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COMPARES BLOOD SUGAR LEVELS BETWEEN OBESE AND NON-OBESE FEMALES

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ABSTRACT

A study conducted by researchers from Mahatma Gandhi Memorial Medical College Indore found a positive relationship between a higher body mass index and blood levels of sugar, cholesterol, and triglycerides. Overweight individuals may shift their metabolism, leading to increased fatty acids, which can cause atherogenic dyslipidemia and elevated triglyceride levels. This can lead to coronary heart disease. The study included 300 young adults, including 150 overweight and 150 normal weight individuals. Demographic variables such as age, gender, height, weight, BMI, blood pressure, and pulse were considered. The results showed that the obese group had significantly higher systolic blood pressure (SBP), greater difference in diastolic blood pressure (DBP), and higher pulse rate. Obese individuals also had higher blood sugar (PP) levels than non-obese individuals. However, there was no significant difference in fasting blood sugar between the two groups. The study concluded that young people who are overweight or obese have higher blood pressure, sugar, and cholesterol levels than their leaner peers. These individuals are at a higher risk of cardiovascular disease due to their sedentary lifestyle and energy imbalance. Despite no metabolic syndrome, the young people in the study were at high risk due to their susceptibility to high blood pressure, weight increase, and lipids.

KEYWORDS

blood glucose levels, obese, non-obese

INTRODUCTION

Overweight and obesity are rampant in the current world scenario and threatening as the major risk factors for many diet-related non communicable diseases (NCDs) like type 2 diabetes, cardiovascular disease, hypertension, stroke and certain forms of cancer. The causes for obesity and overweight being physical inactivity, unhealthy diet, genetic predisposition, behavioral factors like tobacco, alcohol and stress. In India the age of onset of obesity is progressively decreasing over the past years and the young individuals are being predisposed to obesity related health problems. About 30-65 % of adult urban Indians are reported to be either overweight or obese. Obesity is one of the most significant contributors of morbid conditions like metabolic syndrome. Metabolic syndrome is a group of disorders characterized by obesity, hypertension, glucose intolerance, and dyslipidemia. Criteria for diagnosing metabolic syndrome are given by National Cholesterol Education Program

(NCEP) and Adult Treatment Panel (ATP) III guidelines that involve waist circumference (WC), Blood Pressure (BP), HDL-C, TG, and FBS.

The prevalence of metabolic syndrome in obese adolescents has been reported to be between 18 % and 42 %. Abdominal obesity is a marker of dysfunctional adipose tissue and is of central importance in the clinical diagnosis of metabolic syndrome. The age group from 18-21 years is important physically, mentally and emotionally. This is the period of transition when individuals are entering adulthood. Medical students joining Medical Colleges represent this group. In this age group, students may not consume an adequate diet and healthy diet or exercise regularly and usually skip their breakfast.

Their diet is high in fat, sodium and sugar because of frequent snacking and consumption of fast food. As there are few studies in India on obesity and metabolic syndrome among medical students who require early intervention to prevent these diseases among the future doctors, the present study was undertaken with the objective was to assess the prevalence of overweight, obesity and metabolic syndrome among medical students and to determine correlation between overweight, obesity and parameters metabolic syndrome among medical students of MIMS, Mandya.

Obesity is a pathological condition in which excess body fat accumulated, leading adverse effects on health and life expectancy. It is a chronic disorder with complex interaction between genetic and environmental factors. It characterized by high cholesterol, fatty acid levels; imbalance in metabolic energy; insulin desensitization; lethargy, gallstones; high blood pressure; shortness of breath; emotional and social problems; and excessive adipose mass accumulation with hyperplasia and hypertrophy. Pathological obesity is associated with several secondary commodities like heart disease, type 2 diabetes, breathing difficulties during sleep, cancer and osteoarthritis.

LITERATURE REVIEW

Craig (2022) Obesity has emerged as a huge public health concern, affecting people all over the world and causing enormous monetary and human costs. At first, people thought of obesity as a condition rather than an illness since they were causing it themselves. As a result, the suggestion of a straightforward strategy, such eating less and exercising more, to control obesity appeared reasonable. In the last quarter of a century, people have begun to see obesity for what it really is: an illness unto itself, not only a risk factor for other health problems like type 2 diabetes and non-alcoholic fatty liver disease (NAFLD).

