

Study of Risk Factors of Atherosclerotic Coronary Artery Heart Disease among Patients Admitted With Acute Myocardial Infarction

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Abstract

Original Research Article

Background: Coronary artery heart diseases are the major cause of mortality in world. Multifactorial aetiology include high blood pressure, raised blood cholesterol, tobacco use, unhealthy diet, physical inactivity, diabetes, advancing age, genetic predisposition. Non-modifiable risk factors are family history, advanced age, gender and ethnicity. **Aim:** To study of risk factors of atherosclerotic coronary artery heart disease among patients admitted with AMI. **Material & Methods:** Descriptive, cross-sectional study was carried out in medicine unit of tertiary care hospital. Hundred patients with acute myocardial infarction within 24 hours of onset of symptoms were included in study. **Results:** Average age at the onset of first time AMI was 59.21 years. Male to female ratio was 2.57: 1. Statistically significant association found between gender and family history of IHD. Almost 55% of participants were obese. Half of the participants were consuming a risk diet. Forty percent of subjects were smokers. Hypertension was present in 25% of total cases. Single risk factor was present in 12% cases while two and three or more risk factors were present in 17% & 68% cases, respectively. **Conclusion:** Obesity, unhealthy diet, altered lipid profile, smoking, type 'A' personality, family history of IHD & diabetes were common risk factors present in AMI patients. Cessation of smoking, control of hypertension and diabetes, healthy nutrition, exercise promotion are tools of prevention.

Keywords: Non-communicable diseases, Ischemic Heart Disease, CVD, Stroke, Prevention.

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INTRODUCTION

An estimated 17 million people die of cardiovascular diseases (CVDs), particularly heart attacks and strokes, every year [1]. Ischemic Heart Disease (IHD) is important type of CVD, commonly known as coronary heart disease (CHD) and coronary artery disease (CAD). Hospital prevalence of IHD in India was reported to be 6 to 23 percent while community prevalence was reported to be 6.5 percent and 4.8 percent in urban men and women and 2.3 percent and 1.7 percent in rural men and women respectively [2].

The aetiology of CHD is multifactorial. Previous researcher identified major risk factors like high blood pressure, high blood cholesterol, tobacco use, unhealthy diet, physical inactivity, diabetes, advancing age, inherited (genetic) disposition and also other risk factors like poverty, low educational status, poor mental health, inflammation and blood clotting disorders[3-5]. Many are modifiable risk factors but some risk factors like family history, advanced age, gender and ethnicity are non-modifiable.

A considerable increase in prevalence of CHD in rural areas also [6]. Many studies have been conducted on patients with acute myocardial infarction (AMI), but little published information about AMI in rural patients is available. Aim of this attempt to study of risk factors of atherosclerotic coronary artery heart disease among patients admitted with AMI.

MATERIALS & METHODS

An observational, descriptive, cross-sectional study was carried out in medicine unit of tertiary care hospital situated in rural Maharashtra. Aim was to study of risk factors of atherosclerotic coronary artery heart disease among patients admitted with acute myocardial infarction. Study was conducted for the period of two years. All patients who admitted in medicine unit with acute myocardial infarction (AMI) within 24 hours of onset of symptoms and willing to give consent were included in study. Patients who were having previous history or evidence of AMI, other coexistent medical illness (other than diabetes or diseases which were included as risk factors) were excluded. Institutional Ethical Committee (IEC) permission was taken before

data collection. Confidentiality of patient identity was maintained. Hundred patients were included using universal sampling method in mentioned time period.

The diagnosis of AMI was established in the presence of any two of three criteria. Criteria were 1) Typical chest pain suggestive of ischemic heart disease (IHD). 2) ECG changes suggestive of acute MI. 3) Serum markers SGOT & CPK-MB. A valid informed consent was taken before data collection. Information about socio-demographic profile, precipitating factors, disease risk factors like diabetes, smoking, obesity, family history, lipid profile, in addition to analysis of ECG and cardiac enzymes profile was extracted from the patient's caserecords or was collected from patient or relatives. General and systemic clinical examination was done. Standard definitions were fixed before study and used throughout. The important risk factors studied were: gender, smoking, medical history of diabetes (fasting blood glucose \geq 126 mg/dL or random blood glucose \geq 200 mg/dL), hypertension (\geq 140/90 mmHg or on antihypertensive. Standard Operating Protocols were followed for any measurement [6, 7].

