ORIGINAL ARTICLE

Distribution of Myocardial Infarction Regarding Hypertensive, Diabetes and Gender

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ABSTRACT

Background: Coronary artery disease is the leading cause of death throughout the entire world, in Pakistan most common type of coronary disease is the myocardial infarction. Regarding the frequency of risk factors most common location of MI is anterior and inferior wall infarction in male and female, hypertensive and diabetic patients. The aims of this study was to determine the type, site, and risk factors in myocardial infarction patients associated with gender, diabetes and hypertension.

Method: cross sectional study was conducted in CCU and in cardiology ward at Lady Reading Hospital Peshawar. The duration of this study was four months i.e from March 2019 to June 2019. From 18 to 100 years old data were collected on the basis of convenient sampling technique. The data was collected through a standard performa and was analyzed through SPSS 23.

Results: Highest number of cases were found in age group 51-75 years with 60.4%. Male patients (56.8%) were more affected than females. Married persons were frequently suffered from myocardial infarction with 99.1%. Among total myocardial infarction patients 78.4% were suffered from ST segment elevation. Anterior side of heart were affected more with MI, followed by inferior side. Myocardial infarction were common among hypetensive patients. Family history of hypertension was also higher among the myocardial infarcted patients. Low level of diabetes were also found among myocardial infarcted patients. A total of the 227 infarction patients 75.3% patients having ST segment elevation were recorded on ECG.

Conclusion: Frequency of MI is higher in male, hypertensive patients and STEMI were most common type of MI, anterior and inferior wall MI is the most common location of MI among gender, diabetics and hypertensive patients. A risk factor that is extremely powerful in one nation may not be as significant in another due to differences in the incidence of risk factors in various populations.

Keywords: Coronary artery disease, myocardial infarction, type of MI, site of MI, Hypertension, Diabetes, Family History.

INTRODUCTION

Heart attack happens when blood stream to a piece of the heart stop or diminishes or stops, causing irreversible myocardial injury[1]. Mostly heart muscles injury happen because coronary conduit ailment. The complete blockage due rupturing of the atherosclerotic plaque of the coronary artery is the underlying mechanism of MI due heart tissue damage[2]. As plaques amass slowly, extreme atherosclerotic malady bringing about ≥75% coronary artery lumen occlusion does not cause a decrease in blood stream very still. Nonetheless, when myocardial interest is expanded (because of activity, irregular heart rhythm, and so forth.), the stream confinement blocks an expansion in oxygen supply coming about of causing angina pectoris or ischemia. In by far most of cases, MI results from coronary atherosclerotic illness muddled by incidental blood clotting[3].

Various tests are valuable to help with finding including coronary angiography, electrocardiograms (ECGs) and cardiac biomarkers are the test help in finding of MI[4]. The ST segment elevation an ECG mark the heart electrical activity[5]. In view of the after effects of an ECG at the point where there is the proof of MI, it might be Non ST segment myocardial localized necrosis or ST segment elevation myocardial infarction[6]. Creatine kinase MB is used less regularly and commonly blood test which is utilized incorporate troponin[4]. Together with myocardial damage, showed by a rising as well as falling example of cTn values, a diagnosis of intense of heart attack. On the off chance that myocardial ischemia is absent clinically, then raised cTn levels might be demonstrative of intense myocardial damage if the value is raised[7].

Classification of myocardial Infarction occur non ST segment myocardial infarction (NSTEMI) and ST Segment myocardial infarction (STEMI). Myocardial rot (confirm via in blood presence of heart marker; raise level of CK, Troponin T AND troponin I) without intense ST-portion rise. STEMI, Tran's mural MI) is myocardial putrefaction with ECG changes indicating ST-portion rise that isn't immediately turned around by nitroglycerin. CK, Troponin T and troponin T are also raised[8]. Heart muscles death is not only detected by cardiac enzymes and also the patients have regular chest pain[9].

The pathologic planning of an intense localized necrosis the ECG timing of an intense ischemic zone and the clinical finding may not be equivalent for both of them. Cardiovascular troponin may in any case be raised and on ECG may in any case exhibit to developing ST-T section changes (inferring an ongoing infarct) when, pathologically, the infarct is in the recuperating stage[10]. Within the sight of a clinically suitable disorder as shown by standard 12-lead ECG, has been set A working definition for intense or developing MI up by utilizing information from pathobiological shared research and clinical[11].

