

RISK FACTORS OF ACUTE MYOCARDIAL INFARCTION AMONG PATIENTS ADMITTED IN CARDIOLOGY UNIT OF A TERTIARY CARE HOSPITAL

Sadaf Bukhari,¹ Ghulam Mustafa,² Asad Ullah³

ABSTRACT

Background: Acute myocardial Infarction is one of the most common causes of death in developed countries. **Objective:** To determine the risk factors of acute myocardial infarction and time of attack among patients admitted in cardiology unit. **Methodology:** Study site: Sheikh Zayed Medical college/ Hospital, Rahim Yar Khan. Study Subjects: 112 cases of acute myocardial infarction admitted in coronary care unit and 162 controls selected from attendants of cases. Study Design: Case Control Study. Study Duration: 1st October 2014 to 30th April 2015. Sample Size: A total of 324 subjects were included in this study, 162 cases, having acute myocardial infarction and 162 controls, selected from attendants of patients of the same age group. Patients of acute myocardial infarction of either sex admitted in coronary care unit of Sheikh Zayed Medical College/ Hospital, Rahim Yar Khan. Patients having Liver disease, Renal diseases, Thyroid disease, Valvular Heart Disease, Cardiomyopathies, COPD and neurological disease. Variables included was age, Sex, Socioeconomic status, Education, BMI, Residence (Rural/Urban), Hypertension, Diabetes mellitus, Ischemic heart disease, Hyperlipidemia, Smoking, Time of onset of chest pain and obesity. Data analysis was done by using SPSS version 20. Numerical variables like Age, BMI, Height and Weight were presented as Mean and Standard deviation whereas categorical variables like Sex, Hypertension, Diabetes mellitus, Smoking were presented as percentages. Chi Square test was applied to determine the association of different risk factors with Acute Myocardial Infarction. Ethical approval was sought from Institutional Review Board of the hospital. Informed verbal consent was sought from every study subject before data collection. **Results:** The risk factors association assessed was; rural residence 78 (58%), (P value=0.01), Retired persons 16 (80%), (P value=0.000), Businessman 22 (69%), (P value=0.000), Hypertension 67 (64%), (P value=0.000) Smoking 70 (64%), (P value=0.000), Family history, Hypercholesterolemia 11 (91%), (P=0.003) and Sedentary life style 103 (60%), (P value=0.000). **Conclusion:** Our study showed that; rural residence, retired person, businessman, smoking, hypertension, family history hypercholesterolemia, sedentary lifestyle, were significantly associated with acute myocardial infarction. It was noted that 12am-8am was most frequent time of acute Myocardial Infarction episode. **Keywords:** Risk factors, Acute Myocardial Infarction, Residence (Rural/ Urban), Time of Onset of chest pain.

INTRODUCTION

Acute myocardial Infarction is one of the most common causes of death in developed countries.¹ In recent years the incidence of Cardiovascular disease (CVD) has been tremendously increased with some of the most important precipitating causes such as aging, western life styles and urbanization.^{1,2} According to World Health Report which was published in 1999, it was estimated that in 1998, 78% risk of Non Communicable Diseases and 85% risk of the CV was mainly predominant in developing and underdeveloped countries.^{2,3} The Cardiovascular Diseases significantly affect both men and women. According to statistical data cardiovascular diseases have been one of the most significant causes of death causing for 34% of all deaths in females and 28% in males in 1998. Because such diseases have become more common with time, as community based inclination in both developed and developing countries have made poor people more vulnerable target.^{3,4,5} Multiple risk factors such as hyperlipidemia, obesity and sedentary life style have been noticed as the most important precipitating factors, for increase in risk of

developing an acute myocardial infarction (AMI).^{5,6} In previous studies it was also noted that several other factors such as age, psychological discomfort and physical exertion also play a precipitating role in causing AMI.^{6,7,8} So the main purpose of this study was to determine the risk factors and time of attack among acute coronary syndrome patients, admitted in a tertiary care hospital of Pakistan.