Data was stored in Microsoft Excel and analysed in IBM SPSS software. Descriptive statistics like frequency, proportion, mean and standard deviation were used. Chi square test was used. Tables and graphs were used at appropriate places. P-valued < 0.05 were considered significant.

RESULTS

Study was carried out in 100 patients admitted with acute myocardial infarction admitted in tertiary care hospital. Information regarding socio-economic condition and risk factors of coronary artery heart disease (CHD) was collected. As shown in table no. 1, maximum affected age group was 51 to 60 years of age. Average age at the onset of first time AMI was 59.21 years. Male to female ratio was 2.57: 1. Modified Prasad classification used for socio-economic classification. Majority of our patients (38%) were from

upper socioeconomic class while 33% & 29% were from class II & class III respectively.

Table no. 2 displays details of distribution of risk factors of coronary artery heart disease in study subjects. About one third patients had family history of Ischemic heart disease (IHD). Statistically significant association found between gender and family history of IHD. Almost 55% of participants were obese. Isolated cases of obesity were only 2%; combination of Diabetes & obesity was 14% and hypertension & obesity was 13%. Half of the participants were consuming a risk diet. Majority of them belongs to upper socio-economic class (38%). Forty percent of subjects were smokers and 22% of them were heavy smokers. Out of heavy smokers, 5 had decreased HDL. Essential hypertension (HTN) was present in 25% of total cases. It was present in 9% cases as sole risk factor while in 4 cases it was associated with HTN & in 13 cases it was associated with Type 'A' personality. Out of 22 diabetic cases, 19 cases of type II and 3 cases of type I was there. It was also associated with HTN & obesity cases.

As indicated in figure no. 1 and table no. 2, dyslipidaemia was common abnormality (increased total cholesterol). As a sole risk factor, it was present in 2% cases whereas combinations with diabetes & risk diet were present in 14% & 20% cases respectively. Patients with type 'A' personality had significant proportion. No other risk factor except family history of IHD showed statistically significant association with gender. Fifty two percent cases had some trigger factors. Most common was emotional upset (22%) followed by heavy work (15%) and other factors (15%) like smoking, consumption of heavy meal, exposure to cold etc. In diurnal variation of occurrence of AMI cases, 2 peaks were observed i.e. morning (6 AM to 12 PM) (30%) and 6 PM to 12 AM (29%).

Figure no. 2 depicts number of risk factors present in patients with AMI. None of the risk factor could be traced in 3% cases. Single risk factor was present in 12% cases while two and three or more risk factors were present in 17% & 68% cases, respectively.

Table-1: Socio-demographic profile of study subjects (n=100)

		Male (n=72)	Female (n=28)	Total (n=100)
Age (years)	30-40	9	0	9
	41-50	14	1	15
	51-60	29	18	47
	61-70	15	5	20
	71-80	2	4	6
	81-90	3	0	3
Socio-economic status	Upper	26	12	38
	Middle	24	9	33
	Lower	22	7	29

Table-2: Distribution of risk factors in acute myocardial infarction patients (n=100)

		Male (n=72)	Female (n=28)	Total (n=100)	Statistical significance*
Family h/o IHD	Present	28	5	33	Significant (p=0.044)
	Absent	44	23	67	
Obesity	Present	41	13	54	Not significant (p=0.34)
	Absent	31	15	46	
Diet	High risk	38	12	50	Not significant (p=0.37)
	Average/Below average	34	16	50	
Smoking	No smoker	32	28	60	Highly significant (p<0.001)
	Mild	4	0	4	
	Moderate	14	0	14	
	Heavy	22	0	22	
Essential Hypertension	Present	16	9	25	Not significant (p=0.30)
	Absent	56	19	75	
Diabetes	No Diabetes	56	22	78	Not significant (p=0.93)
	DM type I	2	1	3	
	DM type II	14	5	19	
Total Cholesterol	Raised	30	14	44	Not significant (p=0.45)
	Normal/Decreased	42	14	56	
Type A personality	Present	32	8	40	Not significant (p=0.14)
	Absent	40	20	60	

