DOI: https://doi.org/10.54393/pjhs.v5i04.1442

PAKISTAN JOURNAL OF HEALTH SCIENCES
https://thejas.com.pk/index.php/pjhs
ISSN (P): 2790-9352, (E): 2790-9344
Volume 5, Issue 4 (April 2024)

Original Article

Troponin I, Hyperlipidemia and Obesity as Predictor of Cardiovascular Complications: A Cross Sectional Study

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ARTICLE INFO

Keywords:
Troponin I, Body Mass Index, Cholesterol, Blood Pressure

How to Cite:
Haq, Z., Zaidi, S. U. S., Shahid, M. N., Munir, M., Butt, T. W., Yousuf, N., & Shahbaz, M. N. (2024). Troponin I, Hyperlipidemia and Obesity as Predictor of Cardiovascular Complications: A Cross Sectional Study: Troponin I and Cardiovascular Complications. Pakistan Journal of Health Sciences, 5(04). https://doi.org/10.54393/pjhs.v5i04.1442

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Received Date: 3rd April, 2024
Acceptance Date: 28th April, 2024
Published Date: 30th April, 2024

ABSTRACT

High levels of Troponin I, cholesterol, triglycerides, Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL) and Body Mass Index (BMI) are predictor of cardiac complications. **Objective:** To investigate the predictive efficacy of Troponin I, BMI, and lipid profiles in detecting cardiovascular problems. **Methods:** 300 male and female individuals were selected for current study. 100 normal individuals were in Control Group A, while 100 participants were placed in Group B all the individuals of Group B have the indications of different cardiac medical complications. BMI, systolic, diastolic blood pressure, Troponin I, cholesterol, triglycerides, LDL, HDL levels were measured respectively. **Results:** In present study BMI, systolic blood pressure, diastolic blood pressure, Troponin I, cholesterol, triglycerides, LDL, HDL blood serum levels of male and female in Group A and Group B were measured, the comparative analysis of above biomarkers showed a significant p-Value ≤ 0.05 change (0.02 ± 0.01, 183.01 ± 0.02, 120.01 ± 0.02, 87.01 ± 0.03, 44.01 ± 0.01), (0.02 ± 0.01, 172.01 ± 0.02, 130.01 ± 0.01, 88.01 ± 0.03, 42.01 ± 0.04), (0.39 ± 0.04, 272.01 ± 0.02, 180.01 ± 0.01, 138.01 ± 0.03, 37.01 ± 0.01) and (0.37 ± 0.04, 282.01 ± 0.02, 184.01 ± 0.01, 141.01 ± 0.03, 36.01 ± 0.01) were measured respectively. **Conclusions:** The present study found that there were notable significant p-value <0.05 differences in the blood serum levels of BMI, systolic and diastolic blood pressure, Troponin I, cholesterol, triglycerides, LDL, and HDL in both the male and female groups in Groups A and B.

INTRODUCTION

Obesity is a growing global health concern that affects both industrialized and developing nations [1]. It is a finding of different studies that obesity has increased more than 39 percent in all over the world according to the WHO. Cardiovascular illnesses and obesity are related to one another. It has also been demonstrated that the correlation between obesity and dyslipidemias, sleep apnea syndrome, diabetes mellitus, and hypertension raises the risk of cardiovascular diseases [2]. The skeletal muscles and heart both include members of the protein family known as troponin I. It is a component of the protein complex known as troponin, which forms thin myofilaments with actin to keep the actin-tropomyosin complex in place [2,3]. Troponin is a structural protein unique to the heart that is recommended for use in the diagnosis and management of acute coronary syndrome.

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Troponin I prevent myosin from adhering to actin in relaxed muscle. Low-grade elevations in cardiac troponin are strongly associated with incident cardiovascular disease and death in people with existing cardiovascular disease [4]. Age-related increases in cardiac troponin I concentrations in people without overt signs of coronary heart disease indicate silent myocardial damage [5]. Primary care physicians frequently diagnose and treat hyperlipidemia in an effort to prevent Cardiovascular Disease (CVD). It is commonly known that hyperlipidemia poses a significant risk for cardiovascular disease [6]. Elevated triglycerides and cholesterol, or both are referred to as hyperlipidemia [7]. Elevations in fasting total cholesterol that may or may not be correlated with elevated triglyceride concentrations are referred to as hyperlipidemia. Lipids are transported by lipoproteins, which are particles that are not soluble in plasma. As a result, lipoprotein abnormalities are also used to categorize cases of hyperlipidemia [8]. Cardiovascular Diseases (CVDs) remain the leading cause of death worldwide, and they pose a substantial public health problem in Pakistan. CVDs account for roughly 32% of all fatalities worldwide, with an estimated 17.9 million people dying each year, according to the World Health Organization (WHO). In Pakistan, CVDs account for 19% of all fatalities, indicating a significant health burden [9]. The rising incidence of risk factors such as hypertension, diabetes, and obesity exacerbate this burden. The economic consequences are as severe, with the expense of cardiovascular healthcare putting a significant drain on Pakistan's resources. According to studies, the incidence of key risk factors such as hypertension, diabetes, obesity, and smoking is on the rise in Pakistan, emphasizing the need of tackling this issue [10,11]. Various researches have determined that health care practitioners are concerned about hyperlipidemia due to the documented relationship between lipid concentrations and the risk of Cardiovascular Disease (CVD), which is the leading cause of death worldwide [12]. After concluding that troponin is a structural protein unique to the heart, recommendations suggest using it to diagnose and treat acute coronary syndrome [13,14]. Newly developed technologies enable precise assessment of low circulating troponin concentrations in the general population. Increased levels of C-reactive protein and fibrinogen, diabetes, insulin resistance, dyslipidemia, and hypertension are all associated with obesity and increase the risk of CVD events [15].

