratory diseases, and dyslipidaemia are among the co-morbid illnesses that account for the majority of these consequences. Obesity raises cardiovascular risk due to risk factors include high

fasting plasma triglycerides, high LDL cholesterol, low HDL cholesterol, raised blood glucose and insulin levels, and high blood pressure. One of the main connections between obesity, the metabolic syndrome, and dyslipidaemia appears to be the emergence of insulin resistance in peripheral tissues, which increases the amount of fatty acids that the liver absorbs from food, intravascular lipolysis, and adipose tissue that is resistant to insulin's antilipolytic effects. Increased triglycerides (TG) and FFA, decreased HDL-C with HDL dysfunction, and normal or slightly elevated LDL-C with increased small dense LDL are the usual dyslipidaemia associated with obesity.^[5]

OBESITY CAUSES MORBIDITY AND MORTALITY

Obesity and its consequences are a significant cause of illness, poor quality of life, and complications that can have a significant impact on life expectancy. Obesity is connected with the highest risk of mortality from cardiovascular disease (CVD) and cancer. Obesity and overweight are systemic diseases characterised by an excessive and inappropriate buildup of body fat, which leads to negative health consequences. The Long-term consequences of type 2 diabetes include cardiovascular disease (CVD), stroke, peripheral vascular disease, retinopathy, nephropathy, and neuropathy. As a result, preventing or controlling type 2 diabetes will lower obesity-related comorbidities and direct healthcare expenses. Obesity associated with the metabolic syndrome is connected with cardiovascular disease.^[6]

OBESITY AND CARDIOVASCULAR DISEASE

Obesity is a complicated metabolic condition that is unique to modern humans, characterised by chronic positive energy balance and excess adiposity. It has become a serious global public health issue. Obesity causes persistent inflammation, aberrant hormonal and immune system responses, and, ultimately, metabolic dysregulation. Obesity is caused by a combination of genetics, environmental factors, socioeconomic position, and behavioural variables, all of which contribute to its development and persistence. Obesity is a key risk factor for several of the world's most common chronic diseases, including diabetes, hypertension, cardiovascular disease (CVD), renal disease, chronic respiratory disease, and several types of cancer. Excess adiposity causes endothelial dysfunction, small vessel remodelling, and cardiomyocyte toxicity, which contributes to atherosclerotic and vasospastic coronary heart disease, arrhythmias, cardiomyopathy, and congestive heart failure. Prolonged excess calorie consumption causes excessive fat storage, which exceeds adipose tissue's restricted fatty acid storage capacity. This results in increased circulating free fatty acids and aberrant fatty acid storage in organs important for general metabolic regulation, such as the liver, pancreas, and skeletal muscle. Adipocytes produce and secrete a variety of proteins and hormones known as adipokines,

which play critical roles in endocrine regulation, immunological function, and inflammation.^[7]

MEASUREMENT OF OBESITY

The most often used measure was body mass index (BMI). Body fat was evaluated directly using techniques like dual energy x-ray absorptiometry.^[8]

BODY MASS INDEX(BMI)

BMI has long been used to determine who is more likely to be overweight or obese. Divide the weight (in kilogrammes) by the height (in metres) squared. High values suggest excess body fat and are consistently associated with increased health risks and mortality.^[9] Body Mass Index (BMI) is a widely used statistic that computes an individual's body weight in relation to their height.^[10] It gives a standardised measure for tracking the prevalence of underweight, normal weight, overweight, and obesity within a group of participants. It is a low-cost and time-efficient technique for conducting early assessments, especially in situations with limited resources. (BMI), a measurement based on a person's height and weight, classifies them as obese or overweight. BMI is commonly used to assess the risk of developing chronic diseases such as diabetes, hypertension, depression, and cancer.^[11] The most widely used surrogate marker of adiposity is body mass index (BMI; body weight in kg divided by height in m²). The WHO defines normal weight as BMI 18.5-24.9 kg/m², overweight as BMI 25-29.9 kg/m², and obesity as BMI \geq 30 kg/m².^[12]

TREATMENT OF OBESITY

HEALTHY DIET

Food selections and eating habits that encourage consuming an excessive amount of energy are to blame for the current rise in obesity rates. The necessity of healthy eating habits that include a range of nutrient-dense foods, restrict quantities of energy-dense foods, and lower overall energy density is emphasised in the current recommendations for weight management. Similar weight reduction is achieved by several dietary strategies that lower energy intake relative to energy expenditure. The DASH eating pattern advises consuming less unhealthy fats overall and limiting fat intake to less than 25% of energy from food. It also suggests consuming a higher proportion of low-calorie items, such as fruits, vegetables, and low-fat dairy products.^[13]

PHYSICAL ACTIVITY

The main goal of treating obesity remains to reduce weight. Reducing calorie intake from diet and increasing caloric output with increased physical activity are two behavioural guidelines for weight loss. Certain associations between physical exercise and health outcomes, such as improved muscle and cardiorespiratory fitness and a lower risk of cardiovascular disease and all-cause mortality. In both normal-weight and overweight people, physical activity

can enhance various health markers such as general quality of life, brain health, memory, cognition, sleep, and anxiety.^[14]

