

Prevalence of Common Risk Factors of Cardiovascular Disease among the Patients Presenting With Chest Pain at Mayo Hospital Lahore

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ABSTRACT

Background: Cardiovascular disease is a major public health issue all over the world, particularly in the developing countries. Therefore, the increasing number of patients for reporting emergency care has been seen since last few decades. Besides the known risk factors like physical inactivity, stress, hypertension, smoking, diabetes, and psychosocial stressors, etc. There is a strong correlation between cardiovascular diseases.

Objective: This study was planned to estimate the burden of cardiovascular disease and identify risk factors among patients presenting with chest pain at emergency department of Mayo Hospital Lahore.

Methods: A Performa was designed to collect the information including demography, previous disease history etc. All patients were checked for their blood pressure, height, weight using standard procedures. ECG was done using electrocardiogram methods. Blood sample was taken to test blood sugar random, lipid profile, liver function tests, renal function tests and troponin I. Data was entered, cleaned, and analysed using a SPSS version 20.

Results: Of the total 384 patients, 67% (257) were male and 33% (127) were female. The mean age was 48.30 (± 11.09). The ECG value showed that 34.4% had ST elevation, 10.6% had ST depression, 8.5% had ventricular tachycardia or supra ventricular tachycardia and 3.2% had premature ventricular or atrial contraction was 3.2% on electrocardiogram. TROP I was positive in 53% patients including 37% males and 16% females. patients who Analysis showed a significant difference was seen for those who had psychosocial stress, fever history, smoking, hypertension, family history of CVD and diabetes (p-values <0.05).

Conclusion: Cardiovascular patients should be educated on how to maintain a healthy lifestyle in order to avoid the onset of a disease at an early age.

Introduction

The world's largest cause of mortality and disability is currently cardiovascular disease (CVD). Out of CVD 17.3 million fatalities worldwide, heart attacks and strokes, 7.3 million deaths and 6.2 million deaths were estimated by the World Health Organization

(WHO) in 2021. According to studies interstroke the most frequent risk factors for myocardial infarction (heart attack) and strokes include hypertension, diabetes, dyslipidemia, obesity, smoking, physical activity, poor food and alcohol intake. ¹ In low- and medium-sized nations the prevalence and risks of coronary

artery disease have not reduced considerably. In comparison to emerging nations, developed countries exhibited a substantial drop in mortality trends. Cardiovascular diseases are major public health issues and include stroke, cardiovascular breakdown, hypertensive coronary illness, cardiomyopathy, strange heart rhythms, inherent coronary illness, valvular coronary disease, carditis, aortic aneurism, thromboembolic, illness, and Venus thrombosis.² Cardiovascular sicknesses have a significant reason for casualty and inability the world over. Since most recent quite a few years, the paces of cardiovascular illnesses related passing's have diminished in various big-league salary nations however expanded in low-and center pay nations with around 80% of the weight. Regardless of the reality of cardiovascular illnesses in low-and center pay nations, insignificant consideration is given to the avoidance of cardiovascular infections hazard factors in South Asia, especially in Pakistan.³

Atherosclerosis is a condition that affects the arteries and aorta and is caused by restricted or absence of blood flow caused by blood vessel stenosis Atherosclerosis. Dyslipidemia, immunological issues, inflammation and endosis are multiple factors. The 3 formation of an atherosclerotic plaque. The formation of fatty line is assumed to be caused by a gradual process that begins in early infancy. As a result of the accumulation of lipid-laden macrophages (spum cells), extracellular matrix, and the aggregation and proliferation of smooth muscle cells, the atheroma plaque is formed using this approach. As this lesion progresses, apoptosis of the deep layers results in the recruitment of macrophages that can calcify and transform into atherosclerotic plaques. Coronary heart disease atherosclerosis Pathophysiology of Cardiovascular disease.⁴