*Chi square test; IHD: Ischemic heart disease

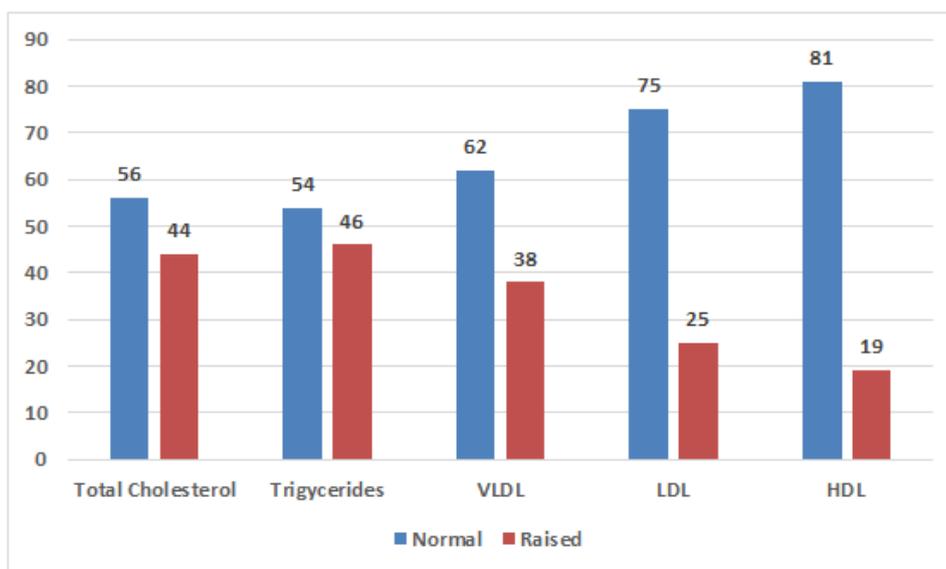


Fig-1: Lipid profile of patients with acute myocardial infarction (n=100)

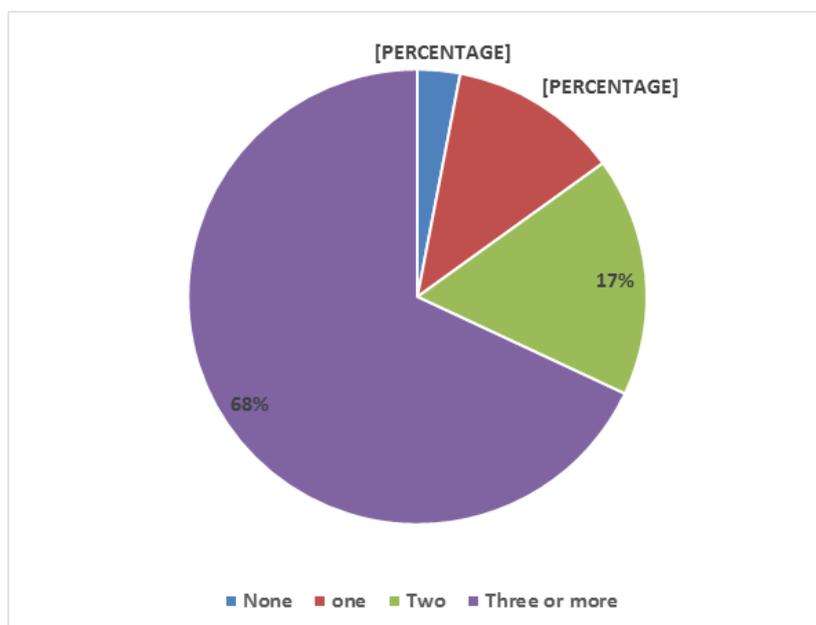


Fig-2: Prevalence of risk factors in acute myocardial infarction patients (n=100)

