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An Association of Body Mass Index and Body Fat Percentage with Blood Lipid Profile of University Employee

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Abstract

The purpose of the present study was to find out the relationship of Body mass index and body fat percentage with blood lipid profile (Haemoglobin, Random blood sugar and Triglyceride) of the university employee. Total hundred employees selected as subjects from Guru Ghasidas Vishwavidyalaya Bilaspur Chhattisgarh. The samples selected for the present study was working at different department in different nonteaching posts (office assistant, junior office assistant, technical assistant, laboratory assistant and lab attendant). For the purpose of the present study body mass index and body fat percentage selected as independent variables and blood lipid profile (haemoglobin, random blood sugar and triglyceride selected as dependent variables. For determining the relationships of Body mass index and Body fat percentage with blood lipid profile of university employee (office workers), descriptive statistics and the Pearson's Product Moment Correlation was used. All the data was calculated with the help of SPSS (16.0 version) software and the level of significance was set at 0.05 level of confidence. On the basis of results and findings of the study it may conclude that significant relationship was observe between body mass index and random blood sugar level ($r = .315$, $p < .05$), body mass index and triglyceride ($r = .282$, $p < .05$). Significant relationship was found between body fat percentage and random blood sugar level ($r = .303$, $p < .05$), body fat percentage with triglyceride ($r = .253$, $p < .05$). Result of the study indicate that insignificant relationship was observe between body mass index and haemoglobin ($r = .038$, $p > .05$), body fat percentage and haemoglobin ($r = .003$, $p > .05$).

Key Words: Body mass index, Body fat percentage, Haemoglobin, Random blood sugar, Triglyceride.

1. Introduction:

BMI is a ratio of individual's weight to height. BMI is commonly used to classify weight as "healthy" or "unhealthy." The negative effects of obesity on health are beyond dispute. Excessive body fat percentage represents a strong risk factor for several diseases; type 2 diabetes, hypertension, cardiovascular diseases and osteoarthritis (Pi-Sunyer, 1991 and World Health Organization, 2000). Most of these deleterious effects are more likely if the excess body fat is mainly stored in the upper body, with abdominal visceral fat being the most critical when evaluating the health risks of obesity (Pi-Sunyer 1991, Björntorp 1993, World Health Organization 2000). Moreover, it has been reported that obesity is associated with disability and poor perceived health (Wolk and Rössner 1996, Manderbacka 1998, Doll 2000, Ford 2001). While BMI is more commonly used to define obesity and closely related to the degree of body fat in most settings, its limitations can result in the wrong classification of certain individuals with increased muscle mass (Uwaifo and Arioglu, 2004). In this regards, WHO highlighted the needs for other indicators to complement the measurement of BMI, to identify individuals at increased risk of obesity-related morbidity due to accumulation of abdominal fat.

BMI is used by Doctors and professionals to screen for overweight and obese person. BMI is a measure of body weight according to height of an individual. Body mass index is the method to know about health risk of individual. It helps to provide information to healthcare professionals to evaluate health risk of patients. A high BMI (above 24.9) is a risk factor for disease and also indicator of death. People with high BMI scores represents that they are overweight or obese have a more chance of cardiovascular disease, high blood cholesterol or other lipid illnesses, type 2 diabetes, stroke, and certain cancers. The patients have high BMI also at an increased risk for premature death, cardiovascular illness, gallbladder disease, sleep apnea, and osteoarthritis. Body Mass Index is calculated as weight in (kg) divided by

height in meter square. This is the simple method and used by most of people and healthcare professionals to know the ideal weight according to their height (Zimmet, 2006).

The body fat percentage of a human or other living being is the total mass of fat divided by total body mass; body fat contains essential body fat and storage body fat. Essential body fat is necessary to maintain life and reproductive functions. The percentage of essential body fat for women is greater than that for men, due to the demands of childbearing and other hormonal functions. The percentage of essential fat is 2–5% in men, and 10–13% in women. Storage body fat consists of fat accumulation in adipose tissue, part of which protects internal organs in the chest and abdomen. A number of methods are available for determining body fat percentage. The body fat percentage is a measure of fitness level, since it is the only body measurement which directly calculates a person's relative body composition without regard to height or weight. The widely used body mass index (BMI) provides a measure that allows the comparison of the adiposity of individuals of different heights and weights. While BMI largely increases as adiposity increases, due to differences in body composition, other indicators of body fat give more accurate results; for example, individuals with greater muscle mass or larger bones will have higher BMIs. As such, BMI is a useful indicator of overall fitness for a large group of people, but a poor tool for determining the health of an individual (https://en.wikipedia.org/wiki/Body_fat_percentage).