The characteristic of posterior heart muscles necrosis is considered in which without rise ST segment in other leads only ST-portion depression with a maximal deviation in leads V1 through V3 due to reduce blood supply to the myocardium and also show both of them[12]. Left side lower chamber also occur with intense heart muscles necrosis when seen on electrocardiography test[13]. Non ST segment elevation myocardial necrosis have no particular pattern on electrocardiogram ,sometime show ST segment downward changes also show T wave inversion. NSTMI on ECG show different pattern[14].

Age extension is a noteworthy hazard factor for creating hypertension, just as a solid stagger of its free effect on CV and renal occasions[15]. In those more established than 70 years ladies are bound to have hypertension and to endure CV diseases and myocardial localized necrosis, cardiac failure than men[16]. Progressively visit history of angina and AMI in hypertensive patients has additionally clinically as diffuse coronary atherosclerosis activate insurance new vessel formation, and restricting the spread of myocardial death and favoring the Non ST-segment myocardial dead tissue (NSTEMI)[17].

Diabetes is a multiple metabolic abnormality due to hyperglycemia over a long period of time[18]. More consequential issues incorporate heart and vascular abnormalities, stroke, prolong kidney disease, vision impairment due high blood glucose level[19].

High blood glucose level due to insufficient insulin secretion and or due to ineffective insulin secretion. Patients with high blood glucose level have either type 2 diabetes mellitus or type I diabetes mellitus. Patients with high blood glucose level due to insulin resistance and insufficient insulin level is most common[20]. The disease of the arteries supply blood to the myocardium are mostly occur due to hyperglycemic condition without other associated risk factors[21]. Atherosclerotic plaques will in general grow a lot prior, advance all the more quickly and are more diffuse in diabetic patients than in non-diabetic[22].

Diabetic patients often have multi vessel coronary artery obstruction then those which have normal blood glucose level[23]. A patients with intense heart muscles necrosis have side effects and signs characteristic of cell death of the left heart lower chamber part of the heart wall and others that is the occasion in which myocardial infarction is silent having no sign and symptom clinically[24]. Individual with high blood glucose level have repetitive heart attack to that of patients without diabetes[25]. Critical high blood glucose level is found in patients in ST segment elevation of heart muscles damage in those patients which have no any clinical record[26]. Patients with ketoacidosis which have blood glucose level independent on abnormal potassium level in blood developed ST segment heart muscles necrosis[27]. High blood glucose level patients developed cardiopathy which is in spite of the piece of plaque in the coronary artery due to diabetes and might be free of the disease of the artery supply to myocardium. Diabetic cardiopathy also independent of the reduced blood supply to myocardium and high blood pressure in arteries[28].

Mortality due to cardiac diseases are the leading cause across the globe according to world health organization[29]. Hypertensive history of the almost 40% patients with ischemic heart disease die suddenly[30]. The incidence of acute myocardial infarction (AMI) in Pakistan was reported as one hundred thousand in the year 2002[31]. CAD occurrence in one in four the aged of middle grouped adult in Pakistan[32]. In Pakistan cross sectional study cited from rural and urban area in diabetes mellitus showed 19% prevalence upon individual of 5433[33].

Mortality rate is significantly higher in patients with diabetes (2.9%) during hospitalization compared to those without diabetes (2.0%) reported [34]. At Karachi two population study were conducted in 1965 and 1973 that o-1.5% population of rural area, and 0.7-3.7% of urban population were suffered from ischemic heart disease, 4% diabetes and 10% hypertension were present[35].

(90%) Myocardial infarctions are responsible for nine factors according to the INTERHEART study report[31]. Among the Diabetics patients the coronary artery disease overall 55% frequency[36]. Currently Indian population suffered from hypertension in 3.15%[37]. In the UK it has been estimated that as compare to white people the 50% MI occur in South Asian[38]. Over 187 million population in Pakistan is a development country[39]. Heart disease is the greatest burden in rural area and the population of Pakistan (67.5%) which live in rural areas were suffered from heart disease[40]. The aims of this study was to determine the type, site, and risk factors in myocardial infarction patients associated with gender, diabetes and hypertension.

