

Cross Sectional Comparative Relationship of Obesity with Ischemic Heart Disease and its impacts. A Clinical Study

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ABSTRACT

Study task: This study was conducted in different CCU Departments of Baluchistan from February 2022 to June 2022 for providing health awareness to the people about obesity and its effects in cardiovascular complications.

Aims and Objectives: The main purpose of this study was to find out the biological effects of obesity in cardiovascular complications in both male and female individuals.

Data Collection: Total 164 individuals of age in between 40- 65 were selected for this study and divided them into two different groups. In group- A, 80 individuals were non- obese of BMI 15-25 while in Group-B, 84 individuals with BMI 30-35 were so obese as compared with individuals of group-A. A medical history Performa was used to collect history of each individual.

Biochemical and Physiological analysis: BMI, systolic and diastolic blood pressure, cholesterol, triglycerides, low density lipoprotein (LDL), high density lipoprotein (HDL). Ischemic heart disease and myocardial infarction were studied in connection to the obesity rate and trends of individuals. BMI calculated by dividing weight in Kg by height in m². Automatic Digital Blood Pressure Monitor was used for measurement of systolic and diastolic blood pressure. Lipid profile was performed with the help of kits on spectrophotometer.

Bio-statistical analysis: Collected raw data were presented with the application of SPSS variant 20. All findings were represented in regression of each biomarker in the form of mean standard deviation and significant changes such as (P<0.05).

Results: Current study stated that an increase in ischemic heart disease in 60 (73.1%) cases of group I, and in 11 (12.2%) instances of group II. Myocardial infarction rates were also higher in obese patient substantially outperformed non-obese instances with a p value. <0.05. Additionally, obese individuals' systolic and diastolic blood pressure levels were greater. While cholesterol, LDL, triglycerides were shown to be greater in obese people, HDL was found to be lower in these patients.

Conclusion: It was concluded that obesity and weight gain are important risk factors for myocardial infarction and ischemic heart disease, which lead to poor outcomes for patients and an increase in the death rate.

Keywords: Cholesterol, Triglycerides, Ischemic heart disease, systolic and diastolic blood pressure

INTRODUCTION

The World Health Organization defines overweight and obesity as abnormal or excessive fat accumulation that poses a danger to health. BMI or body mass index is equal to weight in Kg divided by m² height of a person and obesity is measured with the help of BMI. A BMI of 30 or more is typically regarded as obese [2]. Overweight people are those whose BMI is equal to 25 or higher than it generally. Globally, obesity is thought to be responsible for 2.6 million fatalities and 2.3 percent of all disease-related deaths. Obesity was discovered to be a significant risk factor for the development of cardiovascular complications, type-2 diabetes, blood pressure, hiatus hernia etc. in human beings [4]. Changes in body weight are correlated with changes in these disease risk variables because obesity is linked to higher blood pressure, blood lipids, and blood glucose levels [5].

The most frequent reason for myocardial ischemia is atherosclerosis. Clump of blood Atherosclerosis-related plaques have the potential to rupture and result in a blood clot [6]. A heart attack might occur if the clot blocks an artery and causes abrupt, severe myocardial ischemia. Overweight people have been demonstrated to have higher rates of cardiovascular disease (CVD) mortality and morbidity, particularly when there is central adipose tissue accumulation. It has been demonstrated that abdominal obesity is a global risk factor for CVD [7]. Obesity may be linked to higher levels of fibrinogen and C-reactive protein, diabetes, insulin resistance, dyslipidemia, hypertension, and dyslipidemia, these all factors may increase the risk of cardiovascular diseases events [14]. Obesity has been demonstrated to raise the risk of high blood pressure in addition to CVD (HBP). Chronic hypertension is a primary cause of chronic kidney failure and one of the risk factors for stroke, myocardial infarction (MI), heart failure, and arterial aneurysm [16].