The objectives of present study were to identify the relationship between, Troponin I, BMI and components of lipid profile with cardiac complications in male and female individuals. The objective of this study is to investigate the predictive efficacy of Troponin I, BMI, and lipid profiles in detecting cardiovascular problems. This study was conducted to address the significant gap in data regarding the predictive accuracy of biomarkers like Troponin I for cardiovascular complications in populations at high risk due to obesity and hyperlipidemia.

METHODS

Present study was cross-sectional and conducted in medical and cardiac units of Ghurki Trust and Teaching Hospital from March 2023 to November 2023. The Ethical Approval Clearance Certificate Ref No. 2023/1A was granted by Ethical Review Committee, Faculty of Biological Sciences, Lahore University of Biological and Applied Sciences. The aims and objectives of present study were to identify the relationship between, Troponin I, BMI and components of lipid profile with cardiac complications in male and female individuals. Participants were chosen using stratified random sampling to achieve varied representation across age and sex categories within the community. The sample size was calculated using the Cochran Formula, with the goal of achieving 80% power and a 95% confidence level. This is a clinical cross sectional study where in the patient's initial symptoms were noted at the time of presentation, and additional tests were performed using a calorimetry kit to measure the levels of cholesterol, LDL, triglycerides, and HDL using blood samples that were collected. All subjects in Groups A and B had their raw data collected using a Performa and a medical history questionnaire. BMI, systolic, diastolic blood pressure, Troponin I, cholesterol, triglycerides, LDL, HDL levels were considered as inclusive criteria respectively. Cardiac medical complication like myocardial infarction, thrombosis, deep vein thrombosis, stroke etc. were exclusive criteria. 300 male and female individuals were selected for current study. 100 normal individuals were in control Group A, while 100 participants were placed in Group B all the individuals of Group B have the indications of different cardiac medical complications. BMI, systolic, diastolic blood pressure, Troponin I, cholesterol, triglycerides, LDL, HDL levels were measured respectively. Parameters were measured by using spectrophotometry kit and the regent method. Through a series of linked reactions that oxidize cholesterol's 3-OH group and hydrolyze cholesteryl esters, enzyme assays of cholesterol are performed in blood or plasma. One of the reaction byproducts, H2O2, is measured in a process that produces color and is catalyzed by peroxidase. Glycerol is created by the hydrolysis of triglycerides. One can measure serum HDL directly. The technique measures HDL cholesterol using polyethylene glycol-coupled cholesteryl esterase and cholesterol oxidase, and it forms complexes with Apolipoprotein B (ApoB) containing lipoproteins using

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sulfated alpha-cyclodextrin when Mg+2 is present. LDL cholesterol is determined by measuring total cholesterol, HDL cholesterol, and triglycerides. Using SPSS version 20.0, the bio-statistical operations were performed on all raw data collected, and all parameters were characterized by using standard mean deviation and significant (p-value < 0.05) regression.

RESULTS

In table 1, the results of the present study are systematically presented. The sociodemographic characteristics of normal male individuals are outlined, including gender, age, smoking habits, alcohol consumption, family history of cardiac complications, and lifestyle. The mean and standard deviation values for these characteristics are as follows: gender (67.01 ± 0.03), age (54.01 ± 0.01), smoking (06.01 ± 0.02), alcoholic habit (02.01 ± 0.01), family history (03.01 ± 0.03), and lifestyle (60.01 ± 0.02). Additionally, the biological parameters of males in Group A are detailed, comprising BMI (19.01 ± 0.01 kg/m^2), systolic blood pressure (124.01 ± 0.01 mmHg), diastolic blood pressure (83.01 ± 0.01 mmHg), Troponin I levels (0.02 ± 0.01 ng/mL), cholesterol levels (183.01 ± 0.02 mg/dL), triglycerides levels (120.01 ± 0.02 mg/dL), LDL levels (87.01 ± 0.03 mg/dL), and HDL levels (44.01 ± 0.01 mg/dL).