Triglycerides are a category of fat that is found in your blood stream. When we take food, body changes any calories it doesn't need to use right away into triglycerides. The triglycerides are deposited in your fat cells. After that, hormones release triglycerides for energy between meals. If you habitually eat additional calories than you use, mostly "easy" calories like carbohydrates and fats, you may have high triglycerides (hypertriglyceridemia). Triglycerides and cholesterol both are separate kinds of fats that circulate in the blood stream. Triglycerides store without use calories and make available body with energy, and cholesterol is used to build cells and certain hormones. Because triglycerides and cholesterol can't dissolve in blood, they circulate throughout body that transport the fats.

Cholesterol and triglycerides both are lipids but they are not the similar — they vary in their structure and composition. They do enjoy certain joint similar characteristics but, they are dissimilar in various methods. Cholesterol is a kind of lipid while triglyceride is a category of fat. They enjoy a common association with similarities such as methods to lower their elevated levels. But, they differ in a few ways such as their definition, structure, high-level causes, and functions. Triglycerides and LDL cholesterol (the bad cholesterol), both dangerous and life-threatening when their levels are raised, can be a double risk for heart disease and stroke. If you have a lipid profile that exhibits both these high values, you are sitting on an edge more so if you have a family history of such events, eat foods high in saturated fats, lead a sedentary lifestyle with little physical activity, and drink alcohol and smoke.

1.1 Objectives of the Study:

- The objective of the present study was to find out the relationship of Body mass index and Blood lipid profile (Haemoglobin, Random blood sugar and Triglyceride) of the university employee (office workers).
- The objective of the present study was to find out the relationship of Body fat percentage and Blood lipid profile (Haemoglobin, Random blood sugar and Triglyceride) of the university employee (office workers).

1.2 Hypothesis of the Study:

- It was hypothesized that there will be no relationship between body mass index with blood lipid profile (haemoglobin, Random blood sugar and Triglyceride) of university employee (office workers).
- It was hypothesized that there will be no relationship between body fat percentage with blood lipid profile (haemoglobin, Random blood sugar and Triglyceride) of university employee (office workers).

2. Materials & Methods:

2.1 Sample of the Study:

The purpose of the present study was to investigate the relationship of Body mass index and body fat percentage with blood lipid profile (haemoglobin, Random blood sugar and triglyceride) of the university employee (university office workers). Total hundred university employee selected as subjects from Guru Ghasidas Vishwavidyalaya Bilaspur Chhattisgarh. The samples selected for the present study was working at different department in different non-

teaching posts (office assistant, junior office assistant, technical assistant, laboratory assistant and lab attendant). The age of subjects was ranging from 31 to 59 years and mean of the age is 49.61.

2.2 Selection of Variables:

Independent Variables

- Body Mass Index
- Body Fat Percentage

Dependent Variables- (Blood Lipid Profile)

- Haemoglobin
- Random blood sugar
- Triglyceride

2.3 Criterion Measures:

Body mass index was calculated by measuring the height and weight of university employee with the help of stadiometer and electronic weighing machine. BMI was calculated by following formula.

BMI=weight (kg) ÷ height (m)2

Body fat percentage was measured by using Omron body composition analyzer. To calculate body fat percentage of university workers the investigator input gender, age, height and weight of the person. Then just press the "Start" button and by holding the both handle of omron body composition analyser in front of the chest, after few seconds the readings shows in the digital screen. The Bioelectrical Impedance Analysis workings by transfer electrical current in the body. The electrical current identifies the different types of body tissues based on their electrical conductivity.

Blood lipid profile (Hemoglobin, Random blood sugar and Triglyceride) was measured by taking blood sample of university employee with the help of experienced and skilled medical team (Doctors and nurses) and tested in reputed pathology lab of Bilaspur.

2.4 Administration of test:

For the purpose of present health related survey prior to the test proper instructions and necessary information related to test was provided by the test administrator and motivated to cooperate in the testing procedure.

2.5 Statistical Technique:

For determining the relationships of body mass index and body fat percentage with blood lipid profile of university employee (office workers), descriptive statistics and the Pearson's Product Moment Correlation was used. All the data was calculated with the help of SPSS (16.0 version) software and the level of significance was set at 0.05 level of confidence.