One of the main factors contributing to increased cardiovascular disease (CVD) mortality and morbidity is obesity

[18]. The current study examined the links between rising global rates of cardiovascular disease (CVD) and high blood pressure (HBP) and changes in body mass index (BMI) [19]. Mississippi had the greatest rates of obesity, CVD, and HBP, whereas Colorado had the lowest rates. Keeping a healthy weight reduces the likelihood of having CVD. When combined with other risk factors like diabetes, hypertension, dyslipidemia, or other intervening risk factors, moderate-to-severe obesity is a significant risk factor for cardiac disorders [17]. One of the most significant independent CVD risk factors is obesity, and several large-scale investigations have demonstrated that there is a correlation between CVD mortality and BMI [9].

A series of clinical disorders known collectively as ischemic heart disease (IHD) are defined by myocardial ischemia, since poor perfusion is the primary pathophysiologic defect in the ischemic myocardium, ischemia is also linked with low food availability, inadequate elimination of metabolic waste products, and inadequate oxygen delivery [10]. It is impossible to distinguish between the effects of defective metabolite washout and the repercussions of oxygen deprivation in myocardial ischemia. The detrimental effects on the myocardium are typically less pronounced in diseases associated with isolated hypoxemia and preserved perfusion and emphasizing the importance of metabolic end products and pathogenesis of ischemic injury [18].

MATERIALS AND METHODS

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RESULTS

Table-1: Obese and non-Obese individuals

Biomarkers	Group-A (Mean±SD)	Group-B (Mean ±SD)
Age	50.10±10.52	51.10±10.64
Male	40.1±13.42	44.1±13.42
Female	40.1±13.42	40.1±13.42
BMI	20.11±12.2	35.10±10.20

Table-2: Group-A, non-obese male

Biomarkers	Units	(Mean±SD)	P< 0.05
Cholesterol	mg/dl	190.10±01.02	0.02
Triglyceride	mg/dl	150.1±03.02	0.02
LDL	mg/dl	160.1±03.04	0.04
HDL	mg/dl	40.11±0.02	0.02

Table-3: Group-A, non-obese female

Biomarkers	Units	(Mean±SD)	P< 0.05
Cholesterol	mg/dl	193.10±01.01	0.01
Triglyceride	mg/dl	140.1±03.02	0.02
LDL	mg/dl	154.1±03.03	0.03
HDL	mg/dl	41.11±0.02	0.02

Table-4: Group-B, Obese male

Biomarkers	Units	(Mean±SD)	P< 0.05
Cholesterol	mg/dl	243.10±01.01	0.01
Triglyceride	mg/dl	200.1±03.02	0.02
LDL	mg/dl	192.1±03.01	0.03
HDL	mg/dl	71.11±0.02	0.02

Table-5: Group-B, Obese female

Biomarkers	Units	(Mean±SD)	P< 0.05
Cholesterol	mg/dl	245.10±01.01	0.01
Triglyceride	mg/dl	210.1±03.02	0.02
LDL	mg/dl	215.1±03.01	0.03
HDL	mg/dl	79.11±0.02	0.02

In this study non-obese 40 male and 40 female (40.1±13.42) whereas 44 obese male and 40 female of mean age (50.10±10.52, 51.10±10.64) with mean BMI (20.11±12.2, 35.10±10.20) were selected presented in Table-1. The serum cholesterol, triglyceride, low density lipoprotein and high density lipoprotein of both non-obese and obese male and female (190.10±01.02, 150.1±03.02, 160.1±03.04, 40.11±0.02), (193.10±01.01, 140.1±03.02, 154.1±03.03, 41.11±0.02), (243.10±01.01, 200.1±03.02, 192.1±03.01, 71.11±0.02), (245.10±01.01, 210.1±03.02, 215.1±03.01, 79.11±0.02) respectively. We were found that an increase in ischemic heart disease in 60 (73.1%) cases of group I, and in 11 (12.2%) instances of group II. Myocardial infarction rates were also higher in obese patient substantially outperformed non-obese instances with a p value. <0.05. Additionally, obese individuals' systolic and diastolic blood pressure levels were greater. While cholesterol, LDL, triglycerides,

glucose, and CRP were shown to be greater in obese people, HDL was found to be lower in these patients.