Table 1: Group A Normal Male Individuals (n=67)

Variables	Units / Symptoms	Mean ± SD	p-Value
Gender	Male	67.01 ± 0.03	0.03
Age	40-60 years	54.01 ± 0.01	0.01
Smoking	Rarer	06.01 ± 0.02	0.02
Alcoholic	Rarer	02.01 ± 0.01	0.01
Family history	Little	03.01 ± 0.03	0.03
Lifestyle	Active	60.01 ± 0.02	0.02
BMI	kg/m^2	19.01 ± 0.01	0.01
Systolic BP	mmHg	124.01 ± 0.01	0.01
Diastolic BP	mmHg	83.01 ± 0.01	0.01
Troponin-I Levels	ng/mL	0.02 ± 0.01	0.01
Cholesterol Levels	mg/dL	183.01 ± 0.02	0.02
Triglycerides Levels	mg/dL	120.01 ± 0.02	0.02
LDL Levels	mg/dL	87.01 ± 0.03	0.03
HDL Levels	mg/dL	44.01 ± 0.01	0.01

The figure 1 graph depicts the mean values and standard deviations for various sociodemographic and health parameters such as age, smoking, alcohol consumption, family history, lifestyle, and multiple clinical measurements such as BMI, blood pressure, and lipid levels among healthy males in Group A.

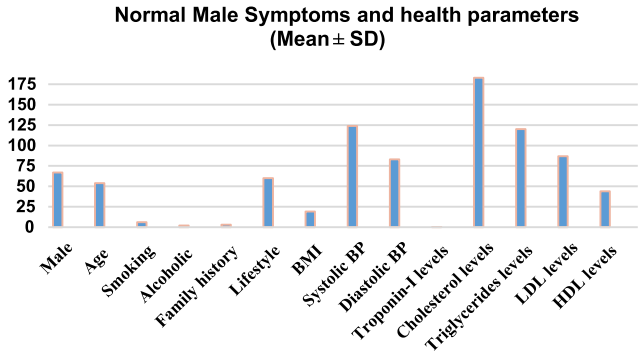

Figure 1: Distribution of Sociodemographic and Health Parameters in Group A Normal Male Individuals

In Table 2, the sociodemographic characteristics of normal female individuals are presented, encompassing variables such as gender, age, smoking habits, alcohol consumption, family history of cardiac complications, and lifestyle. The mean and standard deviation values for these characteristics are as follows: gender (33.01 ± 0.01), age (54.01 ± 0.02), smoking (01.01 ± 0.01), alcoholic habit (00.01 ± 0.01), family history (02.01 ± 0.01), and lifestyle (30.01 ± 0.04). Additionally, the blood serum levels for female individuals in Group A are provided, including BMI (17.01 ± 0.01 kg/m^2), systolic blood pressure (114.01 ± 0.01 mmHg), diastolic blood pressure (73.01 ± 0.01 mmHg), Troponin-I levels (0.02 ± 0.01 ng/mL), cholesterol levels (172.01 ± 0.02 mg/dL), triglycerides levels (130.01 ± 0.01 mg/dL), LDL levels (88.01 ± 0.03 mg/dL), and HDL levels (42.01 ± 0.04 mg/dL).

Table 2: Group A Normal Female Individuals (n=33)

Variables	Units / Symptoms	Mean ± SD	p-Value
Gender	Male	33.01 ± 0.01	0.01
Age	40-60 years	54.01 ± 0.02	0.02
Smoking	Rarer	01.01 ± 0.01	0.01
Alcoholic	Rarer	00.01 ± 0.01	0.01
Family history	Little	02.01 ± 0.01	0.01
Lifestyle	Active	30.01 ± 0.04	0.04
BMI	kg/m^2	17.01 ± 0.01	0.01
Systolic BP	mmHg	114.01 ± 0.01	0.01
Diastolic BP	mmHg	73.01 ± 0.01	0.01
Troponin-I Levels	ng/mL	0.02 ± 0.01	0.01
Cholesterol Levels	mg/dL	172.01 ± 0.02	0.02
Triglycerides Levels	mg/dL	130.01 ± 0.01	0.01
LDL Levels	mg/dL	88.01 ± 0.03	0.03
HDL Levels	mg/dL	42.01 ± 0.04	0.04

The figure 2 shows similar sociodemographic and health statistics as Figure 1, but for normal females in Group A. It shows mean values and standard deviations, allowing for a comparison of health profiles across genders in the control group.

DOI: https://doi.org/10.54393/pjhs.v5i04.1442

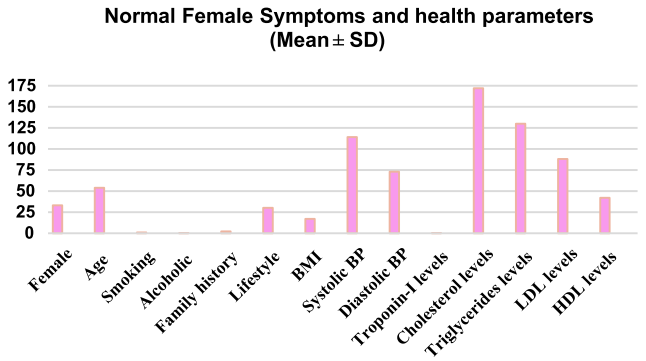

Figure 2: Distribution of Sociodemographic and Health Parameters in Group A Normal Female Individuals