Mazzeo (2016) "Globesity" is the term chosen by the WHO to describe the worldwide pandemic of overweight and obesity. An unhealthy lifestyle, an unhealthy diet, an insufficient amount of physical activity, a change in lifestyle, and genetics are among the many causes of weight gain. According to reports, fat storage begins in infancy and varies with age, race, and sex. Conditions such as depression, osteoporosis, type 2 diabetes, obesity, and colon and breast cancer are associated with excess body fat. While there are a variety of methods for

determining total body fat percentage, the BMI is by far the most used. If a person's body mass index (BMI) is 30 or more, they are considered obese.

Bray (2024) Our present knowledge of obesity has its roots in research that has evolved over the last century and a half, and this review has looked at that research. A surplus of body fat was deemed to constitute obesity. We will talk about ways to measure changes in extra fat levels in populations and individuals. The quantity and size of fat cells impact the body's reaction to insulin and other hormones, and they play a crucial role as a repository for surplus nutrients. Several environmental and genetic variables impact obesity, which is a reflection of an optimal fat balance; several phenotypes of obesity may be generated from various angles, some of which have been discussed below. Consumption of food is fundamental for human health and fat accumulation, whether at normal or excessive levels (obesity). Many different ways to treatment have been developed.

Glazer (2023) In 2015, the Canadian Medical Association (CMA) and other international health groups proclaimed obesity as a chronic, relapsing and remitting disease. This means that the accumulation of adipose tissue in various bodily systems causes dysfunction and negative health effects. Similar to other chronic diseases like diabetes, high blood pressure, or coronary artery disease, obesity should be treated medically

RESEARCH METHODOLOGY

STUDY DESIGN

The research methodology typically employs a cross-sectional observational design, allowing for the assessment of various cardiovascular and biochemical parameters in a defined population of obese young subjects. This design facilitates the collection of data at a single point in time, providing insights into the prevalence and associations of cardiovascular risk factors among different groups based on obesity status.

STUDY SAMPLE SIZE

We have determined that in order to get excellent and meaningful findings from our research, we need to analyses a minimum of 300 people, based on the statistics and literature that we have read. 300 male and female volunteers ranging in age from 5 to 18 years old

Duration of Study: from September 2023 forward, for forty months

INCLUSION CRITERIA

One hundred fifty people, ranging in age from five to eighteen, who were overweight

One hundred fifty healthy adults and children ranging in age from five to eighteen

EXCLUSION CRITERIA

- A person with diabetes and hypertension who is known to exist.

- A record of substance abuse, including steroid medication use.
- A history of heavy drinking.

SELECTION OF PARTICIPANTS

The research included 357 participants who gave their informed permission. Some of these patients were eventually removed from the study because they did not meet the inclusion and exclusion criteria, did not provide enough information, did not show up on time for regular investigations, or for some other reason. The research comprised 300 participants, 150 of whom were obese and 150 of whom were not; half of the men and half of the females in each group were chosen at random. Subjected to anthropometric measures were these individuals. The height was measured in meters and the weight in kilograms using a weighing machine.

ANALYSIS

Table 1: Comparison of blood sugar level between obese males and non-obese males

Parameter	Obese Male (n=50)		Non-obese Male (n=50)		Statistical values	
	Mean	SD	Mean	SD	t	p
Blood sugar (Fasting)	86.20	5.976	84.54	4.908	1.494	0.142
Blood sugar (P.P.)	121.64	6.009	117.46	3.453	4.516	<0.001

Obese men had higher fasting blood sugar levels (86.20±5.976mg/dl) than non-obese men (84.54±4.908mg/dl), but this difference was not deemed statistically significant (p=0.142).

Obese men had considerably higher blood sugar (PP) levels (121.64±6.009mg/dl) than non-obese men (117.46±3.453mg/dl) (p=<0.001).

Table 2: Comparison of blood sugar levels between obese females and non-obese females.