DISCUSSION

Coronary heart disease has been defined as "impairment of heart function due to inadequate blood flow to the heart compared to its needs, caused by obstructive changes in the coronary circulation to the heart". It has modifiable as well as not modifiable risk factors [6]. This study was collected the information related to risk factors in patients admitted with AMI. In most of studies which were carried out in developed countries and in India, the highest incidence has been found in more than 50 years of age group. In studies done by Zodpey *et al.* [8] and Abduelkarem *et al.* [9], 65% and 57% cases were more than 50 years of age respectively which is slightly lower than present study (73%). CHD is much less common in premenopausal women than in men with same age. Similar findings were found in study done by Abduelkarem *et al.* [9]. Preponderance of male gender is known risk factor for CHD [10]. Present study noted male: female ratio of 2.57:1. Studies done by Bahall *et al.* [11] and Rajni *et al.* [12] noted M: F ratio of 1.22: 1 and 16:1, respectively. Study done by Abduelkarem *et al.* [9] showed, more than three-quarter of patients included (75.7%) were male (i.e. a male to female ratio 3.1:1). In present study, highest number of cases was from upper class. Different findings noted by Rajni *et al.* [12] which showed higher cases in lower class. Physical inactivity & risk diet are possible causes of higher occurrence of AMI in upper class [6].

Decreasing order of frequency of risk factors start from obesity (54%), risk diet, raised total cholesterol level, smoking type a personality, family history of IHD to diabetes (22%). In present study, 19 cases of type II and 3 cases of type I diabetes were reported. Out of these 22 diabetic patients, 14 were obese, 8 had HTN and 14 were having altered lipid

profile. Abduelkarem *et al.* [9] reported diabetes was the significant risk factor (48.2% in their study. Smoking, physical inactivity and HTN were common risk factors noted by Rajni *et al.* [12] while 22% cases were due to diabetes. Through its associations with rapidly progressive coronary atherosclerosis, diabetes is a major independent predictor of acute MI [13]. Obesity is a key risk factor in natural history of other chronic and non-communicable diseases, especially CHD and diabetes [6]. Obesity was commonest risk factor in current study affecting half of the patients. Rajni *et al.* [12] reported 44% cases with altered waist hip ratio. Similar findings were reported by other researchers [11, 14]. The blood pressure is the single most useful test for identifying individuals at a high risk of developing CHD. Hypertension accelerates the atherosclerotic process, especially if hyperlipidaemia is also present and contributes importantly to CHD [15]. Our study reported 25% cases with HTN which is on lower side of studies done by Zodpey *et al.* [8] (39%) and Abduelkarem *et al.* [9] (36%). Bahall *et al.* [11] reported 50% cases.

Triangular relationship between habitual diet, blood cholesterol-lipoprotein levels and CHD are judged to be causal [6]. In our study, 44% cases had raised cholesterol levels. Varying degree of hypercholesterolemia was observed in studies done by Abduelkarem *et al.* [9] (1.8%), Zodpey *et al.* [8] (48%) and Bahall *et al.* [11] (19.7%). Recent research report raises question mark on role of cholesterol [16]. Smoking has been identified as a major CHD risk factor [17] with several possible mechanisms - carbon monoxide induced atherogenesis; nicotine stimulation of adrenergic drive raising both blood pressure and myocardial oxygen demand; lipid metabolism with fall in "protective" high-density lipoproteins, etc [6]. In

present study, 40% cases were smokers. Smoking was risk factor in 28% to 50% cases with AMI in studies done by Rajni *et al.* [12], Bahall *et al.* [11] and Abduelkarem *et al.* [9]. Risk diet having high amount of saturated fats, high salt and low fibre contributes directly to obesity, hypertension and ultimately to CHD [18]. Half of the cases were having unhealthy diet in our study. Quite similar findings were reported by Zodpey *et al.* [8]. Type behaviour is associated with competitive drive, restlessness, hostility and a sense of urgency or impatience. Type-A individuals are more coronary prone to CHD than the calmer, more philosophical Type B individuals [6]. It was major risk factor (40%) in our study. Similar findings were reported by Rajni *et al.* [12]. History of CHD was reported by Abduelkarem *et al.* [9] (21.7%), Bahall *et al.* [11] (44%) and Rajni *et al.* [12] (44%). It was only risk factor showing statistically significant association with gender.

Framingham Heart study [3] and the INTERHEART study [19] identified traditional risk factors such as hypertension, diabetes mellitus, history of IHD, family history of IHD, smoking and alcohol consumption as well as stress and hypercholesterolemia, which were associated with AMI. Co-presence of risk factors significantly increases occurrence of CHD, morbidity and mortality.

Obesity, unhealthy diet, altered lipid profile, smoking, type A personality, family history of IHD & diabetes were common risk factors present in AMI patients. Effort must be aimed at lifestyle changes (smoking & exercise) and non-communicable disease risks (diabetes and hypertension) at all levels of health care to control this epidemic. Mitigation of modifiable risk factors is necessary to set the strategy for prevention.