In table 3 Sociodemographic factors include gender, with a predominance of males (57.01 ± 0.04), and age, with the majority falling within the 40-60 years range (54.01 ± 0.01). Smoking habits are represented by the majority being smokers (46.01 ± 0.03), while alcohol consumption is less common, denoted as rarer (12.01 ± 0.01). High family history prevalence (33.01 ± 0.01) and an inactive lifestyle (47.01 ± 0.04) are also notable among the studied population. In terms of clinical parameters, the table delineates BMI (27.01 ± 0.04 kg/m2), systolic blood pressure (140.01 ± 0.02 mmHg), diastolic blood pressure (89.01 ± 0.02 mmHg), Troponin-I levels (0.39 ± 0.04 ng/mL), cholesterol levels (272.01 ± 0.02 mg/dL), triglycerides levels (180.01 ± 0.01 mg/dL), LDL levels (138.01 ± 0.03 mg/dL), and HDL levels (37.01 ± 0.01 mg/dL).

Table 3: Group A Male Individuals with Cardiac Complications (n=57)

Variables	Units / Symptoms	Mean ± SD	p-Value
Gender	Male	57.01 ± 0.04	0.04
Age	40-60 years	54.01 ± 0.01	0.01
Smoking	Majority	46.01 ± 0.03	0.03
Alcoholic	Rarer	12.01 ± 0.01	0.01
Family history	High	33.01 ± 0.01	0.01
Lifestyle	Inactive	47.01 ± 0.04	0.04
BMI	kg/m^2	27.01 ± 0.04	0.04
Systolic BP	mmHg	140.01 ± 0.02	0.02
Diastolic BP	mmHg	89.01 ± 0.02	0.02
Troponin-I Levels	ng/mL	0.39 ± 0.04	0.04
Cholesterol Levels	mg/dL	272.01 ± 0.02	0.02
Triglycerides Levels	mg/dL	180.01 ± 0.01	0.01
LDL Levels	mg/dL	138.01 ± 0.03	0.03
HDL Levels	mg/dL	37.01 ± 0.01	0.01

The figure 3 graph shows comprehensive health data for male Group B members with cardiac problems. The metrics include BMI, systolic and diastolic blood pressure, Troponin I, cholesterol, triglyceride, LDL, and HDL values.

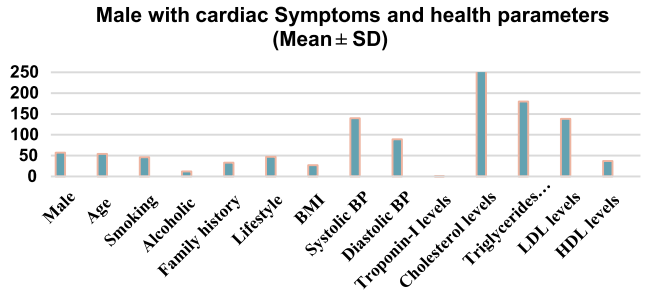

Figure 3: Health Parameters in Group B Males with Cardiac Complications

In table 4, the sociodemographic characteristics of female patients with cardiac complications are presented, including gender, age, smoking, alcohol consumption, family history, and lifestyle levels. The mean and standard deviation values for these characteristics are as follows: gender (43.01 ± 0.01), age (54.01 ± 0.01), smoking (16.01 ± 0.01), alcoholic habit (0.00 ± 0.01), family history (32.01 ± 0.01), and lifestyle (40.01 ± 0.02). Additionally, biological parameters of female individuals with cardiac complications are displayed in Table 4, encompassing BMI, systolic blood pressure, diastolic blood pressure, Troponin-I levels, cholesterol levels, triglycerides levels, LDL levels, and HDL levels. The blood serum levels for these parameters in Group A are recorded as follows: BMI (28.01 ± 0.04 kg/m2), systolic blood pressure (140.01 ± 0.02 mmHg), diastolic blood pressure (90.01 ± 0.02 mmHg), Troponin-I levels (0.37 ± 0.04 ng/mL), cholesterol levels (282.01 ± 0.02 mg/dL), triglycerides levels (184.01 ± 0.01 mg/dL), LDL levels (141.01 ± 0.03 mg/dL), and HDL levels (36.01 ± 0.01 mg/dL).

