

## ORIGINAL ARTICLE

## MODIFIABLE RISK FACTORS IN DIAGNOSED CASES OF ACUTE ST ELEVATION MYOCARDIAL INFARCTION IN YOUNG PATIENTS PRESENTING AT TERTIARY CARE HOSPITAL IN PESHAWAR

Syed Akbar<sup>1</sup>, Jabar Ali<sup>1</sup>, Wasim Sajjad<sup>1</sup>, Noor Faraz<sup>1</sup>, Rahid Ayaz<sup>1</sup>, Asma Iqbal<sup>1</sup>

<sup>1</sup>Lady Reading Hospital, Peshawar, Pakistan

**Objectives:** The objective of this study was to determine the frequency of modifiable risk factors in young patients diagnosed with acute ST elevation myocardial infarction (STEMI).

**Methodology:** A cross-sectional study was conducted at the cardiology department of Lady Reading Hospital, Peshawar. A total of 236 patients presented with acute STEMI, between 18 to 50 years of age of either gender were included. All the included patients were subjected to detailed history and clinical examination and modifiable risk factors were observed.

**Results:** Out of 236 patients, 42 (18%) patients were in age range 18-30 years and 194 (82%) patients were in age range 31-50 years. Mean age was 42±9.77 years, 156 (66%) patients were male. In total, 90 (38%) patients had sedentary lifestyle, 45 (19%) patients had positive history of atrial fibrillation. More over 92 (39%) patients were diabetic, 153 (65%) patients were hypertensive, 99 (42%) patients were smokers, 73 (31%) patients had dyslipidaemia, and 64 (27%) patients were obese.

**Conclusion:** It has been observed that modifiable risk factors were prevalent in a vast majority of the young patients presenting with acute STEMI. Among these, sedentary lifestyle, smoking, obesity, and metabolic risk factors such as diabetes and dyslipidaemia need immediate attention.

**Keywords:** diabetic mellitus, hypertension, smoking, dyslipidemia, obesity, ST elevation myocardial infarction

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### INTRODUCTION

Cardiovascular disease is the commonest reason of death throughout the world. Cardiovascular disease is responsible for more than 100,000 deaths every year. The situation is same in Pakistan where it is estimated that almost one in five adults is having some element of cardiovascular disease.<sup>1-3</sup> Myocardial infarction occurs due to the necrosis of myocardial tissue as a result of ischemia. It is more aptly a part of a spectrum of cardiovascular diseases referred to as acute coronary syndrome (ACSs). It includes ST-elevation MI (STEMI), non-STEMI, and unstable angina.<sup>4,5</sup>

The identification of people who are at an elevated risk of death remains an issue in the management of STEMI and the stratification of risk is key to the management.<sup>6</sup> A major Canadian-led global study in 52 countries has successfully recognized some easily identifiable risk factors which includes smoking, abnormal blood lipid levels, hypertension, diabetes mellitus, obesity, diet, physical activity, alcohol

consumption, that make up the majority of the risk factors for acute myocardial infarction.<sup>7</sup>

The INTERHEART investigators found no geographical or racial/ethnic variation and these risk factors were consistent in both men and women.<sup>8,9</sup> One of the local study conducted at Karachi shows that risk factors in STEMI patients contain 35% diabetes mellitus, 45% hypertension, 41% smoking and 33% of dyslipidemia.<sup>10</sup> The risk of myocardial infarction is reduced with control in hypertension, dyslipidemia and cessation of smoking.<sup>11</sup>

The rationale of the study is to calculate the frequency of modifiable risk factors in patients presenting with ST-elevation acute myocardial infarction. There is intense need for such studies in order to identify the common modifiable risk factors for ST-elevation acute myocardial infarction in this part of the world so that they can be targeted at an earlier stage and managed rigorously to reduce its incidence and prevalence. We felt the need of national representative data in this regards, hence in this study our aim was to

contribute data regarding the modifiable risk factors in young patients diagnosed with a STEMI in our parts of the country.

## METHODOLOGY

Ethical approval for the study was taken from the ethical committee and verbal consent for participation in the study was also obtained from all the patients. The study was conducted at the inpatient section of the cardiology department of Lady Reading Hospital, Peshawar from 26<sup>th</sup> August, 2020 to 26<sup>th</sup> Mar, 2021.

This descriptive cross-sectional study included consecutive patients in accordance with the study inclusion criteria; patients diagnosed with STEMI of both genders between the ages of 18 and 50. Patients with previous percutaneous coronary intervention (on the basis of history), previous coronary artery bypass surgery (on the basis of history) and chronic renal failure (on the basis of ultrasound) were not included in the research. All the patients fulfilling the inclusion criteria were enrolled in this research from emergency department of cardiology. Diagnosis for STEMI was made based on the presenting history of typical chest pain (for at least 20 minutes) and 12-lead ECG findings consistent with that of STEMI (evaluated by the consultant cardiologist).