METHODOLOGY

Study site: Sheikh Zayed Medical College/ Hospital, Rahim Yar Khan. Study Subjects: Case control of acute myocardial infarction admitted in CCU and controls selected from their age matched and attendants. Study Design: Case Control Study Study Duration: 1st October 2014 to 30th April 2015. A total of 324 subjects were included in this study 162 cases, having acute myocardial infarction and 162 controls, selected from attendants of patients of the same age group. Inclusion Criteria: Patients of acute myocardial infarction of either sex admitted in coronary care unit of Sheikh Zayed Medical College/ Hospital, Rahim Yar Khan. Exclusion Criteria: patients having Liver disease, Renal diseases, Thyroid disease, Valvular Heart Disease,

1. Department of Cardiology, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan, University of Health Sciences Lahore, Pakistan.

2. Department of Community Medicine, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan, University of Health Sciences Lahore, Pakistan.

3. House Officer, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan, University of Health Sciences Lahore, Pakistan

Correspondence: Dr. Sadaf Bukhari, PGR, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan, Pakistan

Email: bukharis044@gmail.com Received: 22-02-2018

Accepted: 23-04-2018

Cardiomyopathies, COPD and neurological disease. Variables included were Age, Sex, Socioeconomic status, Education, BMI, Residence (Rural/Urban), Hypertension, Diabetes mellitus, Ischemic heart disease, Hyperlipidemia, Smoking, Time of Onset of Chest pain and Obesity. Data analysis was done by using SPSS version 20. Numerical variables like Age, BMI, Height and Weight were presented as Mean and Standard deviation whereas categorical variables like Sex, Hypertension, Diabetes mellitus, Smoking were presented as percentages. Chi Square test was applied to determine the association of different risk factors with Acute Myocardial Infarction. Ethical approval was sought from Institutional Review Board of the hospital. Informed verbal consent was sought from every study subject before data collection.

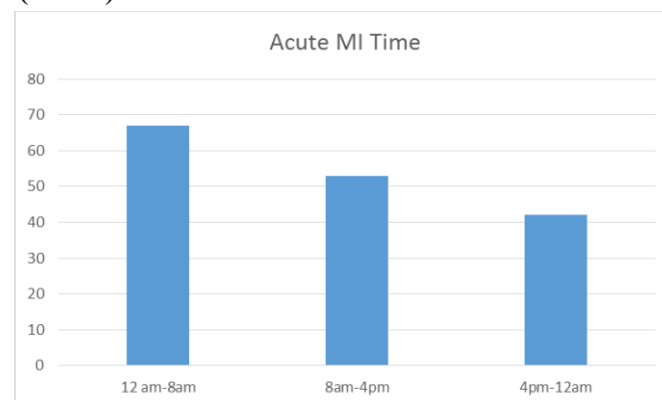
RESULTS

Overall mean age was 49 ± 13 years, BMI 26 ± 5 , weight 71 ± 24 kg and height 64 ± 4 cm. Among cases mean age was 56 ± 12 years, BMI 25 ± 4 , weight 71 ± 20 kg and height 64 ± 3 cm. Among controls mean age was 42 ± 11 years, BMI 27 ± 5 , weight 70 ± 14 kg and height 63 ± 4 cm. Among the cases 124 (52%) were male and among the controls 114 (48%) were male. (P value = 0.2). Among Cases 72 (46%) were unskilled laborers, 14 (40%) skilled laborers, 2 (11%) belonged to educated working class, 36 (56%) housewives, 22 (68%) upper class worker and 16(80%) were retired/ non functional as compared to Controls 84 (54%) were unskilled laborers, 21(60%) were skilled laborers, 15 (88%) belonged to educated working class, 28 (43%) housewives, 10 (31%) belonged to upper class worker and 4 (20%) were retired/ non functional. (P value = 0.000). Among cases 117 (51%) belonged to poor class, 36 (44%) from middle class and 9(60%) belonged to upper class as compared to controls 111(48%) belonged to poor class, 45(55%) from middle class and 6 (40%) belonged to upper class. (P value = 0.41). Among Cases 78(57%) belonged from rural areas as compared to controls where 57(42%) were from rural areas (P value=0.01). Among cases 37 (57%) were diabetics as compared to controls 27(42%). (P value=0.16). Among cases 64 (67%) were hypertensive as compared to controls 31(32 %). (P value=0.000). Among cases 70 (64%) were smokers as compared to controls 38(35%). **Table**