Table 4: Group B Female Individuals with Cardiac Complications (n= 43)

Variables	Units / Symptoms	Mean ± SD	p-Value
Gender	Female	43.01 ± 0.01	0.01
Age	40-60 years	54.01 ± 0.01	0.01
Smoking	Low	16.01 ± 0.01	0.01
Alcoholic	Non	0.00 ± 0.01	0.01
Family history	High	32.01 ± 0.01	0.01
Lifestyle	Inactive	40.01 ± 0.02	0.02
BMI	kg/m^2	28.01 ± 0.04	0.04
Systolic BP	mmHg	140.01 ± 0.02	0.02
Diastolic BP	mmHg	90.01 ± 0.02	0.02
Troponin-I Levels	ng/mL	0.37 ± 0.04	0.04
Cholesterol Levels	mg/dL	282.01 ± 0.02	0.02
Triglycerides Levels	mg/dL	184.01 ± 0.01	0.01
LDL Levels	mg/dL	141.01 ± 0.03	0.03
HDL Levels	mg/dL	36.01 ± 0.01	0.01

The figure 4 displays the health parameters of females in Group B who have cardiac problems. It presents a clear visual depiction of mean values and standard deviations for the same set of clinical measures as in Figure 3, but customized to the female subgroup.

DOI: https://doi.org/10.54393/pjhs.v5i04.1442

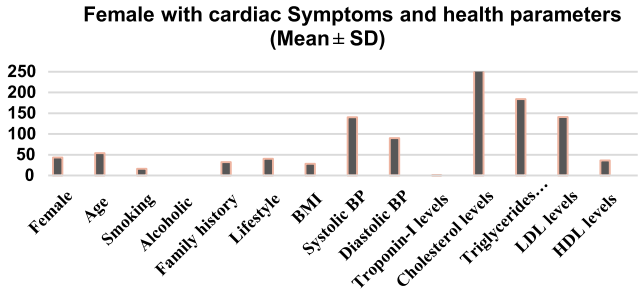

Figure 4: Health Parameters in Group B Female Patients with Cardiac Complications

In table 5, the characteristics of individuals with cardiac complications are stratified by gender and treatment groups (Groups A and B). The table presents the mean and standard deviation values for various variables. For male individuals in Group A, the mean and standard deviation values are as follows: age (67.01 ± 0.03 years), smoking (6.01 ± 0.02), alcoholic habits (2.01 ± 0.01), family history (3.01 ± 0.03), lifestyle (60.01 ± 0.02), BMI (19.01 ± 0.01 kg/m2), systolic blood pressure (124.01 ± 0.01 mmHg), diastolic blood pressure (83.01 ± 0.01 mmHg), Troponin-I levels (0.02 ± 0.01 ng/mL), cholesterol levels (183.01 ± 0.02 mg/dL), triglycerides levels (120.01 ± 0.02 mg/dL), LDL levels (87.01 ± 0.03 mg/dL), and HDL levels (44.01 ± 0.01 mg/dL). For female individuals in Group A, the corresponding values are: age (33.01 ± 0.01 years), smoking (1.01 ± 0.01), alcoholic habits (0.01 ± 0.01), family history (2.01 ± 0.01), lifestyle (30.01 ± 0.04), BMI (17.01 ± 0.01 kg/m2), systolic blood pressure (114.01 ± 0.01 mmHg), diastolic blood pressure (73.01 ± 0.01 mmHg), Troponin-I levels (0.02 ± 0.01 ng/mL), cholesterol levels (172.01 ± 0.02 mg/dL), triglycerides levels (130.01 ± 0.01 mg/dL), LDL levels (88.01 ± 0.03 mg/dL), and HDL levels (42.01 ± 0.04 mg/dL). For male individuals in Group B, the values are: age (57.01 ± 0.04 years), smoking (46.01 ± 0.03), alcoholic habits (12.01 ± 0.01), family history (33.01 ± 0.01), lifestyle (47.01 ± 0.04), BMI (27.01 ± 0.04 kg/m2), systolic blood pressure (140.01 ± 0.02 mmHg), diastolic blood pressure (89.01 ± 0.02 mmHg), Troponin-I levels (0.39 ± 0.04 ng/mL), cholesterol levels (272.01 ± 0.02 mg/dL), triglycerides levels (180.01 ± 0.01 mg/dL), LDL levels (138.01 ± 0.03 mg/dL), and HDL levels (37.01 ± 0.01 mg/dL). For female individuals in Group B, the corresponding values are: age (43.01 ± 0.01 years), smoking (16.01 ± 0.01), alcoholic habits (0.00 ± 0.01), family history (32.01 ± 0.01), lifestyle (40.01 ± 0.02), BMI (28.01 ± 0.04 kg/m2), systolic blood pressure (140.01 ± 0.02 mmHg), diastolic blood pressure (90.01 ± 0.02 mmHg), Troponin-I levels (0.37 ± 0.04 ng/mL), cholesterol levels (282.01 ± 0.02 mg/dL), triglycerides levels (184.01 ± 0.01 mg/dL), LDL levels (141.01 ± 0.03 mg/dL), and HDL levels (36.01 ± 0.01 mg/dL). A remarkable significant (p-value < 0.05) changes were seen in between the variables of each group.