MATERIALS AND METHODS
This study was a comparative cross sectional study**.** This study was conducted in Lady Reading Hospital Peshawar. Through questionnaire data was calculated from cardiology ward and coronary care unit**.** The performa was made in order to meet the entire variable required for research topic. All the myocardial infarction patients' records were taken which meet with this research study. Information about myocardial infarction risk factor, most common site of myocardial infarction were collected from cardiology unit. From March 2019 to July 2019 .This study was taken approximately 4 months to be complete. In this study non probability/convenient technique was used. Patients presented to Lady Reading Hospital at cardiology unit with myocardial infarction information were collected through questionnaire. Some question

were asked from the patient itself and some question were filled form the patient record. Sample size of this study was 227 which was calculated by WHO calculator. The prevalence of myocardial were 18%, 95% confidence interval and 5% confidence significant. Patients are selected for this study which fulfil the inclusion criteria. Patients are selected for this study which are suffered from myocardial infarction. Data are collected from those patients which are agree to give information and data from the desirable patients are collected.

Patients which are suffered from MI, 18 years old Patients are included in this study. Patients which are admitted in Lady Reading Hospital Peshawar. Children, Patients which are not suffered from MI, Patients whose age less than 18 years, Patients which are not admitted in LRH. The results of this study are analyzed by putting all the variables in SPSS version23.

RESULTS
Among 227 myocardial infarction patients 63(27.8%) patients are in between 25-50 years of age, 137 (60.4%) patients are in between 51-75 years of age and only 27(11.9%) patients having age interval of 76-100 years of age (Table 1).

Table 1: Age of the Research Participant

Age	Frequency	Percent
25-50	63	27.8
51-75	137	60.4
76-100	27	11.9
Total	227	100.0

Among 227 myocardial infarction patients 129(56.8%) male patients were suffered from myocardial infarction and female patients were 98(43.2%) (Table 2).

Table 2: Gender of the Myocardial Infarction Patients

Gender	Frequency	Percent
Male	129	56.8
Female	98	43.2
Total	227	100.0

Among 227 myocardial infarction patients 225 (99.1%) were married and 2 (0.9%) patients were unmarried (Table 3).

Table 3: Marital Status

Marital Status	Frequency	Percent
Single	2	.9
Married	225	99.1
Total	227	100.0

Among 227 myocardial infarction patients 178(78.4%) patients were suffered from ST segment elevation myocardial infarction and 49 (21.6%) patients having non ST segment elevation myocardial infarction (Table 4).

Table 4: Type of Myocardial Infarction

Type of MI	Frequency	Percent
STEMI	178	78.4
NSTEMI	49	21.6
Total	227	100.0

Total of the 227 MI research participant 82(36.1%) were suffered from anterior wall MI,48(21.1%) suffered from inferior wall MI, 4 (1.8%) patients suffered from posterior wall MI,6 (2.6%) having lateral wall MI, 4(1.8%) patients suffered from high lateral wall MI,16 (7%) having anterolateral wall MI, 12(5.3%) patients suffered from extensive anterior wall MI,9 (4%) patients suffered from anterior-inferior wall MI, 3(1.3%) having anterior and posterior wall MI,5(2.2%) suffered from anteroseptal wall MI,2(.9%) having inferior-posterior wall MI, 8(3.5%) suffered from inferior and right ventricular infarct, 3(1.3%) having inferolateral myocardial infarction (Table 5)**.**

Table 5: Location of Myocardial Infarction

Site of MI	Frequency	Percent
Anterior	82	36.1
Posterior	4	1.8
Lateral	6	2.6
Inferior	48	21.1
High lateral	4	1.8
Anterior and lateral	16	7.0
extensive anterior	12	5.3
anterior-inferior	9	4.0
Anterior-Posterior	3	1.3
Anteroseptal	5	2.2
inferior-posterior	2	.9
Inferior and RV Infarct	8	3.5
posterior-lateral	2	.9
No	23	10.1
Inferior-Lateral	3	1.3
Total	227	100.0

Total of 227 myocardial infarction patients 158(69.6%) patients were hypertensive and 69(30.4%) patients were normotensive (Table 6).

Table 6: Hypertension

Parameter	Frequency	Percent
Yes	158	69.6
No	69	30.4
Total	227	100.0

Among 227 myocardial infarction patients 130 (57.3%) myocardial infarction patients have positive family history of hypertension and 97 (42.7%) myocardial infarction patients in total of 227 patients have no family history of hypertension (Table 7).