Table I: Risk factors of acute myocardial infarction

Characteristic		Cases No (%)	Control No (%)	P-value
Sex	Male	124(52%)	114(47%)	0.4
	Female	38(44%)	48(55%)	
Profession	Unskilled laborer	72(46%)	84(53%)	0.000
	Skilled laborer	14(40%)	21(60%)	
	Educated class worker	2(12%)	15(88%)	
	Housewives	36(56%)	28(43%)	
	Upper class worker	22(69%)	10(31%)	
Socioeconomic status	Retired/nonfunctional	16(80%)	4(20%)	0.41
	Poor	117(51%)	111(49%)	
	Middle	36(44%)	45(55%)	
Residence	Upper	9(60%)	6(40%)	0.01
	Rural	78(58%)	57(42%)	
Residence	Urban	84(44%)	105(55%)	0.01
	Underweight	6(46%)	7(53%)	
BMI	Normal Weight	61(57%)	46(43%)	0.234
	Overweight	66(49%)	68(51%)	
	Obesity	29(41%)	41(58%)	
	Obesity	29(41%)	41(58%)	
Risk factors	DM	37(57%)	27(42%)	0.163
	HTN	64(67%)	31(32%)	0.000
	Smoking	70(64%)	38(35%)	0.000
	Family History	27(36%)	48(64%)	0.006
	Hypercholesterolemia	11(91%)	1(8%)	0.003
	Obesity	5(62%)	3(37%)	0.47
Life Style	Sedentary	103(60%)	67(39%)	0.000
	Active	59(38%)	95(62%)	

Figure I: Acute MI attack time among cases of AMI (n=162)



Among cases 27 (36%) have positive family history of IHD as compared to controls 48(64%). (P value=0.006). Among cases 11(91%) have hypercholesterolemia as compared to controls 1(8%). (P value=0.003). Among cases 5(62%) were obese as compared to controls 3(37%). (P value=0.47).

Among Cases 6(46%) were underweight, 61 (57%) with normal BMI, 66 (49%) overweight, 29 (41%) were obese as compared to controls 7(53%) were underweight, 46 (43%) have normal BMI, 68 (50%) were overweight and 41 (58%) were obese (P value=0.234). Among cases 103 (60%) have sedentary life style as compared to controls 67(39%).

(P value=0.000). Considering time of AMI cases; 67 (41%) in b/w 12 am-8am, 53 (32%) during 8am-4pm, 42 (25%) in between 4pm-12am. (P value=0.000).

DISCUSSION

The main purpose of this study was to sort out the different risk factors among patients suffering from acute coronary syndrome who were admitted in a tertiary care hospital of Pakistan. Mean age of cases in this study was found to be lower than a previous study.⁹

In our study, among the cases 124 (52%) were male and among the controls 114 (48%) were male. (P value = 0.2). In contrast AMI was significantly more common in a previous study in females than in males (66.3% vs. 47.3%; P < .001).¹⁰ In current study, among cases; 72 (46%) were unskilled labourer, 14 (40%) skilled labourer, 2 (11%) belonged to educated working class, 36(56%) house wives, 22(68%) upper class worker and 16 (80%) were retired / non functional as compared to controls 84(54%) were unskilled labourer, 21 (60%) were skilled labourer, 15 (88%) belonged to educated working class, 28 (43%) housewives, 10 (31%) belonged to upper class worker and 4 (20%) were retired/nonfunctional. (P value = 0.000).

A significant increase in prevalence of AMI was noted in a previous study in graduates as compared to highly educated class.¹⁰ This is in accordance with the different studies previously conducted. In fact, in different previous studies it was noted that people who are not so much educated are more vulnerable to the diseases like hypertension because of their sedentary life styles and more significant smoking habits.¹¹⁻¹³ Among cases 117(51%) belonged to poor class, 36(44%) from middle class and 9(60%) belonged to upper class as compared to controls 111(48%) belonged to poor class, 45(55%) from middle class and 6(40%) belonged to upper class. (P value = 0.41). In a previous study, adjusting for known prognostic factors and individual SES using the Andersen-Gill model, higher estimated hazards were associated with poor neighborhood SES.¹⁴