Table 5: Comparative Analysis of Group A and Group B Male and Female Individuals

Variables	Units / Symptoms	(Mean ± SD) Male G-A	(Mean ± SD) Female G-A	(Mean ± SD) Male G-B	(Mean ± SD) Female G-B
Gender	Male	67.01 ± 0.03	33.01 ± 0.01	57.01 ± 0.04	43.01 ± 0.01
Age	40-60 years	54.01 ± 0.01	54.01 ± 0.02	54.01 ± 0.01	54.01 ± 0.01
Smoking	Majority	06.01 ± 0.02	01.01 ± 0.01	46.01 ± 0.03	16.01 ± 0.01
Alcoholic	Rarer	02.01 ± 0.01	00.01 ± 0.01	12.01 ± 0.01	0.00 ± 0.01
Family history	High	03.01 ± 0.03	02.01 ± 0.01	33.01 ± 0.01	32.01 ± 0.01
Lifestyle	Inactive	60.01 ± 0.02	30.01± 0.04	47.01 ± 0.04	40.01 ± 0.02
BMI	Kg/m^2	19.01 ± 0.01	17.01 ± 0.01	27.01 ± 0.04	28.01 ± 0.04
Systolic BP	mmHg	124.01 ± 0.01	114.01 ± 0.01	140.01 ± 0.02	140.01 ± 0.02
Diastolic BP	mmHg	83.01 ± 0.01	73.01 ± 0.01	89.01 ± 0.02	90.01 ± 0.02
Troponin-I levels	ng/mL	0.02 ± 0.01	0.02 ± 0.01	0.39 ± 0.04	0.37 ± 0.04
Cholesterol levels	mg/dL	183.01 ± 0.02	172.01 ± 0.02	272.01 ± 0.02	282.01 ± 0.02
Triglycerides levels	mg/dL	120.01 ± 0.02	130.01 ± 0.01	180.01 ± 0.01	184.01 ± 0.01
LDL levels	mg/dL	87.01 ± 0.03	88.01 ± 0.03	138.01 ± 0.03	141.01 ± 0.03
HDL levels	mg/dL	44.01 ± 0.01	42.01 ± 0.04	37.01 ± 0.01	36.01 ± 0.01

DISCUSSION

D. Johnson *et al.*, in 2019 concluded in their study that Cardiac Troponin I (cTnI), a benchmark for detecting myocardial damage, was recently found to predict acute myocardial infarction or mortality in individuals with unstable Coronary Heart Disease (CHD). Cardiac TnI concentrations rise with age in people with no clinical indications of CHD, indicating silent myocardial damage [16]. Obesity, which is defined by excessive amounts of adipose tissue (body fat), might raise your chance of developing hyperlipidemia. Excess weight promotes inflammation, disrupts metabolism, and leads to insulin resistance. Researchers assume that 60-70% of obese persons have hyperlipidemia. The main findings of the different studies were that obesity, higher lipedema, and high blood pressure are strongly associated with cardiovascular complications [17]. Different studies showed that obesity and lipid profile has close relationships. In the previous studies a close associations of obesity, hypercholesterolemia, hypertriglyceridemia and high blood pressure, with cardiovascular medical complications in various populations were noted [18]. The first written accounts of obesity appear at the close of the 1800s and the start of the 1900s. More than 57,000 publications have been published in PubMed as of right now with the term "obesity" in the title; these numbers increase if the term is also searched for in the abstract [19]. According to unique research, the obesity incidence among adults in numerous countries in North Africa, Oceania, and the Middle East exceeded 50% in 2013. This is pretty worrying [20]. Obesity was lower but still extremely common in other regions of the world, such as North America, where one-third of adults suffer from the

DOI: https://doi.org/10.54393/pjhs.v5i04.1442

condition, and Western Europe, where one-fifth of persons do [21]. Despite the fact that coronary artery disease and stroke have similar risk factors, we found that patients with a history of thrombotic events, Transient Ischemic Attack (TIAs), or stroke were much less likely to have obstructive coronary artery disease [21,22]. Our study's utilization of a large sample size and realistic portrayal of the actual practice environment of a reputed invasive cardiology center is one of its strengths [23]. However, the study has a number of drawbacks, including a retrospective design that limits the collection of certain data (alcohol, BMI, smoking); and the impact of the angiographer's visual assessment on the assessment of stenosis severity, which could result in a larger margin of error [24].The variables of this study, which were measured for the male and female participants in Groups A and B, respectively, and which have a significant correlation with cardiovascular medical complications, include BMI, systolic and diastolic blood pressure, Troponin I, cholesterol, triglycerides, LDL, and HDL blood serum levels. The current study also has very close relationships with previous studies [25]. There were remarkably significant (p-Value < 0.05) differences observed between each group's variables. Neeland *et al.*, in 2018 found from their research that Obesity causes cardiovascular disease and death irrespective of other cardiovascular risk factors. More recent research identifies abdominal obesity, as measured by waist circumference, as a cardiovascular disease risk factor that is independent of BMI. Obesity is regarded as a heterogeneous illness in which people with comparable BMIs might have different metabolic and CVD risk profiles [26]. Thus, the risk of obesity-related cardiovascular problems is mostly determined by individual variations in regional body fat distribution, which have a deleterious impact on heart structure and function. Excess adiposity alters cardiac function both directly, through effects on the heart and vascular, and indirectly, through obesity-related comorbidities. Excess adipose tissue buildup causes hemodynamic alterations, such as increased blood volume and cardiac output and a decrease in systemic vascular resistance [17].