3. Results of the Study:

Table-1 Descriptive Statistics of Selected Variables

Selected Variables	N	Mean	SD
Body mass index	100	26.19	4.04
Fat percentage	100	31.10	6.35
Haemoglobin	100	14.21	6.94
Random Blood Sugar	100	108.66	39.88
Triglyceride	100	199.44	75.23

Table-1 shows the mean and SD of body mass index, fat percentage, haemoglobin, random blood sugar and triglyceride

Table-2 Correlation between Body Mass Index with blood lipid profile (haemoglobin, random blood sugar and triglyceride)

Independent Variables	N	Correlation Coefficient r	p-value
Haemoglobin	100	.038	.710
Random Blood Sugar	100	.315*	.001
Triglyceride	100	.282*	.004

Table-2 shows the relationship of haemoglobin, Random blood sugar and Triglyceride with body mass index of office workers.

Figure-1 Graphical representation of relationship between Body Mass Index with Haemoglobin, Random blood sugar and Triglyceride.

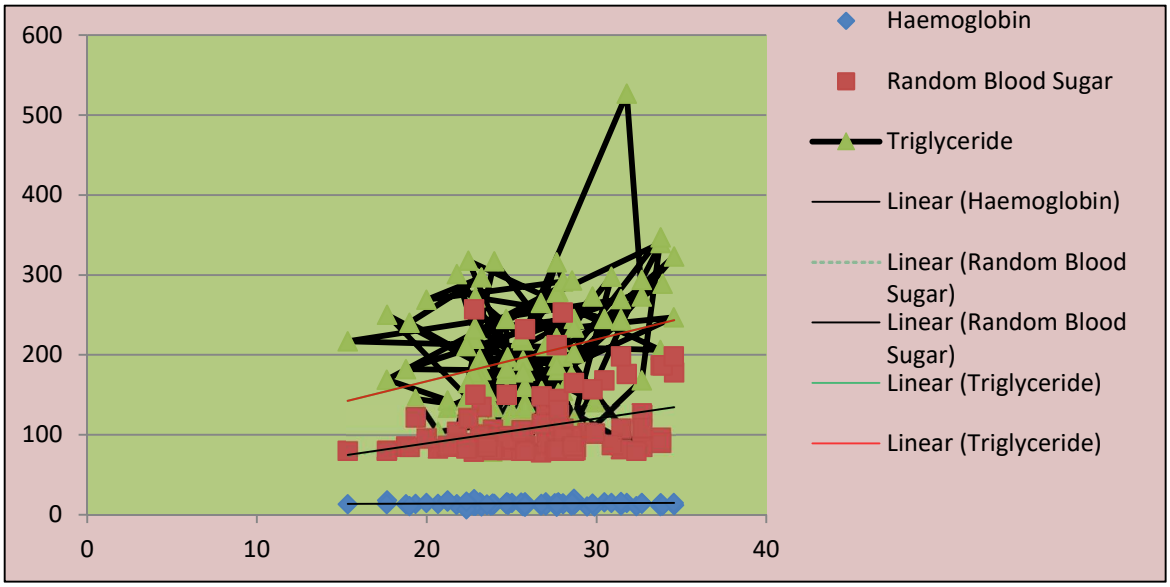
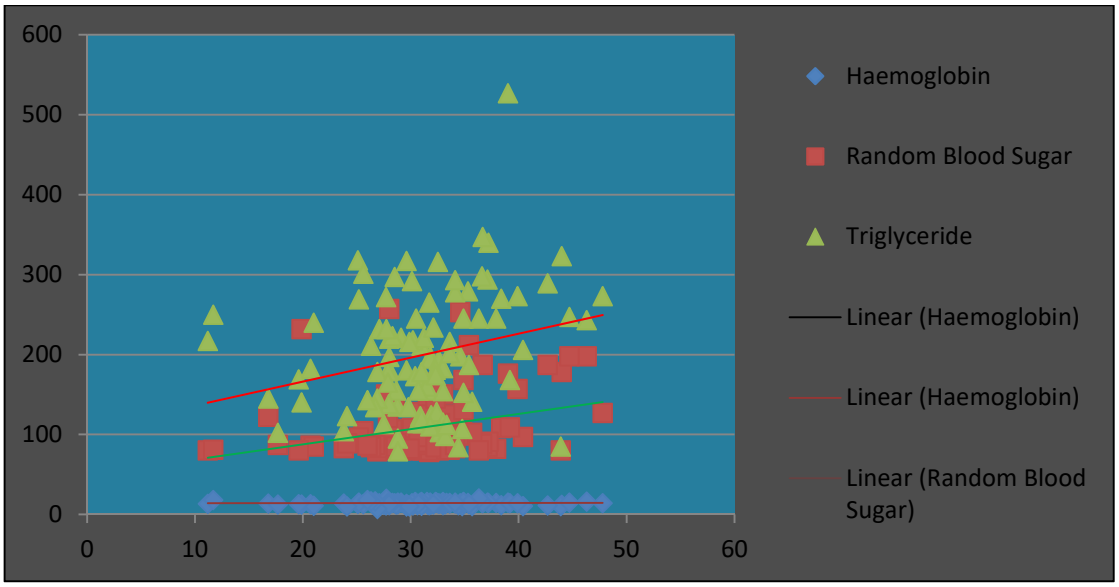