Parameter	Obese female(n=50)		Non-obese female (n=50)		Statistical values	
	Mean	SD	Mean	SD	t	p
Blood sugar (Fasting)	85.44	5.233	84.55	4.910	0.857	0.396
Blood sugar (P.P.)	122.30	4.924	117.64	3.456	6.180	<0.001

There was no statistically significant difference in the fasting blood sugar levels of obese and non-obese females, although the former had higher values (85.44±5.233mg/dl) than the latter (84.55±4.910mg/dl).

Compared to non-obese females, whose blood sugar levels were 117.64±3.456mg/dl, obese females had considerably higher levels (122.30±4.924mg/dl, p=<0.001).

Table 3: Comparison of blood sugar level between obese males and obese females

Parameter	Obese males(n=50)		obese females(n=50)		Statistical values	
	Mean	SD	Mean	SD	t	p
Blood sugar (Fasting)	86.200	5.976	85.440	5.233	0.794	0.431
Blood sugar (P.P.)	121.64	6.009	122.30	4.92	0.586	0.561

Statistical analysis did not reveal a significant difference in the fasting blood sugar levels of obese men (86.20±5.976mg/dl) and obese females (85.44±5.233mg/dl).

Obese men had higher blood sugar (PP) levels (121.64±6.009mg/dl) than obese females (122.30±4.92mg/dl), however this difference was not statistically significant (p=0.561).

Table 4: Group wise comparison of Lipid Levels.

Parameter	Group-I (n=150)		Group-II (n=150)		Statistical values	
	Mean	SD	Mean	SD	t	p
T. Cholesterol	162.90	4.14	152.67	5.14	14.999	<0.001
Triglycerides	82.23	7.07	62.83	7.90	18.672	<0.001
HDL	52.95	6.00	53.59	3.30	-0.924	0.358
VLDL	18.31	3.2	13.56	3.07	3.940	<0.001
LDL	94.60	5.90	90.15	9.25	10.071	<0.001

The patients in Group I had higher total cholesterol levels (162.90±4.14 mg/dl vs. 152.67±5.14 mg/dl) than those in Group II. There was a statistically significant finding (p=<0.001) regarding these variations.

The presence of triglycerides was detected Significantly higher in Group I patients (82.23±7.07 mg/dl) compared to Group II subjects (62.83±7.90 mg/dl) (p=<0.001).

There was a statistically significant difference between Group I and Group II in terms of VLDL levels, with Group I participants having elevated levels (18.31±3.2 mg/dl vs. 13.56±3.07 mg/dl).

"LDL" values were discovered the level was higher in Group I patients (94.60±5.90 mg/dl) compared to Group II subjects (90.15±9.25 mg/dl). There was a statistically significant finding (p=<0.001) regarding these variations.

Group I participants had lower HDL levels (52.95±6.00mg/dl) compared to Group II subjects (53.59±3.30mg/dl), however this difference was not deemed statistically significant (p=0.358).

Table 5: Comparison of Lipid Levels between obese males and non-obese males

Parameter	**obese male**		**non-obese male**		**Statistical significance**	
	Mean	**SD**	**Mean**	**SD**	**t**	**p**
T. Cholesterol	163.73	4.490	152.35	5.438	10.660	<0.001
Triglycerides	82.82	6.589	61.47	6.507	16.085	<0.001
HDL	52.46	5.857	53.45	2.260	-1.140	0.260
VLDL	18.97	3.767	13.12	2.545	8.714	<0.001
LDL	94.45	6.383	89.11	12.294	2.647	<0.011

The patients who were male and obese had significantly higher total cholesterol levels (163.73±4.490 mg/dl vs. 152.35±5.438 mg/dl), with a p-value of less than 0.001.

The presence of triglycerides was detected Statistically significant differences were observed between participants of obese men (82.82±6.589mg/dl) and non-obese guys (61.47±6.507mg/dl), with a p-value of less than 0.001.

The levels of very low-density lipoprotein (VLDL) were discovered The levels were significantly higher in guys who are obese (18.97±3.767 mg/dl vs. 12.12±2.545 mg/dl) compared to males who are not fat (p=<0.001).

"LDL" values were discovered the results showed a statistically significant difference (p=<0.011) between the participants who were obese and those who were not (94.45±6.383 mg/dl vs. 89.11±12.294mg/dl).

