

## Comparative Outcome of Obesity in Ischemic Heart Disease a Clinical Study

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### ABSTRACT

**Objective:** The purpose of this study is to determine the comparative outcome of obesity in ischemic heart disease.

**Duration of Study:** July, 2021 to Dec, 2021

**Place and Duration:** CCU department D.G. Khan Medical College and Teaching Hospital Dera Ghazi Khan

**Methods:** This research included 180 participants of both sexes. Patients were between the ages of 22 and 80 years old, according to the study. As part of their informed written permission, researchers collected demographic information such as age, sex and BMI. Patients were divided in two groups, group I had 90 obese patients and group II had non obese 90 patients. Follow up among patients were taken in duration of 12 months. Both groups' outcomes were evaluated and compared in terms of increase in risk factor of IHD, myocardial infarction and mortality because of these factors. SPSS 22.0 was used to analyze complete data.

**Results:** There were 55 (61.1%) males and 35 (38.9%) females in group I and in group II 46 (51.1%) males and 44 (48.9%) females in group II. The mean age of the patients in group I was 41.4±11.62 years and had mean BMI 32.14±21.86 kg/m<sup>2</sup> while in group II mean age was 38.41±12.42 years with mean BMI 25.2±11.34 kg/m<sup>2</sup>. 40 (44.4%) patients in group I and 45 (50%) patients in group II was educated. In group I 25 (27.8%) patients were smokers, 19 (21.1%) patients had DM and in group II 27 (30%) were smokers and 5 (5.6%) cases had DM. We found increase in Ischemic heart disease in 65 (72.2%) cases of group I and in group II IHD was found in 11 (12.2%) cases. Frequency of Myocardial Infarction was also higher in obese patients than non-obese cases. Systolic and diastolic blood pressure was also higher in obese patients. HDL was lower in obese patients while cholesterol, LDL, triglycerides and CRP was found higher in obese patients. Mortality in obese patients with IHD was 12 (13.3%) but no any mortality found in non-obese cases.

**Conclusion:** In this study we found that obesity and increase in weight is a significant risk factor for ischemic heart disease and myocardial infarction and because of these diseases patients had poor outcomes with increase in rate of deaths.

**Keywords:** MI, IHD, Mortality, Obese, Smoking

### INTRODUCTION

WHO defines obesity and overweight as abnormal or excessive accumulations of fatty tissue that pose a health threat.<sup>1</sup> Obesity is quantified by a person's BMI, which is calculated by dividing their weight (in kilogrammes) by their height (in metres) (in meters). If your body mass index (BMI) is 30 or more, you are termed obese. Being overweight means having a BMI of 25 or greater.<sup>1,2</sup>

Obesity is on the rise among Americans of all ages, but it is especially prevalent among youngsters. More than two thirds of adults in the United States are either overweight or obese, according to government statistics. Obesity is responsible for an estimated 2.6 million deaths globally and 2.3% of the global burden of illness.<sup>3,4</sup> Obesity was revealed to be a substantial risk factor for the development of type-2 diabetes, asthma, hypertension, stroke, coronary artery disease, cancer, and cancer-related mortality, liver and gallbladder illnesses, sleep apnea, osteoarthritis, and gynaecological issues.<sup>5</sup> Obesity is associated with an increased risk of heart disease and stroke, even when other risk factors are taken into consideration. Increased levels of blood pressure, cholesterol, and glucose are all connected with obesity, and weight gain corresponds to these changes.<sup>6</sup> There has been some debate over the last decade on whether or not obesity may be metabolically beneficial. Obesity-related cardiovascular disease (CVD) is not more common in people with metabolic health than in those with metabolic health who are either normal weight or not obese.<sup>7,8</sup> Other studies have shown that obese persons who are metabolically fit are more likely to develop cardiovascular disease than their normal-weight counterparts.<sup>9,10</sup>

In other research, differing definitions of outcomes or race and sex stratifications led to different findings.<sup>11</sup> Some of the variance in the results is due to the use of various metabolic health criteria and outcomes. In other words, there is a lack of agreement in the definition of metabolically healthy obesity.<sup>12</sup> Since risk variables vary across and within research populations and might impact CVD risk differently, prior studies have permitted

metabolically healthy people to have at least one metabolic risk factor<sup>13</sup>.

The prevalence of obesity may be assessed using the body mass index (BMI), but no information on fat distribution is provided, which is critical for assessing cardiovascular risk.<sup>14</sup> Abdominal circumference and the computation of waist/hip ratio have been proposed as innovative clinical metrics to characterise central obesity. Central obesity is defined as having a waist circumference of more than 102 cm in males and 88 cm in women. This type of obesity increases cardiovascular risk. Obesity is considered central in males with a waist/hip ratio more than 0.9 and in women with a ratio greater than 0.85.<sup>15</sup>

As far as women's cardiovascular risk is concerned, there is a dearth of information. Research on obesity and heart disease has been conducted mostly on male volunteers, despite the fact that heart disease is a leading cause of death for both men as well as women in the United States. Most earlier studies have also neglected to account for factors such as smoking or preexisting illness, or they have equated the real impact of obesity with its residual influence after accounting for factors such as hypertension and hyperglycemia.<sup>14,15</sup>

We examined this study to analyze comparative outcomes among patients of obesity in ischemic heart disease.