Table 7: Family history of hypertension

Parameter	Frequency	Percent
Yes	130	57.3
No	97	42.7
Total	227	100.0

Total of the 227 patients of myocardial infarction 109(48%) patients were suffered from diabetes and 118 (52%) patients were non diabetic (Table 8).

Table 8: Diabetes

Parameter	Frequency	Percent
Yes	109	48.0
No	118	52.0
Total	227	100.0

100 (44.1%) Patients have positive family history among the 227 myocardial infarction patients and 127 (55.9%) patients have no positive family history of diabetes (Table 9).

Table 9: Family History of Diabetes

Parameter	Frequency	Percent
Yes	100	44.1
No	127	55.9
Total	227	100.0

Table 10: Electrocardiographic Finding

Parameter	Frequency	Percent
ST Segment elevation	171	75.3
ST segment depression	19	8.4
ST Segment elevation-heart block	11	4.8
arrhythmia-st segment elevation	2	.9
ST Segment elevation-Bundle Branch Block	11	4.8
inferior-RV Infarction	1	.4
Nil	12	5.3
Total	227	100.0

Total of the 227 infarction patients 171(75.3%) patients having ST segment elevation were recorded on ECG,19(8.4%)patients have ST segment depression finding present in ECG, 11(4.8%) have ST segment elevation along with heart block,2(.9%) patients also have arrhythmia along with ST segment elevation,11(4.8%) patients have bundle branch block and ST segment elevation recorded on ECG, only 1 (.4%) patients having inferior -RV infarction and 12(5.3%) patients have no changes recorded on ECG (Table 10).

Among 227 patients 222 having wall motion abnormality and 5 patients which have no wall motion abnormality (Table 11).

Table 11: Wall Motion Abnormality

Parameter	Frequency	Percent
Yes	222	97.8
No	5	2.2
Total	227	100.0

Total of 227 myocardial infarction patients 11 (4.8%) having complete heart block, 4 (1.8%) patients were suffered from atrial fibrillation, 1 (.4%) patient having ventricular tachycardia, 1 (.4%) first degree heart block and 210 (92.5%) were not suffered from any arrhythmia (Table 12).

Table 12: Arrhythmia in Electrocardiography

Parameter	Frequency	Percent
Ventricular tachycardia	1	.4
Atrial fibrillation	4	1.8
1st degree HB	1	.4
Complete HB	11	4.8
Nil	210	92.5
Total	227	100.0

Among 227 patients of MI 3(1.3%) patients were suffered from cardiogenic shock, 6 (2.6%) patients were suffered from heart failure, 1 (.4%) patient had aortic aneurysm and 217 (95.6%) patients were not suffered from any complication (Table 13).

Table 13: Others Mechanical Complications to the Patients

Parameter	Frequency	Percent
Heart failure	6	2.6
Cardiogenic shock	3	1.3
Aneurysm	1	.4
Nil	217	95.6
Total	227	100.0

Other predisposing factor for myocardial infarction: The total of 227 myocardial infarction patients 34 (15.0%) were smokers, 3(1.3%) patients having high LDL level, 9 (4.0%) myocardial infarction patients were physical inactivity, 29 (12.8%) were in stress full condition, 7 (3.1%) patients were sunup addict, 5(2.2%) patients were in stress full condition also used sunup, 6 (2.6%) patients were smoker and also in stress, 1 (.4%) having high LDL level and smoker, 1 (.4%) suffered from high LDL level and was sunup addict and 132 (58.1%) were not expose to these factors (Table 14).

Table 14: Other Risk Factor

Factors	Frequency	Percent
Smoking	34	15.0
High LDL	3	1.3
Physical inactivity	9	4.0
Stress	29	12.8
NILL	132	58.1
Sunup	7	3.1
sunup-stress	5	2.2
smoking-high LDL	1	.4
Smoking-stress	6	2.6
High LDL-Sunup	1	.4
Total	227	100.0

Among 227 myocardial infarction patients 98 (42.2%) patients were house wife, 22(9.7%) patients were former, 6 (2.6%) patients were shopkeeper, 5(2.2%) patients having teacher profession, 12

(5.3%) were driver, 1 (0.4%) patient was engineer, and 83 (36.6%) patients having other occupation (Table 15).