Pakistan is confronting a double burden both communicable and non-communicable diseases. In 2013 worldwide weight of infection report anticipated that the 30% of the overall passing are identified with CVD.⁵ In Pakistan the pervasiveness information of cardiovascular illnesses are scanty. Two population study were directed in 1965 and 1973 which demonstrated a commonness rate for ischemic

coronary illness of 0 to 1.5% in provincial and 0.7% to 3.7% in metropolitan population of Karachi (Hashmi, 1966). It has been reported that 17.5% (1109/6351) of the populace had CVDs with 16.6% (519/3127) being male and 18.3% (590/3224) female. This examination presumed that CVDs are a significant issue for the two sexes and influenced 17.5% of the considered populace. Illnesses are more normal in females than guys with youthful time of beginning. Keeping in view above, it is important to identify the potential risk factors especially among young. We propose this study to evaluate the current prevalence and common risk factors for CVD among population of Lahore who attending a hospital related to the CVD with the help of literature review and analysis of collected data results. Also sum up the present data to realize the tendency and collective prevalence and risk factors of CVD undiagnosed CVD and pre-CVD in a common population of Lahore.⁶

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Methods

Ethical committee clearance was taken from the ethical review committee UMT Lahore. The participants were briefed about the objectives of the study and written informed consent form. The study population in this study was the patients presenting with chest pain at emergency department of mayo hospital Lahore. They were enrolled using following inclusion criteria. Adult aged between 18 to 40 years of both genders without any previous history of CVD was enrolled. The participants should have one another symptom from following chest pain radiating to left arm, jaw pain, tooth pain, upper abdominal pain, sweating etc. Those patients suffering from cancer, pregnancy, CKD, diabetes etc.

A sample size of 384 individuals was calculated using online WHO sample size calculator conceding 5% margin error and 95% confidence interval. Convenient sampling technique was used to approach the patients at emergency department mayo hospital Lahore. They were briefed about the objective of study. There informed consent was taken in written form. The patients were approached. They were briefed about the objective of the study. After taking informed consent, a detailed history was taken by standard procedures. Based on the history, all affected patients who are with presenting chest pain, and any other symptom from the following chest pain radiating to left arm, jaw pain, tooth pain, upper abdominal pain, sweating etc. After marking a questionnaire was administering and information including demography, educational status, marital status, eating behaviors, physical activity and other CVD related risk factors was assessed on a standard questionnaire. Physical measurement was done including height and weight as per standard of operating procedure and their blood pressure was checked using sphygmomanometer.

Blood Sampling: A 5ml blood was collected in labeled gel tube as per standard protocol. All blood samples were stored at +2°C to +8°C. Blood sample was collected in sodium fluoride tube for blood glucose. Blood sample was taken in clotted gel tube for the analysis of Top I. After collection, the samples were centrifuge the test tube at 1600RPM for 1 minute and were separate serum in another sample tube and stored at -4 degree grade in a refrigerator. Blood sample was used to measure the HbA1c, ALT, AST, ALP, urea, creatinine, Cholesterol and triglyceride using standard methods. 2.8

Biochemical testing: Blood Glucose; A standard colorimetric technique was used for estimating blood sugar glucose. We used an otoluidine reagent to calculate the glucose levels in the provided serum sample. First of all, three test tubes were obtained, which were designated as white, standard and test samples. Add the distillate water to the white tube and the standard 0.1 ml glucose to the standard tube and the serum to the sample tube for testing. Subsequently, I added 2 ml of o-toluidine. Each tube had 26 mingled its contents. Opening of

the aluminum-covered tube. The tubes were then immersed in a heated bath of water. After 10 minutes, the tubes were removed from the bath and cooled by tapping before being watered. Absorption 630 nm.

TROPONIN-I; A quick visual immunoassay for cardiac Troponin I detection in whole human blood was a Troponin I rapid test device. The rapid test device Troponin I had been created to detect cardiac Troponin I by visually interpreting the development of colors in the stripped. This colorful band shows a positive result. **Total bilirubin;** The Beckman coulter analyzer system was based on the quantitative total human blood and plasma bilirubin measurements (OSR6112) absorption at 570/660 nm of the bilirubin sample concentration. **Alanine Aminotransferase;** Quantitative measurement system reactive to the Beckman coulter and an analyzer for alanine amino-transferase activity in human blood or plasma (OSR6107). It was ready for use by the reagent. Lactate, ALT, and NADH, NAD⁺ are produced when the sample is combined with the reagent. At 340nm, there is a decrease in absorption (Murray, R.L., et. al 1987). **Aspartate Aminotransferase;** Aspartate aminotransferase activity reaction in human serum on Beckman coulter in the analyzer quantitative determination system (OSR6109). It was ready for use by the reagent. Aspartate aminotransferase (AST) and reagent components react and produce NAD⁺, NADH eventually. The reduction in absorption at 340 nm (Saris, et al., 1987). **Alkaline Phosphatase;** Beckman coulter system reagent in human serum and plasma for the quantitative detection of alkaline phosphates and phosphates (OSR6004). Everything was prepared to go. The absorption rate was modified by the PnP generation at 410/480 nm bichromatically and was directed to the activity of the sample (Bowers, G.N., and McComb, R.B., 1975). **Urea;** Multi-calibrator to quantify the urea levels in human serum, plasma or urine, synchronic systems have been designed. (REF442820). The urea reagent was used to measure urea concentration using an enzyme rate method. The system Synchron (s) dilutes sample urine and dilutes in the appropriate quantities the sample and reagents in a cuvette.