Table-3 Correlation between body fat percentage and Blood lipid profile (haemoglobin, random blood sugar and triglyceride)

Independent Variables	N	Correlation Coefficient r	p-value
Haemoglobin	100	.003	.976
Random Blood Sugar	100	.303*	.002
Triglyceride	100	.253*	.011

Table-3 shows relationship of haemoglobin, random blood sugar and triglyceride with fat percentage of office workers

Figure-2 Graphical representation of relationship between body fat percentage with haemoglobin, random blood sugar and triglyceride



4. Discussion of the Findings:

The purpose of the present study was to investigate the relationship between body mass index and body fat percentage with blood lipid profile (haemoglobin, random blood sugar and triglyceride) of university employee. The mean and SD score of body mass index is 26.19 and 4.04. According to WHO BMI norms it comes under over weight category and extreme over weight is sign of obesity that is responsible factor for various non-communicable diseases. The mean and SD of body fat percentage of university employee was 31.10 and 6.35. The body fat percentage of university employee is more than its normal limit (ideal fat percentage) and excess body fat is cause of obesity that increases the risk of heart diseases. Fat percentage is mainly depends on body type and life style of the individual. The people living sedentary life style and take more food than they required are mainly affected by obesity. The mean and SD of haemoglobin is 14.21 and 6.94 that indicate the haemoglobin level of university employees is ideal range.

The results of the study indicate that significance relationship was observe between Body mass index with Random blood sugar and Triglyceride the probable reason is the random blood sugar and triglyceride are the kind of fat and body mass index indicates the ratio of weight and height, if body weight increases comparison to height BMI of a person also increases. Results indicate if a person's random blood sugar and triglyceride level increases his BMI also increase that is the risk factor of cardiovascular diseases. Obesity is the risk factor of various non-communicable diseases. The results of the present study shows that significance relationship between body fat percentage with Random blood sugar and Triglyceride because if the body fat percentage of the person increases then random blood sugar and triglyceride also increases that reaches in the blood stream that is responsible for various non-communicable diseases. This is known fact that body mass index and body fat percentage are very closely associated to each other it means if a person has greater body fat percentage he carry more body weight and because of more body weight they have greater BMI.

The results of the study indicate that insignificance relationship between body mass index and body fat percentage with haemoglobin reason may be body mass index and body fat percentage are the risk indicator of obesity and it is not indicator of good haemoglobin. Obesity and body mass index is a risk factor for many diseases such as type 2 diabetes, hypertension, heart disease, stroke, osteoarthritis, gynecological problems, sleep apnea, and respiratory problems. Also, various studies showed that obesity (body mass index and body fat percentage) has no relation with iron status (haemoglobin level). University employee with high body mass index and high fat percentage had lower haemoglobin levels. Lower levels of haemoglobin have been observed in obese adults compared to non-obese. The reason of the haemoglobin deficiency of obesity is not clear. Low level of haemoglobin in obese individuals may be a result of low iron intake (due to an unbalanced diet), reduced iron absorption in the small intestine, and greater iron requirements caused by a larger blood volume.

5. Conclusion:

After the analysis of the data, On the basis of results and findings of the study it may conclude:

- Significant relationship was found between body mass index and random blood sugar level (r = .315, p <.05).
- Significant relationship was found between body mass index and triglyceride (r =.282, p <.05).
- Significant relationship was found between body fat percentage and random blood sugar level (r = .303, p <.05).
- Significant relationship was found between body fat percentage and triglyceride (r =.253, p <.05).
- Insignificant relationship was observe between body mass index and hemoglobin (r =.038, p >.05).
- Insignificant relationship was observe between body fat percentage and hemoglobin (r =.003, p >.05).

Initially it was hypothesized that there will be no relationship of body mass index and body fat percentage with Blood lipid profile (Random blood sugar and Triglyceride) of university employee is not accepted at 0.05 level of significant.

It was also hypothesized that there will be no relationship of body mass index and body fat percentage with haemoglobin is accepted at 0.05 level of significant.

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