Data for this study were collected using a structured proforma. Proforma consisted of demographic characteristics and modifiable risk factors which included gender, age, body mass index (BMI), sedentary lifestyle (less than 30 minutes of daily physical activity), diabetic mellitus (history of diagnosis with or without anti-diabetic medications), hypertension (history of diagnosis with or without anti-hypertensive medications), smoking (history of smoking at least 10 cigarette a day for more than a year or use of huqqa/shisha at least once a day for more than one year), dyslipidemia, and obesity (BMI > 30kg/m<sup>2</sup>).

The data were analysed using IBM SPSS version 22. Mean  $\pm$  standard deviation (SD) was calculated for continuous variable like age, weight, height, BMI. Frequency and percentages were calculated for categorical variables like gender, sedentary lifestyle, and modifiable risk factors (diabetic mellitus, hypertension, smoking, dyslipidemia, obesity). Modifiable risk factors were stratified among age and gender to see the effect modifications. Post-stratification, Chi-square test was applied with p-value  $\leq 0.05$  was considered significant.

## RESULTS

The study included 237 patients of which 156 (66%) patients were male, 42 (18%) patients were in age range 18-30 years and mean age was 42 $\pm$ 9.77 years. The BMI >25 kg/m<sup>2</sup> was observed in 97 (41%) patients. A total of 146 (62%) patients had sedentary lifestyle and 45 (19%) patients had positive history of atrial fibrillation. Among other modifiable risk factors, 92 (39%) patients were diabetic, 153 (65%) patients were hypertensive, 99 (42%) patients were smokers, 73 (31%) patients had dyslipidemia, and 64 (27%) patients were obese as presented in Table 1.

**Table 1: Distribution of demographic characteristics and modifiable risk factors among young patients with STEMI**

	Frequency	Percentage
<b>Age</b>		
18-30 years	42	18%
31-50 years	194	82%
<b>Gender</b>		
Male	156	66%
Female	80	34%
<b>Body mass index</b>		
<25kg/m <sup>2</sup>	139	59%
>25kg/m <sup>2</sup>	97	41%
<b>History of atrial fibrillation</b>		
Yes	45	19%
No	191	81%
<b>Modifiable risk factors</b>		
Sedentary lifestyle	90	38%
Diabetes mellitus	92	39%
Hypertension	153	65%
Smokers	99	42%
Dyslipidemia	73	31%
Obesity	64	27%

We observed no statistical differences in the distribution of modifiable risk factor among male and female patients, as presented in Table 2.

**Table 2: Distribution of risk factors by gender**

	Gender		P-value
	Male	Female	
<b>Total (N)</b>	<b>156</b>	<b>80</b>	-
<b>Diabetes Mellitus</b>			
Yes	39.1% (61)	38.8% (31)	0.958
No	60.9% (95)	61.3% (49)	
<b>Hypertension</b>			
Yes	64.1% (100)	66.3% (53)	0.7436
No	35.9% (56)	33.8% (27)	
<b>Smoking</b>			
Yes	41.7% (65)	42.5% (34)	0.9022
No	58.3% (91)	57.5% (46)	
<b>Dyslipidemia</b>			
Yes	30.8% (48)	31.3% (25)	0.9397
No	69.2% (108)	68.8% (55)	
<b>Obesity</b>			
Yes	26.9% (42)	27.5% (22)	0.9248
No	73.1% (114)	72.5% (58)	

Similarly, we observed no statistical differences in the distribution of modifiable risk factor among patients between 18 to 30 years of age versus 31 to 50 years of age, as presented in Table 3.

**Table 3: Distribution of risk factors by age**

	Age		P-value
	18-30 years	31-50 years	
<b>Total (N)</b>	<b>42</b>	<b>194</b>	-
<b>Diabetes Mellitus</b>			
Yes	40.5% (17)	38.7% (75)	0.958
No	59.5% (25)	61.3% (119)	
<b>Hypertension</b>			
Yes	66.7% (28)	64.4% (125)	0.7436
No	33.3% (14)	35.6% (69)	
<b>Smoking</b>			
Yes	45.2% (19)	41.2% (80)	0.9022
No	54.8% (23)	58.8% (114)	
<b>Dyslipidemia</b>			
Yes	31% (13)	30.9% (60)	0.9397
No	69% (29)	69.1% (134)	
<b>Obesity</b>			
Yes	28.6% (12)	26.8% (52)	0.9248
No	71.4% (30)	73.2% (142)	