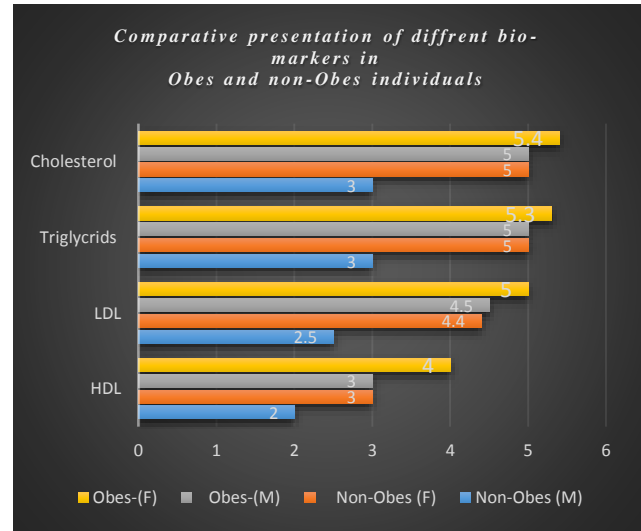


Fig-1:

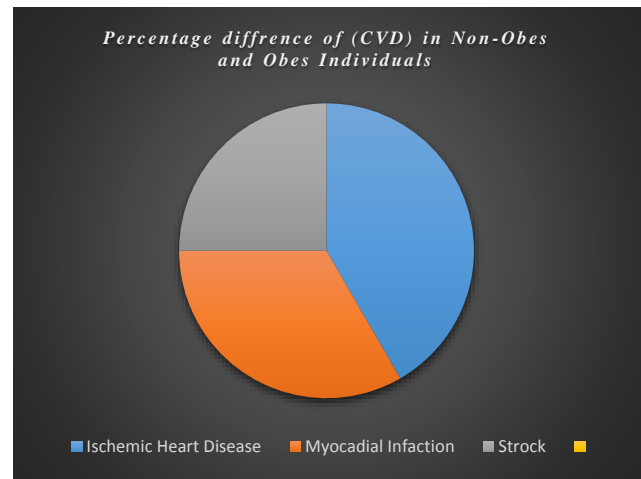


Fig-2:

DISCUSSION

Van Gaal et al., 2010 concluded in their study that both adults and children are becoming more and more obese over the world. It is a rapidly expanding issue that increases the danger of dying young and has numerous negative health implications, such as ischemic heart disease. Compared to 25 percent four decades ago, about 70 percent of individuals are now considered overweight or obese. If the current patterns continue, smoking might lose ground to obesity as the main contributor to avoidable illnesses [20]. When combined with other risk factors like diabetes, hypertension, dyslipidemia, or other intervening risk factors, moderate-to-severe obesity is a significant risk factor for cardiac disorders. One of the most significant independent CVD risk factors is obesity, and several large-scale studies have demonstrated that there is a correlation between CVD mortality and BMI. The structure and function of the cardiovascular system are significantly harmed by obesity. Obesity increases cardiac output and total blood volume, and the burden on the heart is often higher [11]

A study was concluded in their findings that increase in ischemic heart disease in 64 (71.3%) cases of group I, and in 12 (13.1%) instances of group II. With a P< 0.05, the frequency of Myocardial Infarction was also substantially greater in fatty

individuals than in non-obese persons. Moderate to severe obesity can make diabetes, dyslipidemia, hypertension, and other risk factors for heart diseases. In another study by Din-Dzietham et al., 2010 concluded that Obesity is one of the most important independent risk factors for cardiovascular disease, and several extensive research have stated a significant relationship between BMI and CVD mortality. Obesity has a number of negative effects on cardiovascular health. Obesity causes a rise in total blood volume and a rise in cardiac workload.

In current study systolic and diastolic blood pressure were greater in obese individuals than the non-obese individuals. The blood serum levels of triglycerides, HDL and LDL were all significantly ($P < 0.05$) different. This study nominated 164 individuals of age in between 40- 65 and divided them into two different groups. In group- A, 80 individuals were non- obese of BMI 15-25 while in Group-B, 84 individuals with BMI 30-35 were so obese as compared with individuals of group-A. A medical history Performa was used to collect history of each individual. It was concluded that ischemic heart disease is very common in individuals of group-B because they all have over weight than the normal and their metabolic changes were seen in lipid profile comparatively.

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