In a previous study it was noted that most of the people included in that study belonged to middle socioeconomic strata (71%) but a notable contrast was observed in serum cholesterol and blood pressure among lower socioeconomic class in comparison with the other socioeconomic

classes.¹¹ Notably 65% of the people suffering from diabetes mellitus die from cardiovascular disease in the United States, making it one of the most leading causes of death among this population.¹⁵ However in our study, among cases 37(57%) were diabetics as compared to controls 27(42%) and this was not statistically significantly associated (P value=0.16). In our study, among cases 64 (67%) were hypertensive as compared to controls 31 (32 %). (P value=0.000). In a previous study similar to current study, it was significantly noted that some of the most important factors such as family history of coronary heart disease were noted to be a convincing predictor reported of acute coronary syndrome in both males and females.¹⁶

However in contrast to our study acute coronary syndrome was also mainly associated with obesity in women (OR, 3.31; 1.54-7.14). While in males but not in females there was a predominant association with hypertension and current smoking (P =0.011 and P <0.001, respectively),¹⁷ this is comparable to our study, where among cases 70(64%) were smokers as compared to controls 38(35%). (P value=0.000). As far as Diabetes is concerned similar to our study, in a previous study it was not significantly independently associated in either sex.¹⁶ A study reported that, patient who were constant smokers and unsteadiness to diet and exercise had a 3.8-fold, higher probability of myocardial infarction/stroke/death in comparison with non smokers who did also change their sedentary life style. This is similar to our findings where, among cases 70 (64%) were smoker as compared to controls 38 (35%).¹⁷ (p =value0.000)

In another study, persistent smoking remained an important predicting factor for MACE after secondary adaptations for LVEF (hazard ratio 2.154, 95% CI 1.313-3.535, P = .002) or reperfusion treatment (hazard ratio 2.327, 95% CI 1.423-3.804, P = .001). Harrell c statistic revealed that the model with constant smoking had the best inequitable power in comparison with models with LVEF or reperfusion treatment. In this era of statins and reperfusion treatment, persistent smoking is the most convincing strongest distinct long-term predicting factor for recurrent MACE in young survivors of premature AMI.¹⁸ In current study, among cases 27(36%) have positive family history of IHD as compared to controls 48 (64%). (P value=0.006). In a previous study, as compared to our study high blood glucose was significantly associated with ACS (P =.019) and triglycerides (P <.001) were much more

common in males in with metabolic syndrome, but abdominal obesity ($P<.001$) and low high-density lipoprotein cholesterol ($P=.001$) were predominating in women.¹⁹

In our study, among cases 11(91%) have hypercholesterolemia as compared to controls 1(83%) (P value=0.003), however in another study, patients had higher serum cholesterol and blood pressure in comparison with controls in each behavioral assessment parameters from HDL-c levels ($p<.001$), which were notably lower in patients ($p<.001$).¹¹ In current study, among cases 5(62%) were obese as compared to controls 3(37%). (P value=0.47). Among Cases 6(46%) were underweight, 61(57%) with normal BMI, 66(49%) overweight, 29(41%) were obese as compared to controls 7(53%) were underweight, 46(43%) have normal BMI, 68(50%) were overweight and 41(58%) were obese (P value=0.234). In a previous study as well as in current study most patients had sedentary life style and remarkably lower physical activity and most (86%) did not attain the minimal level of physical activity.¹¹ In current study, considering time of AMI cases; 67(41%) have AMI in between 12am-8am, 53(32%) during 8am-4pm, 42(25%) in between 4pm-12am. (P value=0.000).

CONCLUSION

Our study showed that; rural residence, retired person, businessman, smoking, hypertension, family history hypercholesterolemia, sedentary lifestyle, were significantly associated with acute myocardial infarction. It was noted that 12am-8am was most frequent time of acute Myocardial Infarction episode.