## DISCUSSION

Recent clinical studies in our local population have reported alarmingly steep rise in the number of premature and young cases of acute myocardial infarction.<sup>12-15</sup> Most of these studies have reported a significant burden of modifiable risk factors in these young patients. For example a study conducted by Khan KA et al.<sup>14</sup> evaluated age distribution of patients with acute coronary syndrome and reported 2.1% of the patients between 20 to 30 years, 4.03% between 30 to 35 years of age, and 16.1% between 36 to 45 years of age, collectively making up 22.2% of the patients in  $\leq 45$  years of age bracket. Another study by Batra MK et al.<sup>15</sup> reported 12% of under 40 years patients in a typical clinical sample of patients with acute myocardial infarction. Considering the clinical as well as socio economic implications of increasing burden of young CVD, it is important to identify and tackle the pre-disposing risk factors in this particular population. In the absence of mass level national databases, the clinical studies can provide us the glimpse of distribution of modifiable pre-disposing risk factors of CVD in our young population. Therefore, in this clinical study we evaluated the distribution of modifiable risk factors in young patients presented to a cardiac hospital in Peshawar, Khyber Pakhunkhwa, with acute myocardial infarction. Our study showed that among 236 patients with STEMI, the modifiable risk factors were highly prevalent such as sedentary lifestyle, obesity, diabetes, hypertension, and dyslipidaemia. Moreover, these modifiable risk factors were equally prevalent in both

the genders and event in very young (under 30 years) age group.

Previously, young CVD has been reported to be associated with male gender, smoking behaviour, and family history of CVD, while, the conventional risk factors such as hypertension, diabetes, and metabolic syndrome were reported less commonly among young patients.<sup>15</sup> Additionally, overweight/obesity, current smoking, use of smokeless tobacco especially gutka were the additional potential predisposing risk factors.<sup>14</sup> When evaluated, young patients were frequently observed to have single vessel involvement, recanalized vessels, involvement of proximal segment of left anterior descending artery (LAD) with type B lesion along with better prognosis after coronary intervention as compared to their older counterpart.<sup>14,16</sup>

A distinctive role of gender has been well reported in the literature, it is a common observation that premature CVD or CVD event at young ages is relatively lesser common among females, an average difference of 10 years has been reported in the age of male and female patients at the time of occurrence of event.<sup>17-19</sup> Comparatively, female patients were observed to have higher prevalence of conventional CVD risk factors such as hypertensive, diabetic, and obese, frequent late presentation after symptom onset, and higher angiographic finding of three vessel disease.<sup>16,17</sup> All of these factors have contributed to the prognostic role of female gender with an increased risk of adverse outcomes after coronary intervention.<sup>16-22</sup> Converse to the local norms, an equal proportion of smoking among females as male counterparts in this particular population can be attributed to the cultural acceptability of domestic use of huqqa in this population.

Observational nature, limited sample size, and variability in definition of assessment of various risk factors as well as criteria used of categorizing a patient as young remained the main limitations for the generalizability of findings of this study.

## CONCLUSION

It has been observed that modifiable risk factors were prevalent in a vast majority of the young patients presenting with acute STEMI. Among these, sedentary lifestyle, smoking, obesity, and metabolic risk factors such as diabetes and dyslipidaemia need immediate attention.

## AUTHORS' CONTRIBUTION

SA and JA: Concept and design, data acquisition, interpretation, drafting, final approval, and agree to be

accountable for all aspects of the work. WS, NF, RA, and AI: Data acquisition, interpretation, drafting, final approval and agree to be accountable for all aspects of the work.