Creatinine: The system answers a Beckman coulter to the human serum and urine analyzer to quantify creatinine (OSR6172). In combination with the sample, the reagent was willing to respond to the measured creatinine and orange complexes. The reagent was prepared to use it as well. **Cholesterol:** System reactant on Beckman Coulter AU analyzers to detect human blood cholesterol levels (OSR6116). The spectrophotometric ally may be measured to 540/600 nm as a rose of absorption in red Quinoneimine coloration (Fredrickson et al., 1967). **Triglyceride:** The

Results

The total of 384 patients were enrolled at emergency department of Mayo hospital Lahore. Among them 256 (67%) male and 128 (33%) female and majority of them was married (77%). About 40% were self-employed, 13% labor and 36% were jobless and 11% were government employer. Among different socio-economic classes was majority was belonging to middle class 62% (Table 1).

Table 1: Demographic characteristics of the patients

Characteristics		N	%
Gender	Male	256	66.7
	Female	128	33.3
Age		48.30	11.09
Marital status	Unmarried	47	12.3
	Married	295	77.2
	Divorce	23	6.0
	Widow	17	4.5
Education	Illiterate	124	32.3
	Elementary	94	24.5
	Secondary School	109	28.4
	College or More	57	14.8
Occupation	Health Worker	19	5.0
	Govt. Employee	42	11.0
	Self-Employment	155	40.5
	Labor	48	12.5
	Jobless	138	36.0
Socio-economic Status	Upper class	38	10.0
	Middle Class	235	61.8
	Lower Class	107	28.2

reagent Beckman Coulter AU is used for the quantification of triglyceride concentrations in human serum and plasma (OSR 60118). The sample triglycerides create a chromophore, when reacting with reagent components.⁷

Data analysis: All information collected from participants was entered in excel sheet. The data was cleaved and decoded using SDSS version 20. The descriptive statistics was used to calculate the frequencies and percentages while inferential statistics was used determine the significance associated with risk factors and prevalence of CVD.

Detailed clinical history of all patients was recorded using structured questionnaire and analyzed. Analysis showed that half of the patients (55.5%) have previous history of hypertension. Similarly, 41% have previous history of diabetes, 23% have history of fever, 8% were drug addicted, 41% were smoker, and 13% were using smokeless tobacco. Half of patients (50%) had history of cardiovascular disease, only 20% of the patient were doing daily exercise (Table 3.2). About 114 patients were obese, 128 where overweight while 142 patients had normal weight.

The Mean values and Standard Deviations of blood pressure and saturation of patients given below in (Table 3).

The patients presenting with chest pain were tested using ECG. The findings showed that 43% of the patient had normal ECG, 34% had ST elevation, and 11% had ST depression, The ECG of 3% patients showing premature ventricular and atrial contractions and 9% patients showing ventricular tachycardia supra ventricular tachycardia and some other changes (Figure 1)

The blood sample were collected and tested for biochemical test including LFTs, RFTs, Lipid profile, etc. The mean values of each parameter given in (Table 4). More than half of the patients (53%) were TROP-I positive and while others (47%) were negative.

Analysis showed that there is no significant association with gender and education level however the significant difference was seen for those who are married and belonging to middle class (Table 5).