CONCLUSIONS

The study demonstrated significant (p-Value < 0.05) variations in blood serum levels of cholesterol, triglycerides, LDL, HDL, BMI, systolic and diastolic blood pressure, Troponin I, and cholesterol levels between male and female individuals in Groups A and B. These findings highlight the possibility of using Troponin I as a predictor of cardiovascular issues and the importance of addressing modifiable risk factors as soon as possible. Further long-term study is required to validate these associations and direct targeted preventative measures.

Acknowledgement

We are grateful to everyone who helped us, directly or indirectly, complete the study assignment. This was a collaborative effort in which all researchers contributed actively and truly.

Authors Contribution

Conceptualization: ZH, MNS[2]
Methodology: SUSZ
Formal analysis: TWB
Writing, review and editing: MM, TWB, NY, MNS[1], MNS[2]

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Bashir A, Azharuddin M, Rashid I, Murti K, Pandey K. Predictors of cardiomyopathy in patients with type-2 diabetes mellitus with and without cardiovascular complications: A cross-sectional study. Diabetes Research and Clinical Practice. 2019 Aug; 154: 90-100. doi: 10.1016/j.diabres.2019.06.012.

[2] Wojszel ZB, Kuźma Ł, Rogalska E, Kurasz A, Dobrzycki S *et al.* A Newly Defined CHA2DS2-VA Score for Predicting Obstructive Coronary Artery Disease in Patients with Atrial Fibrillation—A Cross-Sectional Study of Older Persons Referred for Elective Coronary Angiography. Journal of Clinical Medicine. 2022 Jun; 11(12): 3462. doi: 10.3390/jcm11123462.

[3] Rogalska E, Kuźma Ł, Wojszel ZB, Kurasz A, Napalkov D, Sokolova A *et al.* Atrial fibrillation is a predictor of nonobstructive coronary artery disease in elective angiography in old age: a cross-sectional study in Poland and Russia. Aging Clinical and Experimental Research. 2022 Jan; 34(1): 175-83. doi: 10.1007/s40520-021-01895-y.

[4] Colaci M, Giuggioli D, Spinella A, Vacchi C, Lumetti F, Mattioli AV *et al.* Established coronary artery disease in systemic sclerosis compared to type 2 diabetic female patients: a cross-sectional study. Clinical Rheumatology. 2019 Jun; 38: 1637-42. doi: 10.1007/s10067-019-04427-2.

[5] Hidru TH, Yang X, Xia Y, Ma L, Li HH. The relationship between plasma markers and essential hypertension in middle-aged and elderly Chinese population: a community based cross-sectional study. Scientific Reports. 2019 May; 9(1): 6813. doi: 10.1038/s41598-019-43278-4.

DOI: https://doi.org/10.54393/pjhs.v5i04.1442

[6] Iyanda A, Ade-Oni A, Omiyefa S, Krishnan B. Prevalence, spatial pattern, and predictors of cardiovascular and chronic diseases: A cross-sectional study. 2023 Apr; 1. doi: 10.21203/rs.3.rs-2861281/v1.

[7] Kodaman N, Aldrich MC, Sobota R, Asselbergs FW, Poku KA, Brown NJ *et al.* Cardiovascular disease risk factors in Ghana during the rural-to-urban transition: a cross-sectional study. PLOS One. 2016 Oct; 11(10): e0162753. doi: 10.1371/journal.pone.0162753.

[8] Rohde LE, Hennekens CH, Ridker PM. Survey of C-reactive protein and cardiovascular risk factors in apparently healthy men. The American Journal of Cardiology. 1999 Nov; 84(9): 1018-22. doi: 10.1016/S0002-9149(99)00491-9.

[9] Vaduganathan M, Mensah GA, Turco JV, Fuster V, Roth GA. The global burden of cardiovascular diseases and risk: a compass for future health. Journal of the American College of Cardiology. 2022 Dec; 80(25): 2361-71. doi: 10.1016/j.jacc.2022.11.005.

[10] Zubair F, Nawaz SK, Nawaz A, Nangyal H, Amjad N, Khan MS. Prevalence of cardiovascular diseases in Punjab, Pakistan: a cross-sectional study. Journal of Public Health. 2018 Oct; 26: 523-9. doi: 10.1007/s10389-018-0898-4.

[11] Liaquat A, Javed Q. Current trends of cardiovascular risk determinants in Pakistan. Cureus. 2018 Oct; 10(10). doi: 10.7759/cureus.3409.

[12] Bankier B, Barajas J, Martinez-Rumayor A, Januzzi JL. Association between C-reactive protein and generalized anxiety disorder in stable coronary heart disease patients. European Heart Journal. 2008 Sep; 29(18): 2212-7. doi: 10.1093/eurheartj/ehn326.