REFERENCES

1. Yusuf S, Reddy S, Ounpuu S, Anand S. Global burden of cardiovascular diseases, part I: general considerations, the epidaemiologic transition, risk factors, and impact of urbanization. *Circulation*. 2001;104:2746–53.
2. Roger VL, Go AS, Lloyd-Jones DM, Adams RJ, Berry JD, Brown TM, et al. Heart disease and stroke statistics 2011 update: a report from the American Heart Association. *Circulation*. 2011;123:e18–e209.)
3. The World Health Report. Making a Difference. Geneva: World Health Organization; 1999.
4. Popkin BM. The nutrition transition and its health implication in lower-income countries. *Public Health Nutr*. 1998; 1: 5–21)
5. Hong Du, Chang-yan Dong, Qiao-yan Lin. Risk factors of acute myocardial infarction in middle-aged and adolescent people (<45 years) in Yantai.
6. BMC Cardiovascular Disorders 2015;15:106. <https://doi.org/10.1186/s12872-015-0102-5>
7. Culic V, et al. Meta-analysis of possible external triggers of acute myocardial infarction. *Int J Cardiol* 2005;99:1-8.
8. Nawrot TS, et al. Public health importance of triggers of myocardial infarction: A comparative risk assessment. *Lancet* 2011;377:732-740.
9. Yusuf S, et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): Case-control study. *Lancet* 2004;364:937-952.
10. Alvaro Avezum, Marcia Makdisse, Frederick Spencer, Joel M. Gore, Keith A.A. Fox, Gilles Montalescot, Kim A Eagle, et al. Impact of age on management and outcome of acute coronary syndrome: Observations from the global registry of acute coronary events (GRACE). *January 2005; 149(1): 67–73*
11. Ana Jover,a Emili Corbella,b Anna Mun`oz,c Jesu` s Milla` n,d Xavier Pinto` ,b Alpio Mangas,e Manuel Zu` n` iga,f
12. Juan Pedro-Botet,g and Antonio Herna` ndez-Mijaresa,h, Prevalence of Metabolic Syndrome and its Components in Patients With Acute
13. Coronary Syndrome* Received 12 January 2011, Accepted 2 March 2011, Available online 2 June 2011. *Rev Esp Cardiol*. 2011;64(7):579–586)
14. A Kumar, R Sivakanesan, S Nagtilak. Behavioral pattern, life style and socio economic status in elderly Normolipidemic Acute Myocardial Infarct Subjects - A case control study from South Asia. *The Internet Journal of Cardiovascular Research*. 2008 Volume 6 Number 2.)
15. Murphy M, Nevill A, Neville C, Biddle S, Hardman A. Accumulating brisk walking for fitness, cardiovascular risk, and psychological health. *Med Sci Sports Exerc* 2002; 34(9): 1468-1474.
16. Minh HV, Byass P, Chuc NT, Wall S. Gender differences in prevalence and socio-economic determinants of hypertension: findings from the WHO STEPs survey in a rural community of Vietnam. *J Hum Hypertens* 2006; 10:109-15.)
17. Koren A, Steinberg DM, Drory Y, Gerber Y; Israel Study Group on First Acute Myocardial Infarction. Socioeconomic environment and recurrent coronary events after initial myocardial infarction. 2012; 22(8):541-6.)
18. A Kumar, R Sivakanesan, S Nagtilak. Behavioral pattern, life style and socio economic status in elderly Normolipidemic Acute Myocardial Infarct Subjects - A case control study from South Asia. *The Internet Journal of Cardiovascular Research*. 2008 Volume 6 Number 2. pages.....-.....)
19. Thom T, Haase N, Rosamond W. et al. American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics–2006 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation*. 2006;113(6):e85-e151)
20. Genc Burazeri, Artan Goda, Gerhard Sulo, Jonida Stefa, Enver Roshi, Jeremy D. Kark. Conventional Risk Factors and Acute Coronary Syndrome during a Period of Socioeconomic Transition: Population-based Case-control Study in Tirana, Albania. *Croatian Medical Journal Travanj* 2007: Vol.48. No.2:225–233)
21. Loukianos S, Rallidis, Eleftherios A. Sakadakis, Konstantinos Tympas, Christos Varounis, Maria Zolindaki, Nikolaos Dages, Jonh Lekakis. The impact of smoking on long-term outcome of patients with premature (≤ 35 years) ST-segment elevation acute myocardial infarction. *AHJ*. March 2015;169(3):356–362.)