**Conflict of interest:** Authors declared no conflict of interest.

## REFERENCES

1. Hedayatnia M, Asadi Z, Zare-Feyzabadi R, Yaghooti-Khorasani M, Ghazizadeh H, GhaffarianZirak R, et al. Dyslipidemia and cardiovascular disease risk among the MASHAD study population. *Lipids Health Dis.* 2020;19(1):1-11.
2. Shah I, Hafizullah M, Shah ST, Gul AM, Iqbal A. Comparison of the efficacy and safety of thrombolytic therapy for ST-elevation myocardial infarction in patients with and without diabetes mellitus. *Pak Heart J.* 2012;45(01):33-8.
3. Zhang Z, Fang J, Gillespie C, Wang G, Hong Y, Yoon PW. Age-specific gender differences in in-hospital mortality by type of acute myocardial infarction. *Am J Cardiol.* 2012;109:1097-103.
4. Antman EM, Localzo J. ST-segment elevation myocardial infarction. In: Kasper DL, Hauser SL, Jameson JL, Fauci AS, Longo DL, Localzo J. *Harrison's Principles of Internal Medicine.* 19th ed. New York: The McGraw-Hill companies. 2015.p.1599-611.
5. Lawler PR, Filion KB, Eisenberg MJ. Efficacy of exercise-based cardiac rehabilitation post-myocardial infarction: a systematic review and meta-analysis of randomized controlled trials. *Am Heart J.* 2011;162(4):571-84.
6. Antman EM, Localzo J. Ischemic heart disease. In: Kasper DL, Hauser SL, Jameson JL, Fauci AS, Longo DL, Localzo J. *Harrison's Principles of Internal Medicine.* 19th ed. New York: The McGraw-Hill companies. 2015.p.1578-92.
7. Wong ND. Epidemiological studies of CHD and the evolution of preventive cardiology. *Nature Reviews Cardiol.* 2014;11:276-89.
8. Yusuf S Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study)". *Lancet.* 2004.364:937-52.
9. Steg G, James SK, Atar D, Badano LP, Borger MA. ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. *Eur Heart J.* 2012;33:2569-619.
10. Saleh U, Ali SS. Risk Factors in Patients with Acute ST Elevation Myocardial Infarction; a Survey in a Tertiary Care Government Hospital, NICVD, Karachi, Pakistan. *Int J Cardiol.* 2013;11(2):1-7.
11. Malik R, Begum S, Afridi MN. Acute myocardial infarction; frequency of modifiable risk factors. *Profe Med J.* 2016;23(3):293-7.
12. Adam AM, Rehan A, Waseem N, Iqbal U, Saleem H, Ali MA. Prevalence of conventional risk factors and evaluation of baseline indices among young and elderly patients with coronary artery disease. *J Clin Diagn Res.* 2017;11(7):OC34-OC39.
13. Ashraf A, Ashraf S. Conventional cardiovascular risk factors associated with acute coronary syndrome in female patients admitted in cardiology department Khyber Teaching Hospital Peshawar. *Khyber Med Uni J.* 2012;4(2):64-9.
14. Khan KA, Khan MN, Kumar R, Shah JA, Batra MK, Kumar D, et al. A surge in prevalence and factors affecting early onset acute coronary syndrome. *Signa Vitae.* 2021;1(8):63-70.
15. Batra MK, Rizvi NH, Sial JA, Saghir T, Karim M. Angiographic characteristics and in hospital outcome of young patients, age up to 40 versus more than 40 years undergoing primary percutaneous coronary intervention. *J Pak Med Assoc.* 2019;69:1307-11.
16. Khan KA, Kumar D, Shaikh AH, Khowaja S, Ali M, Bhattachi KI, et al. Impact of Gender on the Clinical Features, Angiographic Findings, and Outcomes of Young Patients Presented with Acute Coronary Syndrome. *Pak Heart J.* 2021;54(4):321-7.
17. Afaque SM, Muhammad AS, Kumar M, Aamir KF, Ahmed A, Soomro NA, et al. Gender-based Differences in Clinical Profile and Outcome of Primary Percutaneous Coronary Intervention in Patients with ST-Segment Elevation Myocardial Infarction. *Pak Heart J.* 2021;54(3):254-60.
18. Zachura M, Wilczek K, Kurzawski J, Gierlotka M, G?si?r M, Sadowski M. Gender-related differences in men and women with ST-segment elevation myocardial infarction and incomplete infarct-related artery flow restoration: a multicenter national registry. *Postepy Kardiol Interwencyjne.* 2018;14(4):356.
19. Ghaffari S, Pourafkari L, Tajlil A, Bahmani-Oskoui R, Nader ND. Is female gender associated with worse outcome after ST elevation myocardial infarction? *Indian Heart J.* 2017;69:S28-S33.
20. Venetsanos D, Lawesson SS, Alfredsson J, Janzon M, Cequier A, Chettibi M, et al. Association between gender and short-term outcome in patients with ST elevation myocardial infarction participating in the international, prospective, randomised Administration of Ticagrelor in the catheterisation Laboratory or in the Ambulance for New ST elevation myocardial infarction to open the Coronary artery (ATLANTIC) trial: a prespecified analysis. *BMJ Open.* 2017;7(9):e015241.
21. Mahajan K, Negi PC, Merwaha R, Mahajan N, Chauhan V, Asotra S. Gender differences in the management of acute coronary syndrome patients: One year results from HPIAR (HP-India ACS Registry). *Int J Cardiol.* 2017;248:1-6.
22. Bugiardini R, Ricci B, Cenko E, Vasiljevic Z, Kedev S, Davidovic G, et al. Delayed care and mortality among women and men with myocardial infarction. *J Am Heart Assoc.* 2017;6(8):e005968.

## Address for Correspondence:

**Dr. Jabar Ali**, Assistant Professor Lady Reading hospital, Peshawar, Karachi, Pakistan.

**Email:** [dr.jabarali78@gmail.com](mailto:dr.jabarali78@gmail.com)