REFERENCES

1. WHO. Cardiovascular disease-The Atlas of Heart Disease and Stroke. Accessed on 10 February 2019. Available at: (https://www.who.int/cardiovascular_diseases/resources/atlas/en/)
2. National Cardiovascular Disease Database. Sticker No: SE/ 04 / 233208. IC Health. Ministry of Health and Family Welfare, Government of India and World Health Organization. Accessed on 10 February 2019. Available at: (www.whoindia.org/LinkFiles/NMH_Resources_National_CVD_database-Final_Report).
3. Mahmood SS, Levy D, Vasan RS, Wang TJ. The Framingham heart study and the epidemiology of cardiovascular diseases: a historical perspective. *Lancet*. 2014;383(9921):999–1008.
4. Ryoo JH, Cho SH, Kim SW. Prediction of risk factors for coronary heart disease using Framingham risk score in Korean men. *PLoS One*. 2012;7(9):
5. WHO. Types of cardiovascular disease (PDF). Accessed on 12 January 2019. (https://www.who.int/cardiovascular_diseases/en/cvd_atlas_01_types.pdf?ua=1)
6. K. Park, Textbook of Preventive and Social Medicine, 23 Edition. Jabalpur, BanarasidasBhanot Publishers. 2015; 366-372.
7. Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson J, Loscalzo J. eds. Harrison's Principles of Internal Medicine, 18e. New York, NY: McGraw-Hill. 2012: 473-600.
8. Zodpey SP, Shrikhande SN, Negandhi HN, Ughade SN, Joshi PP. Risk factors for acute myocardial infarction in Central India: A case-control study. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*. 2015 Jan;40(1):19.
9. Abduelkarem AR, El-Shareif HJ and Sharif SI. Evaluation of risk factors in acute myocardial infarction patients admitted to the coronary care unit, Tripoli Medical Centre, Libya. *EMHJ*. 2012; 18(4): 332-336.
10. Mendelsohn ME, Karas RH. The protective effects of estrogen on the cardiovascular system. *New England journal of medicine*. 1999 Jun 10;340(23):1801-11.
11. Bahall M, Seemungal T, Legall G. Risk factors for first-time acute myocardial infarction patients in Trinidad. *BMC public health*. 2018 Dec;18(1):161.
12. Gupta R, Kishore J, Bansal Y, Daga MK, Jiloha RC, Singal R, Ingle GK. Relationship of psychosocial risk factors, certain personality traits and myocardial infarction in Indians: A case-control study. *Indian J Community Med*. 2011;36:182-6.
13. Ribeiro DG, Andrade PJ, Paes Júnior JN, Saraiva LR. Acute myocardial infarction: predictors of mortality at a public hospital in the city of Fortaleza, Ceará state. *Arquivos brasileiros de cardiologia*. 2003 Jun;80(6):614-20.
14. Kadarkar KS, Tiwari SR, Velhal GD, Giri PA. Physical activity levels during work, leisure time and transport and its association with obesity in urban slum of Mumbai, India. *Int J Community Med Public Health*. 2016;3:715-20.
15. World Health Organization. Risk factor: blood pressure (PDF). Accessed on 12 January 2019. (https://www.who.int/cardiovascular_diseases/en/cvd_atlas_05_HBP.pdf?ua=1).
16. Kratz M. Dietary cholesterol, atherosclerosis and coronary heart disease. *HandbExpPharmacol*. 2005;(170):195-213.
17. Du H, Dong CY, Lin QY. Risk factors of acute myocardial infarction in middle-aged and adolescent people (< 45 years) in Yantai. *BMC Cardiovasc Disord*. 2015;15:106.
18. Kadarkar KS, Velhal GD, Tiwari SR. Preventable Risk Factors for Non- Communicable Diseases in Urban Slum of Mumbai: A Prevalence Study using

WHO STEPS Approach. Ntl J Community Med. 2016; 7(8):672-676.

19. Anand SS, Islam S, Rosengren A, Franzosi MG, Steyn K, Yusufali AH, Keltai M, Diaz R, Rangarajan S, Yusuf S. Risk factors for myocardial infarction in women and men: insights from the interheart study. European heart journal. 2008 Mar 10;29(7):932-40.