### MATERIAL AND METHODS

This prospective study was conducted at CCU department D.G. Khan Medical college and Teaching Hospital Dera Ghazi Khan from July, 2021 to Dec, 2021 and comprised of 180 patients. As part of their informed written permission, researchers collected demographic information such as age, sex and BMI. Exclusion criteria for this trial were patients with severe renal or liver illness or those who refused to provide written permission.

Patients ranged in age from 22 to 80. Group I included 90 obese patients, whereas group II included 90 non-obese individuals. It was determined by dividing the weight in kilos by the

squared height in metres. To find out how much you weigh, find the halfway between your rib cage and the top of your pelvis and measure your waist circumference there. In order to collect the systolic and diastolic blood pressure measurements, an automatic Digital Blood Pressure Monitor was utilised (Kivex). Cholesterol and triglyceride levels as well as C-reactive protein concentrations were measured using plasma samples from non-fasting individuals. Patients with hypertension and diabetes reported using aspirin and receiving lipid-lowering treatment. To account for the lack of information on lipid-lowering drugs, we used non-fasting triglyceride levels in the diagnosis of the metabolic syndrome. The whole set of data was analysed in SPSS 22.0. Ischemic heart disease and myocardial infarction were studied in connection to ageing using Cox regression analysis to derive HRs and cumulative incidence curves of the two diseases. Normal weight, overweight, and obesity were coded 1–3 to compare incidence rates and trends, respectively; the log-rank test was used for each of these tasks.

**RESULTS**

There were 55 (61.1%) males and 35 (38.9%) females in group I and in group II 46 (51.1%) males and 44 (48.9%) females in group II. (fig 1)

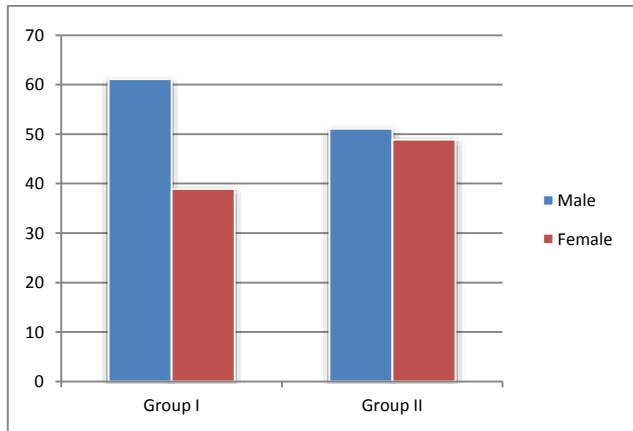


Figure-1: Comparison of gender among both groups

The mean age of the patients in group I was 41.4±11.62 years and had mean BMI 32.14±21.86 kg/m<sup>2</sup> while in group II mean age was 38.41±12.42 years with mean BMI 25.2±11.34 kg/m<sup>2</sup>. 40 (44.4%) patients in group I and 45 (50%) patients in group II was educated. 48 (50.5%) cases were from urban areas in group I and in group II 50 (55.6%) cases were from urban areas.(table 1)

Table-1: The demographics of the patients enrolled in the study

Variables	Obese	Non-obese
Mean age (years)	41.4±11.62	38.41±12.42
Mean BMI (kg/m <sup>2</sup> )	32.14±21.86	25.2±11.34
Education Status		
Yes	40 (44.4%)	45 (50%)
No	50 (55.6%)	45 (50%)
Place of living		
Urban	48 (50.5%)	50 (55.6%)
Rural	42 (49.5%)	40 (44.4%)

Table-2: Association of comorbidities among enrolled cases

Variables	Group I	Group II
Smokers		
Yes	25 (27.8%)	27 (30%)
No	65 (72.2%)	63 (70%)
DM		
Yes	19 (21.1%)	5 (5.6%)
No	71 (78.9%)	85 (94.4%)

In group I 25 (27.8%) patients were smokers, 19 (21.1%) patients had DM and in group II 27 (30%) were smokers and 5 (5.6%) cases had DM. (table 2)

We found increase in ischemic heart disease in 65 (72.2%) cases of group I and in group II IHD was found in 11 (12.2%) cases. Frequency of Myocardial Infarction was also higher in obese patients than non-obese cases significantly with p value <0.05. (table 3)