BEHAVIOUR CHANGES

Genetic, metabolic, behavioural, environmental, cultural, and socioeconomic factors all affect bodyweight. Obesity raises the risk for cardiovascular illnesses, some cancers, cholelithiasis, metabolic disorders (including hypertension, dyslipidaemia, hyperlipidaemia, and type 2 diabetes), and an increased risk of morbidity and death. Adult obesity is most commonly associated with ischaemic heart disease, complications from type 2 diabetes, chronic obstructive pulmonary disease, and cancer. It has been demonstrated that implementing behavioural change in the treatment of obesity results in decreased body mass and weight. Exercise and food apart, numerous studies consistently demonstrate that sustained behavioural treatment results in a notable reduction in body weight.^[15]

MEDICINES

The moderate efficacy of lifestyle and behavioural therapies suggests that obesity treatment options should be further enhanced with the addition of pharmaceutical and/or surgical interventions. Bariatric surgery is the most effective way to lose weight, which lowers the risk of dying from cancer or cardiovascular disease. Hospital stays get shorter with increasingly sophisticated laparoscopic operations, and bariatric surgery improves overall life expectancy with significant and long-lasting improvements in glucose, cholesterol, and blood pressure regulation. However, surgical procedures cannot address the extent of medical need that exists worldwide. The pursuit of anti-obesity drugs (AOMs) has proven extremely difficult for technological and societal reasons. Obesity pharmacotherapy has a lengthy and troubled history, with promising medications being abandoned due to safety concerns. Over the previous century, the pharmaceutical treatment of obesity has included amphetamines, thyroid hormones, dinitrophenol, and other medication combinations (rainbow pills) that were discontinued shortly after regulatory approval due to substantial side effects. Short-term use of centrally acting sympathomimetic drugs including phentermine, cathine, and diethylpropion remains prevalent. Medicines explored in obesity include substances as diverse as mitochondrial uncouplers, sympathomimetics, serotonergic agonists, lipase inhibitors, cannabinoid receptor antagonists.^[16]

SURGERY

In patients with a BMI > 40 kg/m² or > 35 kg/m² with obesity-related complications like hypertension, type 2 diabetes mellitus, and obstructive sleep apnoea, as well as for those who do not improve with medical therapy, bariatric surgeries significantly improve the health and quality of life of obese patients. In very high-risk patients, staged approaches may be necessary, in which one operation (either gastrectomy or intestinal bypass) is

followed by the other operation in two separate surgical procedures. There were two forms of bariatric surgery: open and laparoscopic. They fall into three general categories: combination operations, malabsorptive operations, and restriction operations. The sleeve gastrectomy and the adjustable gastric band are examples of restrictive procedures. Biliopancreatic diversion is one example of a malabsorptive procedure. The biliopancreatic diversion-duodenal switch and Roux-en-Y gastric bypass reflect a mix of restriction and malabsorption.^[17]

AIM AND OBJECTIVE

BMI-based assessment of obesity among college students using the KAP questionnaire.

MATERIAL AND METHOD

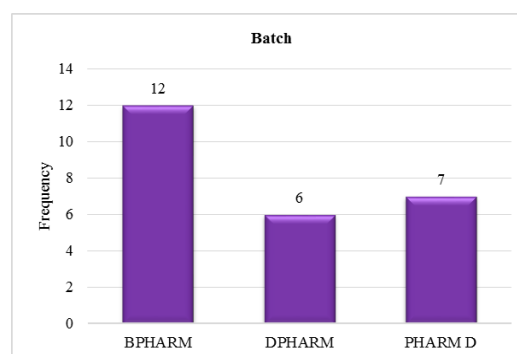
Method: Data were obtained from 200 randomly selected college students at The Dale View College of Pharmacy and Research Centre, Punalal P.O Poovachal, Thiruvananthapuram. The questionnaire was divided into two sections: the first was about socio-demographic variables, and the second was about college student's knowledge, attitudes, and practices. The BMI of 200 pupils was calculated for the purposes of the above study. Three months were spent on this prospective observational study.

Material: In order to ensure that the questionnaire was appropriate for the study, it was prepared by consulting experts and consulting pertinent literature reviews. Each participant's height and weight were recorded, and their BMI was computed using their weight in kilogrammes and height in meters squared. Weight in kg / Height in m equals BMI. Each participant's BMI is calculated and used to classify them as Underweight, Healthy, Overweight, or Obese.