Table 15: Occupation of the Patients

Occupation	Frequency	Percent
Shopkeeper	6	2.6
Former	22	9.7
Teacher	5	2.2
Engineer	1	.4
Driver	12	5.3
Housewife	98	43.2
Others	83	36.6
Total	227	100.0

Among 227 studied population, 129(56.8%) were males in which 82.9% patients were suffered from ST segment elevation myocardial infarction and 17.1% patients were suffered from Non ST segment elevation myocardial infarction. Rest of the patients were female 98(43.2%) in which 78.4% females were suffered from ST segment elevation myocardial infarction and 21.6% patients having Non ST segment elevation myocardial infarction so that the % of the STEMI type is higher in male patients then female and the NSTEMI % were higher in female then male patients. (The chi square test is significant P value is .05) (Table 16).

Table 16: Gender of the Patients and Type of Myocardial Infarction Cross Tabulation

Parameter			STEMI	NSTEMI	Total
Gender of the patient	Male	Count	107	22	129
		% within Gender of the patient	82.9%	17.1%	100.0%
		% of Total	47.1%	9.7%	56.8%
	Female	Count	71	27	98
		% within Gender of the patient	72.4%	27.6%	100.0%
		% of Total	31.3%	11.9%	43.2%
Total		Count	178	49	227
		% within Gender of the patient	78.4%	21.6%	100.0%
		% of Total	78.4%	21.6%	100.0%

On 227 myocardial infarction patients chi square test was applied which showed that test is highly significant having P value is 0.042 & showed that the myocardial infarction location is associated with gender differences. Among the 227 MI patients most conmen type of MI in 129(56.8%) male MI patients and 98 (43.2%) female patients. Most common type of MI among the 129 (54.8%) male patients most 54(23.8%) having anterior wall MI and 30(13.2%) male patients suffered from inferior wall MI and most common types of MI in 98(43.2%) female patients 34 (15%) having anterior wall MI and 18 (7.95) were suffered from inferior wall MI and the other type of MI rarely occur (Table 17).

Table 17: Association between locations of MI & Gender

Parameter	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	24.285a	14	.042
Likelihood Ratio	28.557	14	.012
Linear-by-Linear Association	2.784	1	.095
N of Valid Cases	227		

(The P value of fisher exact test is 0.028) which Showed that location of MI were highly associated with hypertension. Total of the 227 patients 158 (69.6%) patients were hypertensive and 69(30.4%) patients were normotensive. Among the 158 (69.6%) hypertensive patients 65 (28.6%) patients were suffered from anterior wall MI and 29 (12.8%) patients were suffered from inferior wall MI. Among the

69 (30.4%) normotensive patients 23(10.1%) having anterior wall MI and 19(8.4%) patients suffered from inferior wall MI and the other types of MI rarely occurred (Table 18). Total 227 MI patients 100 (44.1%) were diabetic and 127 were non diabetic. Among the 100 diabetic patients 30(13.2%) were suffered from anterior wall MI, 24 (10.6%) were from inferior wall MI. Among 127 non diabetic 58(25.6%) were suffered from anterior wall MI and 24(10.1%) were suffered from inferior wall MI. The Fisher Exact test is significant which show that location of MI is associated with diabetes. (The P value of fisher exact test is 0.056) (Table).

Table 18: Association of MI with Hypertension

Parameter	Value	Df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	24.893a	14	.036	.026		
Likelihood Ratio	28.832	14	.011	b		
Fisher's Exact Test	22.855			.028		
Linear-by-Linear Association	.166c	1	.683	.688	.351	.012
N of Valid Cases	227					

A 20 cells (66.7%) have expected count less than 5. The minimum expected count is .30.
B Cannot be computed because there is insufficient memory.
C The standardized statistic is -.408.

DISCUSSION

In the Indo-Pakistan subcontinent mortality rate have a greater burden that is high due to CAD and the Indo-Asian population have a high burden of CAD[41]. Data from 227 myocardial infarction patients were collected to find out distribution of MI and to rule out most common location of MI among gender, hypertension and diabetes. This study was conducted in leady reading hospital Peshawar. The parameters which were studied included age, gender, types of MI, location of MI, hypertension, diabetes, marital status, smoking history, LDL level, stress, physical inactivity.