Table 3: Outcomes of IHD and MI among both groups

Variables	Group I	Group II
IHD		
Yes	65 (72.2%)	11 (12.2%)
No	25 (27.8%)	79 (87.8%)
MI		
Yes	60 (66.7%)	17 (18.9%)
No	30 (33.3%)	73 (81.1%)

Systolic and diastolic blood pressure was also higher in obese patients. HDL was lower in obese patients while cholesterol, LDL, triglycerides, glucose and CRP was found higher in obese patients. (table 4)

Table-4: Comparison of plasma levels among both groups

Variables	Obese	Non-Obese
HDL mg/dL	44.13±6.25	71.16±10.23
Cholesterol mg/dL	227.8±9.77	210.23±13.53
LDL mg/dL	134.1±9.33	118.4±6.49
Triglycerides mg/dL	214.2±13.64	109.3±7.19
Glucose mg/dL	98.11±23.57	91.17±13.26
CRP mg/L	3.0±2.22	1.9±3.16
Blood Pressure		
Systolic (mmHg)	149.45±12.321	130.18±15.212
Diastolic (mmHg)	91.8±21.78	80.45±15.76

Mortality in obese patients with IHD was 12 (13.3%) but no any mortality found in non-obese cases. (table 5)

Table-5: Comparison of mortality among both groups

Variables	Group I	Group II
Mortality		
Yes	12 (13.3%)	0
No	78 (86.7%)	0

**DISCUSSION**

Heart disease is directly linked to obesity, according to recent research. The metabolic syndrome's three hallmark symptoms — hypertension, dyslipidemia, and hyperglycemia — are considered to have a role in this relationship. In fact, the findings of this study may be explained by the accumulation of various symptoms of metabolic syndrome over time in overweight and obese people who do not have the illness at the outset, resulting in a cardiovascular event. The development of additional cardiovascular risk factors, such as hypertension, may be linked to abdominal fat as a result of this<sup>16</sup> As a result, people with metabolic syndrome had a higher BMI than those without the illness, which may explain some of their elevated risk.<sup>17</sup>

In this study 180 obese and non-obese patients were presented. Patients were divided in two groups, group I had 90 obese patients and group II had non obese 90 patients. There were 55 (61.1%) males and 35 (38.9%) females in group I and in group II 46 (51.1%) males and 44 (48.9%) females in group II. The mean age of the patients in group I was 41.4±11.62 years and had mean BMI 32.14±21.86 kg/m<sup>2</sup> while in group II mean age was 38.41±12.42 years with mean BMI 25.2±11.34 kg/m<sup>2</sup>. 40 (44.4%) patients in group I and 45 (50%) patients in group II was educated. The results were similar to those of prior investigations.<sup>18,19</sup> In group I 25 (27.8%) patients were smokers, 19 (21.1%) patients had DM and in group II 27 (30%) were smokers and 5 (5.6%) cases had DM.<sup>20</sup>

We found increase in ischemic heart disease in 65 (72.2%) cases of group I and in group II IHD was found in 11 (12.2%) cases. Frequency of Myocardial Infarction was also higher in obese patients than non-obese cases significantly with  $p$  value  $<0.05$ . Hypertension, dyslipidemia, and diabetes are all risk factors for heart disease that can be exacerbated by moderate to severe obesity. One of the most major independent risk factors for cardiovascular disease (CVD) is obesity, and several large-scale studies have found positive correlations between BMI and CVD mortality.<sup>21</sup> There are several ways in which obesity harms cardiovascular health. There is an increase in cardiac workload and a rise in total blood volume due to obesity. This study's technique has produced inconsistent results in previous investigations.<sup>22</sup> A number of studies have revealed that overweight and obese persons who do not have metabolic syndrome do not have an elevated risk of cardiovascular disease.<sup>23</sup> There is an elevated risk for cardiovascular disease among overweight and obese adults who do not have metabolic syndrome compared to normal weight individuals, according to a study of middle-aged Swedish males with over 30 years of follow-up.<sup>24</sup> The disparities between these earlier studies may be due to differences in metabolic syndrome definitions or cohort selection procedures.

Obese individuals also had higher systolic and diastolic blood pressures. There was a significant difference in the levels of HDL (good cholesterol) and LDL (bad cholesterol), triglycerides, glucose and CRP in obese patients.<sup>25</sup> Twelve (13.3 percent) individuals with IHD who were fat died, whereas no deaths were detected in non-obese patients. Cardiovascular disease (CVD) is more common among overweight people, particularly those with central adipose tissue buildup, according to a number of studies. Worldwide, researchers have shown a relationship between abdominal obesity and an elevated risk of cardiovascular disease (CVD). As a result of obesity, high levels of fibrinogen, C-reactive protein, and insulin resistance, cardiovascular disease is more likely (CVD).<sup>26,27</sup>

## CONCLUSION

In this study we found that obesity and increase in weight is a significant risk factor for ischemic heart disease and myocardial infarction and because of these diseases patients had poor outcomes with increase in rate of deaths.

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