RESULT AND DISCUSSION

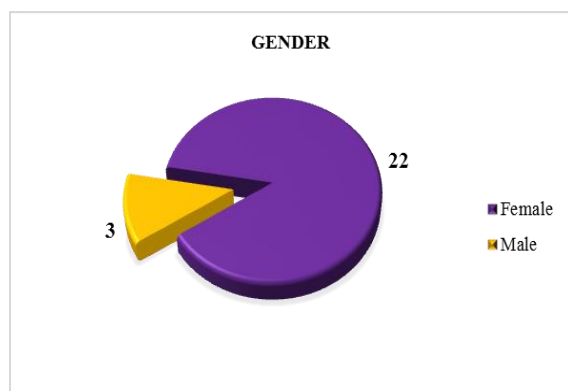
Based On Batch

Batch	Frequency	Percent
BPHARM	12	48.0
DPHARM	6	24.0
PHARM D	7	28.0
Total	25	100.0



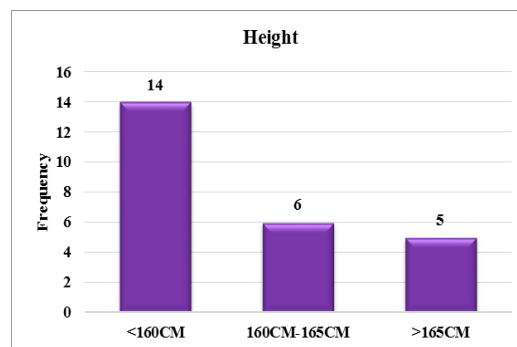
Based On Gender

Gender	Frequency	Percent
Female	22	88.0
Male	3	12.0
Total	25	100.0



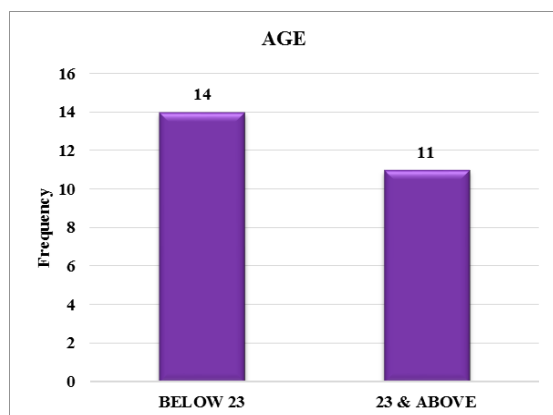
Based On Height

Height	Frequency	Percent
<160CM	14	56.0
160CM-165CM	6	24.0
>165CM	5	20.0
Total	25	100.0



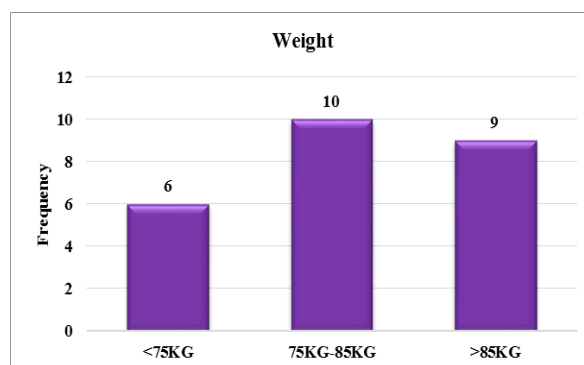
Based On Age

Age	Frequency	Percent
BELOW 23	14	56.0
23 & ABOVE	11	44.0
Total	25	100.0



Based On Weight

Weight	Frequency	Percent
<75KG	6	24.0
75KG-85KG	10	40.0
>85KG	9	36.0
Total	25	100.0



OBESITY LEVEL vs KNOWLEDGE / PRACTICE / ATTITUDE

OBESITY LEVEL		Mean	Std. Deviation	Std. Error	Kruskal-Wallis H	p-value
KNOWLEDGE	Obesity level1	7.500	1.168	0.337	1.235	0.539
	Obesity level2	7.000	1.069	0.378		
	Obesity level3	7.800	1.304	0.583		
	Total	7.400	1.155	0.231		
PRACTICE	Obesity level1	1.367	0.215	0.062	6.328	0.042
	Obesity level2	1.050	0.233	0.082		
	Obesity level3	1.260	0.378	0.169		
	Total	1.244	0.284	0.057		
ATTITUDE	Obesity level1	1.242	0.353	0.102	0.898	0.638
	Obesity level2	1.213	0.164	0.058		
	Obesity level3	1.320	0.249	0.111		
	Total	1.248	0.2771	0.0554		

Kruskal-Wallis test* Significant at 0.05 level

CONCLUSION

Being overweight or obese carries significant health concerns and medical expenses. Obesity has a complicated aetiology that involves interactions between hormones, social and environmental variables, genetic background, and other factors. In the end, preventing and reducing overweight and obesity depend on individual lifestyle modifications; therefore, it would be crucial to conduct additional research on the factors that motivate behaviour modification in order to combat the obesity epidemic. Obesity causes persistent low-grade inflammation, leading to vascular dysfunction, thrombotic diseases, organ damage, and metabolic dysfunction. These physiological effects eventually contribute to the development of a variety of morbidities, including Cardiovascular Disease, Type2 Diabetes, and certain malignancies, among others, while also having a substantial impact on mortality.

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