Although there was no statistically significant difference in the levels of HDL in obese guys (52.46±5.857mg/dl) and non-obese males (53.45±2.260mg/dl), the difference was nevertheless noticeable.

Table 6: Comparison of lipid level between obese females and non-obese females.

Parameter	obese male		non-obese male		Statistical significance	
	Mean	SD	Mean	SD	t	p
T. Cholesterol	162.45	2.519	152.99	4.869	12.036	<0.001
Triglycerides	81.63	7.540	64.19	8.952	-11.159	<0.001
HDL	53.44	6.163	53.74	4.107	-.271	0.787
VLDL	17.65	2.609	13.99	3.498	5.779	<0.001
LDL	94.75	5.454	91.19	4.432	-3.468	<0.001

The total cholesterol levels of the male and obese individuals were noticeably higher (163.73±4.490 mg/dl vs. 152.35±5.438 mg/dl), and the p-value was less than 0.001.

It was found that triglycerides were present. There were notable disparities between the people who were overweight (82.82±6.589mg/dl) and those who were not (61.47±6.507mg/dl), with a p-value lower than 0.001.

Very low-density lipoprotein (VLDL) values were reported men who are overweight had considerably greater amounts (18.97±3.767 mg/dl vs. 12.12±2.545 mg/dl) than men who are not overweight (p=<0.001).

values known as "LDL" were found Those who were obese had a significantly higher blood sugar level (94.45±6.383 mg/dl) compared to those who were not (89.11±12.294 mg/dl), according to the findings (p=<0.011).

Despite the lack of a statistically significant difference, the difference in HDL levels was nevertheless visible between obese men (52.46±5.857mg/dl) and non-obese males (53.45±2.260mg/dl).

CONCLUSION

Compared to non-obese individuals, this research aimed to examine the effects of obesity on hemodynamic variables, glycemic and lipid profiles, and cardio-vascular and biochemical parameters in young people who were overweight.

Throughout the study, 150 obese subjects (BMI >25 kg/m2) and 150 non-obese subjects (BMI > 25 kg/m2) were enrolled as Cases and Controls, respectively. The participants had to meet the inclusion criteria, which included not having a history of diabetes, hypertension, respiratory disease, alcohol abuse, or steroid/drug dependence, and they had to be between the ages of 5 and 18.Each participant filled up their own case record form with their demographic, anthropometric, and hemodynamic information, and their blood sugar and lipid profiles were tested in the lab. A total of 150 individuals were included in the research as Group I, with a body mass index (BMI) more than 25.0 kg/m2. In contrast, 150 individuals were classified as either Cases or Controls, depending on their BMI, and 150 individuals were classified as non-obese, with a BMI greater than 25 kg/m2 or less than 25 kg/m2.The participants had a mean age of 24.70±3.19 years, were mostly female (56.50%), and followed a vegetarian diet (67.50%). There was no significant difference in the subjects' dietary preferences, age, or gender.Conclusions drawn from the current investigation are as follows:

In contrast to obese persons, whose BMI varied from 25.10 to 36.54 kg/m2 and averaged 27.5989±1.966 kg/m2, non-obese individuals' BMIs ranged from 18.5 to 24.90 kg/m2. The mean BMI for this group was 22.29±2.053 kg/m2. Seventeen percent of the obese participants were classified as Obese Grade II, whereas eighty-three percent were classified as Obese Grade 1.Obese and nonobese participants had comparable eating patterns (vegetarian or nonvegetarian).In comparison to non-obese people, a much larger percentage of obese respondents (47.0%) were at a leading level of sedentary activity (20.0%).

Compared to non-obese patients, obese people had substantially higher mean systolic BP, diastolic BP, and pulse rate.The systolic blood pressure of overweight men (123.32±4.582 mmHg) was substantially (p=0.003) higher than that of non-obese men (120.92±3.641 mmHg).Differences in systolic blood pressure (SBP), diastolic blood pressure (DBP), and pulse rate were substantially greater in obese women than in non-obese women.Although there was no difference in fasting blood sugar levels between the obese and the non-obese, there was a statistically significant increase in postprandial blood sugar levels in the obese.

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