[13] Chow EJ, Rolfes MA, O'Halloran A, Anderson EJ, Bennett NM, Billing L, Chai S, Dufort E, Herlihy R, Kim S, Lynfield R. Acute cardiovascular events associated with influenza in hospitalized adults: a cross-sectional study. Annals of Internal Medicine. 2020 Oct; 173(8): 605-13. doi: 10.7326/M20-1509.

[14] Yoshioka K. Skin autofluorescence is associated with high-sensitive cardiac troponin T, a circulating cardiac biomarker, in Japanese patients with diabetes: A cross-sectional study. Diabetes and Vascular Disease Research. 2018 Nov; 15(6): 559-66. doi: 10.1177/1479164118785314.

[15] Ekrikpo UE, Akpan EE, Ekott JU, Bello AK, Okpechi IG, Kengne AP. Prevalence and correlates of traditional risk factors for cardiovascular disease in a Nigerian ART-naive HIV population: a cross-sectional study. BMJ Open. 2018 Jul; 8(7): e019664. doi: 10.1136/bmjopen-2017-019664.

[16] Johnson D, Zhu L, Landim-Vieira M, Pinto JR, Chalovich JM. Basic residues within the cardiac troponin TC terminus are required for full inhibition of muscle contraction and limit activation by calcium. Journal of Biological Chemistry. 2019 Dec; 294(51): 19535-45. doi: 10.1074/jbc.RA119.010966.

[17] Huang J, Liu M, Su E, Yu P, Jiang H, Zhao J, Ge J. Elevated circulating high-sensitivity cardiac troponin t and cardiac remodeling in obesity. BMC Cardiovascular Disorders. 2021 Dec; 21: 1-8. doi: 10.1186/s12872-021-02445-0.

[18] Kaur S, Kaur S, Kaur A, Kaur S, Gupta S, Mittal S, Dhiman M. A cross-sectional study to correlate antioxidant enzymes, oxidative stress and inflammation with prevalence of hypertension. Life Sciences. 2023 Jan; 313: 121134. doi: 10.1016/j.lfs.2022.121134.

[19] Abate E, Degef M, Melkie A, Gnanasekeran N, Mehdi M, Tolcha Y, Chala D. Haematological Parameters in People with Atherosclerotic Cardiovascular Disease versus Those Who are Only at Risk for Cardiovascular Disease: A Comparative Cross-Sectional Study. Diabetes, Metabolic Syndrome and Obesity. 2023 Dec: 1869-83. doi: 10.2147/DMSO.S407480.

[20] Madadi R, Kalantari Z, Kalantari S, Makoui RH, Ahangar H, Sepehr G, Mahjani M, Mansouri K. The relationship between the severity of coronary artery disease in angiography and the incidence of short-term major cardiovascular events of patients with Covid-19 and myocardial infarction: a cross-sectional study in Iran. 2023 Feb; 1. doi: 10.21203/rs.3.rs-2579378/v1.

[21] Basuliman AS, Malabarey MA, Abousamak FW, Alyousef BY, Alrabea SS, Alshabibi RA, Al Aseri ZA. Predictive value of triglycerides to high density lipoprotein ratio in patients with first attack of acute coronary syndrome. Saudi Medical Journal. 2023 Apr; 44(4): 379. doi: 10.15537/smj.2023.44.4.20220928.

[22] Showande SJ, George OA, Adekunle OO. Gender Related Differences in the Prevalence and Correlates of Modifiable Cardiovascular Disease Risk Factors among Seemingly Healthy Adult Nigerians-A Cross Sectional Study. British Journal of Medicine and Medical Research. 2014 Jun; 4(25): 4325-40. doi: 10.9734/BJMMR/2014/8737.

[23] da Costa Teixeira F, Pereira FE, Pereira AF, Ribeiro BG. Overweight or obesity and abdominal obesity and their association with cardiometabolic risk factors in Brazilian schoolchildren: A cross-sectional study. Nutrition. 2020 Oct; 78: 110780. doi: 10.1016/j.nut.2020.110780.

DOI: https://doi.org/10.54393/pjhs.v5i04.1442

[24] Kannan P. A Cross Sectional study on Clinical Profile and Risk Factors in Female Coronary Artery Disease patients attending Chengalpattu Medical College [Doctoral Dissertation]. 2020.

[25] Ahanghar H, Heydari A, Tahrekhani M, Mohammadi M, Abdi M, Jalilvand A *et al.* Association of Troponin-I Level on Admission with 6-month Clinical Consequences in Acute Coronary Syndrome Patients: A Preventive Approach in Patient Care. Preventive Care in Nursing & Midwifery Journal. 2021 Dec; 11(4): 1-7. doi: 10.52547/pcnm.11.4.1.

[26] Neeland IJ, Poirier P, Després JP. Cardiovascular and metabolic heterogeneity of obesity: clinical challenges and implications for management. Circulation. 2018 Mar; 137(13): 1391-406. doi: 10.1161/Circulationaha.117.029617.