Table 2. All parameters of the Clinical history of the patients

Clinical history		N	%
Fever History	Yes	86	22.6
	No	295	77.4
Drug addict	Yes	29	7.6
	No	351	92.4
Smoking	Yes	156	40.6
	No	228	59.4
Smokeless Tobacco	Yes	51	13.4
	No	330	86.6
Family History of CVD	Yes	185	49.9
	No	186	50.1
Hypertension History	Yes	213	55.5
	No	171	44.5
History of Diabetes Mellitus	Yes	158	41.1
	No	226	58.9
Exercise	Yes	77	20.3
	No	302	79.7
Sportsman	Yes	21	5.6
	No	357	94.4
Psycho Stressor	Yes	244	63.9
	No	138	36.1

Discussion

Findings of this study showed that physical inactivity, history of high blood pressure and diabetes, are the strong predictor of cardiovascular disease. Cardiovascular diseases are a major cause of fatalities and difficulties all over the world³ and include stroke, heart disease, hypertensive coronary disease, heart deflection, curious heart rhythms, coronary valve disease, carditis, aneurysms, aortic aorta, fringe course, thromboembolic and venal thrombosis. In general, cardiovascular conditions include heart disease and cardiomyopathy.²

Table 3: Clinical presentation of the patients

Blood Pressure	Mean	Standard Deviation
Systolic BP	133.79	23.77
Diastolic BP	81.58	15.24
Saturation	92.45	3.99

Figure 1: ECG Changes

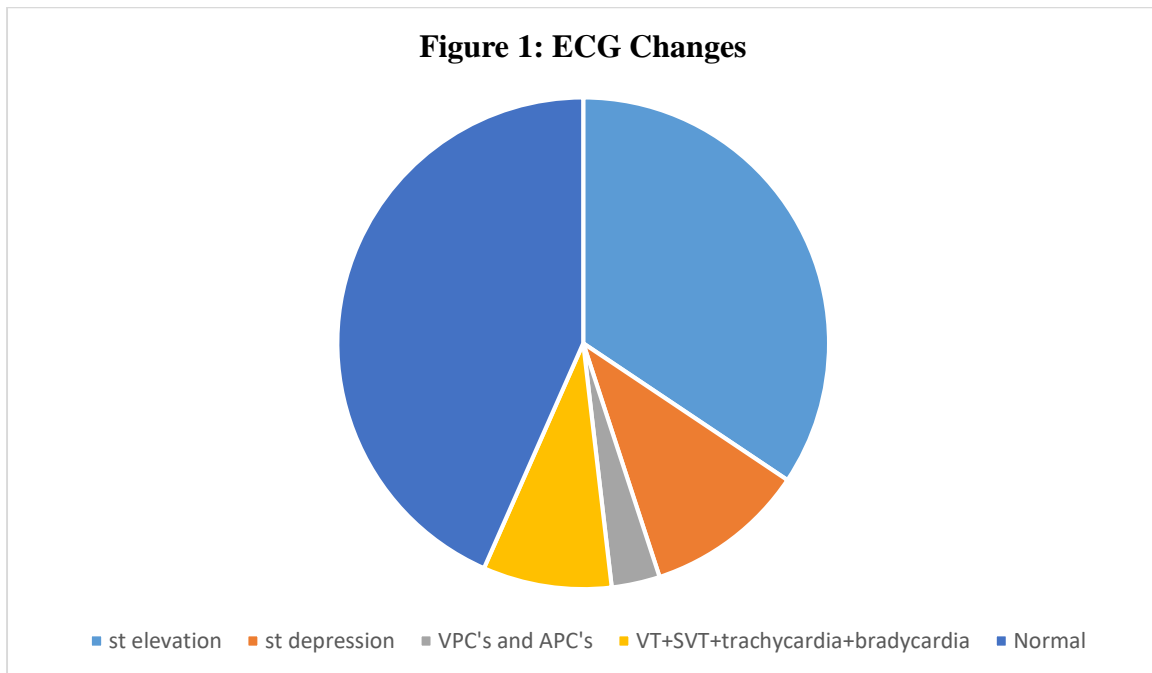


Table 4: Lab findings of the patients

Biochemical test	Units	Mean	Standard Deviation
BSL	mg/dl	179	81
HDL	mg/dl	44	18
CHOLESTROL	mmol/L	213	66
Triglyceride	mg/dl	193	58
ALT	IU/L	40	28
AST	IU/L	38	17
ALP	IU/L	158	74
Total Bilirubin	mg/dl	1.11	.7443
Urea	mg/dl	32	10
Creatinine	mg/dl	.8341	.2557