In this study 56.8% were males and 43.2% were females patients were suffered from Myocardial infarction. Also the study conducted by Khan et al., that 56.6% were male and 43.4% were female patients of MI. Both of these study confirm that MI mostly occurred in male gender[42]. Among 227 research participant, 27.8% were from age group 25-50 years, 60.4% were from age group 51-75 years which is supported Khan et al., study which found that most of the MI patients were older than 61 years[42]. In this study among 227 MI patients 69.6% were hypertensive and 30.4% were normotensive patients, 48% were diabetics and 52% having non diabetics. 15% were smoker, 4% were physically inactive, and 12.8% were physically stressed. The study conducted all over the provinces of Pakistan by Khan et al., found that 77.1% patients were hypertensive, 70.6% were suffered from diabetes mellitus, 51.1% were smoker and 42.2% were physically inactive patients[42].

Among 227 research participant 78.4% showed STEMI and 21.6% were having NSTEMI. This study was supported as 45% patients were suffered from STEMI and 16% were NSTEMI patients[42]. Total of the 227 myocardial infarction (75.3%) patients having ST segment elevation were recorded on ECG (8.4%) patients having ST segment depression, 4.8% having ST segment elevation long with heart block, 4.8% having along with ST segment elevation bundle branch block was recorded. Study conducted in a tertiary care Karachi Hospital support this study that ST segment elevation occurred in (54%) patients, ST segment depression occurred in (45%) patients and (4%) patients having bundle branch block were recorded[43].

Among the (69.6%) hypertensive MI patients were (28.6%) anterior wall MI and while in (30.4%) normotensive patients were suffered from (10.1%) anterior wall MI.S Bruki at al conducted such type of study in which most commonly anterior wall MI occurred in

hypertensive patients (55.7%) then in patients which is normotensive patients(43.6%) p=0.047[44].

Among the 227 MI among the diabetic patients ECG recorded 13.2% anterior wall MI and 10.6% were suffered from inferior wall MI , in non-diabetics 25.6% anterior wall MI and 10.1% were suffered from inferior wall MI. Ahmad et al., studied that diabetic patients having (65.8%) anterior wall MI and (25.2%) inferior wall MI, in non-diabetic patients (64.9%) anterior wall MI and (23.9%) were inferior wall MI[45].

Most common site of MI among (56.8%) male patients were suffered from (23.8%) anterior wall MI and second most common site of MI (13.2%) were inferior wall MI. Among the (43.2%) female patients most common site of MI (15%) anterior wall MI and second most common site of MI were (7.95%) inferior wall MI. This study was supported by Ahmad et al., which diagnosed that among (64.4%) male patients (65.8%) were suffered from anterior wall MI and (26%) male patients were suffered from inferior wall MI which were most common site in his study[33]. Among (43.2%) female patients of MI diagnosed from ECG in which most common site of MI in female patients were (15%) anterior wall MI and (7.95%) were suffered from inferior wall MI. This study was supported by Ahmad at al concluded that female patients (64%) suffered from anterior wall MI and (23.5%) having inferior wall MI[45].

In this study types of MI were diagnosed in which among the 56.8% male patients having 82.9% STEMI type of MI and 17.1% NSTEMI type of MI were found ,among the 43.2% female patients having 72.4% STEMI type of MI and 27.6% NSTEMI type of MI were diagnosed. This studied was correlate with Ahmad et al.,.They were studied that STEMI male patients were 79.5% and 8.69% were NSTEMI,64% STEMI patients were female and 22.4% NSTEMI patients were female[45].

CONCLUSIONS

It is concluded that frequency of myocardial infarction is higher in male and more common in 51-75 years of age people. It is concluded that hypertension is a major risk factor. ST segment elevation myocardial infarction (STEMI) is more common male and NSTEMI type is more common in female participant. Most common site of myocardial infarction is anterior wall and inferior wall. This study concluded that most common site of MI in male and female, diabetes mellitus and hypertensive patients were anterior and inferior wall myocardial infarction. In STEMI patients bundle branch block is more common.

This study is only applicable in LRH Peshawar because this study conducted only at LRH. This study cannot be generalized to all over the Pakistan .To generalized this study multiple center and large sample size needed. This study was cross sectional study. Another limitation of this study male and female ratio (M:F) was not equal, most important limitation was equal number of diabetic and non- diabetic ,equal number of hypertensive and normotensive due to shortage of time this ratio was not achieved.

Arrange cardiac rehabilitation program to educate the people and stress management component. Patients who are hypertensive check their blood pressure and take the antihypertensive medicine routinely. Avoid smoking, eat healthy diet and reduce the stressful situation.

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