Table 5: Association of demographic characteristics with cardiovascular disease

		TROPONIN-I		P value
		Negative	Positive	
		n (%)	n (%)	
Gender	Male	113 (63.1)	143 (69.8)	0.103
	Female	66 (36.9)	62 (30.2)	
Marital status	Unmarried	33 (18.6)	14 (6.8)	0.001
	Married	137 (77.4)	158 (77.1)	
	Divorce	6 (3.4)	17 (8.3)	
	Widow	1 (0.6)	16 (7.8)	
Education	Illiterate	47 (26.3)	77 (37.6)	0.071
	Elementary	44 (24.6)	50 (24.4)	
	Secondary	60 (33.5)	49 (23.9)	
	College and above	28 (15.6)	29 (14.1)	
Occupation	Govt. Employee	18 (10.1)	24 (11.7)	0.19
	Self-Employment	87 (48.9)	68 (33.2)	
	Labor	19 (10.7)	29 (14.1)	
	Jobless	54 (30.3)	84 (41.0)	
Scio economic status	Upper class	17 (9.7)	21 (10.3)	0.01
	Middle Class	123 (69.9)	112 (54.9)	
	Lower Class	36 (20.5)	71 (34.8)	

Analysis showed that high prevalence CVDs among diabetes mellitus. It has been reported that those patients who did not take medicines lead to hyperglycemia are more prone to cardiovascular problems. Our results supported by previous studies in Iran and Pakistan.^{8, 9, 10} Another finding from this study was hyperlipidaemia which was statically significant for cardiovascular disease and those patients who had high level of cholesterol. However in a study conducted in Iran, hyperlipidemia was statistically insignificant for cardiovascular diseases.^{11, 12}

Similarly, half of the patients had a history of hypertension. Hypertension (HTN) is a well-known risk factor for cardiovascular disease in diabetic patients. Type 2 diabetes (T2DM) on the other hand, is an important risk factor for cardiovascular ailments such as atherosclerosis and heart failure. T2DM raises the risk of cardiovascular death by 4.9 times, resulting in a life expectancy decrease ranging from 5 to 15 years depending on the age of diagnosis. When T2DM is linked with HTN, the risk of getting CVD increases. Systolic blood pressure (SBP) readings of 140 mmHg or higher in T2DM patients increase the risk of coronary heart disease, stroke, and cardiovascular events and deaths from all source.¹³

It was noted that 41% were smoker while 13% were taking smokeless tobacco, Tobacco use is a significant cause of morbidity and death from cardiovascular disease (CVD). There is little evidence linking smoking to various subtypes of CVD, including fatal and non-fatal outcomes.¹⁴ Only 20% of the patient were doing daily exercise while others were physical inactive. Physical inactivity is a major risk factor for cardiovascular disease. Those patients who were doing their daily exercise regularly had less risk of

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cardiovascular disease as compare to those who were not doing their exercise regularly. So we assume that exercise is good for better health and early onset of cardiovascular disease.

Half of that patients had family history of cardiovascular disease which is alarming for population. A hypertensive individual's family history of CVD might be utilized to determine which hypertensive persons are more at risk. A CVD-related family history is an independent predictor of both myocardial infarction and stroke. Prognostic models for stroke that incorporate both hypertension and family history outperform models that just include hypertension or family history.¹⁵ Similar study was done in UNITED STATE they gave us the result that family history was not be significant for cardiovascular disease.^{16, 17} But the same time other scientist was doing research on cardiovascular disease in united states he gave us the result that family history of the patients can be significant for cardiovascular disease and family history can predict that in future person can be diseased by observing him lifestyle and physical appearance.¹⁸

Conclusion

The basis of this study shows that most people who had a significant difference in hypertension history were instructed in the common risk factors, such as exercise, physical activity, habits, and that psychosocial stressors, fever history, smoking and other non-smoke-able tobacco were also associated with a family history of cardiovascular disease. Cardiovascular patients should be educated on how to maintain a healthy lifestyle in order to avoid the onset of a disease at an early age.

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