COMPARISON OF RISK FACTORS PROFILE IN PATIENTS BELOW AND ABOVE FORTY YEARS OF AGE PRESENTING WITH ACUTE MYOCARDIAL INFARCTION

Samiullah Khan[1], Muhammad Asghar Khan[2], Muhammad Nadeem Khan[3], Ibrahim Shah[4], Mahmood ul Hassan[5]

ABSTRACT

Objective: *To compare the frequency of conventional risk factors in patients below and above forty years of age presenting with acute myocardial infarction.*

Methodology: *It was a three years retrospective comparative descriptive study conducted in Cardiology Department, PGMI, Lady Reading Hospital, Peshawar. Computerized data of patients admitted with acute myocardial infarction (AMI) from 1st September 2006 to 31st August 2009 was reviewed. Patients with age <40 years were assigned Group-I while those with ≥40 years as Group-II. Conventional risk factors were age, sex, pertinent family history, smoking, hypercholesterolemia, hypertriglyceridemia, hypertension and diabetes mellitus. Using SPSS version 16, data was analyzed.*

Results: *A total of 4935 patients were admitted with AMI over the study period. Mean age was 58.4 ± 12.37 (20 to 99) years. Group-I had 252 patients (79.4% males), while Group-II had 4683(65.9% males). Positive family history in Group-I vs. Group-II was 43(17.1%) vs. 426(9.1%), [p<0.001], respectively. Hypertension in Group-I vs. Group-II was 57(22.6%) vs. 1666(35.6%), [p<0.001], respectively. Diabetes mellitus in Group-I vs. Group-II was 29/252(1.5%) vs. 1059(22.6%), [p<0.001], respectively. Hypercholesterolemia in Group-I vs. Group-II was 63(25%) and 583(12.4%), [p<0.001], respectively. Hypertriglyceridemia in Group-I vs. Group-II was 68(27%) vs.1188 (25.4%), [p<0.001], respectively. Smokers in Group-I vs. Group-II were reported in 24(9.5%) vs. 76(1.6%), [p<0.001], respectively.*

Conclusion: *Positive family history, hypercholesterolemia, hypertriglyceridemia and smoking were more frequent in younger age group while hypertension and diabetes mellitus were the predominant risk factors in older age group.*

Key Words: *Conventional risk factors, Acute myocardial infarction, Coronary heart disease.*

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[1]DHQ Hospital Lakki Marwat - Pakistan.
[2,5]Department of Cardiology, Hayatabad Medical Complex, Peshawar - Pakistan.
[3]Khalifa Gul Nawaz Hospital, Bannu - Pakistan.
[4]Department of Cardiology, Lady Reading Hospital, Peshawar - Pakistan.
Address for correspondence:
Dr. Samiullah Khan
District Cardiologist,
DHQ, Hospital Lakki Marwat - Pakistan.
E-mail: drsamee@yahoo.com
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INTRODUCTION

Over the past decades the incidence of acute myocardial infarction (AMI) together with mortality have decreased dramatically in developed countries[1,2]. Advances in understanding and control of major cardiovascular risk factors and medical care of coronary heart diseases (CHD) have contributed to these reductions[3]. In contrary, CHD have emerged as a major health burden in developing countries[4]. Cardiovascular risk factors for ischemic heart disease and acute myocardial infarction are on the rise in Pakistan. People of Indo-Asian origin have a high burden of CHD and the later is now the leading cause of death[5,6]. The projected increase in CHD is expected to be much greater in South Asia than in any other region worldwide,[7] where it is expected to

grow more than double over the next 20 years[8].

It is well known that CHD is strongly associated with conventional risk factors, namely smoking, diabetes, hypertension and hypercholesterolemia[3,9]. The most recent reports suggest that these risk factors are found in about 75% of the occurrences of CHD within populations, and not 50%, as has been previously claimed.[10] Changes in the prevalence rates of different forms of CHD have implications for prevention policy and health provision. Moreover, continued assessment of temporal trends regarding risk factors for CHD is needed to devise population strategies in order to reduce risk and predict the future burden of CHD[11].

Significant differences in the prevalence of CHD exist with respect to gender, age and ethnicity[12]. Cardiovascular risk reduction has been maintained in patients aged 60 or greater, but the difference in risk reduction observed from National Health and Nutrition Examination Survey (NHANES) II and III has been minimal in younger people, especially among those aged 30-39[13]. There is very limited data available about the frequency of various conventional cardiovascular risk factors in different age grups in our setup. The aim of the present analysis was therefore to compare the prevalence of conventional risk factors in patients below and above forty years of age presenting with acute myocardial infarction.

METHODOLOGY

It was a three years retrospective hospital based Comparative descriptive study conducted in Cardiology department PGMI, Lady Reading Hospital, Peshawar, from September 2006 to August 2009. The only inclusion criterion was the diagnosis of acute myocardial infarction. Computerized data of Patients admitted with acute myocardial infarction were reviewed. Conventional risk factors were identified as follow; History of smoking was defined as smoking at least 100 cigarettes in their lifetime and who, at the time of admission, smoked either every day or some days. Hypertension was defined as systolic blood pressure ≥140 mm Hg and/or diastolic blood pressure ≥90 mm Hg or current treatment with antihypertensive drug in subject with history of hypertension. Patients were considered as diabetics if they self reported as diabetes and/or on treatment for diabetes. Patients with Fasting Blood sugar ≥ 126 mg/d were included as newly diagnosed cases. Significant family history was considered pertinent when atherosclerotic disease was found in male before the age of 55 or before 65 years in female patients. Hypercholesterolemia and Hypertriglyceridemia (Dyslipidemia) were labeled as total Cholesterol ≥ 200mg/dl and Triglycerides greater than 150mg/dl, respectively. Patients were assigned group-I and group-II for age less than 40 years and age 40 years and above, respectively. Using SPSS version 16, data was analyzed. Frequencies and percentages were determined for Categorical variables and means and standard deviation (SD) for continuous variables. P value was determined by using chi square test. All comparisons were considered significant at $P<0.05$.

RESULTS

A total of 4935 patients were admitted with acute myocardial infarction from 1st September 2006 to 31st August 2009. Their mean age was 58.4 ±12.37 (20 to 99) years. The male (66.6%, n=3288) to female (33.4%, n= 1647) ratio was 1.9:1. A total of 5.1% (252) patients were in group-I (age<40 years), while the rest 94.83% (4683) were in group-II (age ≥ 40 years) with the mean age of 58.4 ±12.37 years (range 20-99 years). We calculated the gender distribution within the age groups and observed that there were 79.4% (200) male and 20.6% (52) female patients in group-I while in group-II, there were 65.9% (3088) male and 34.1% (1595) female patients as shown in Table 1.

We observed that smoking, dyslipidemia and family history was more frequent in younger age group patients as compared to older one. Smoking was 9.5% (24) in group-I patients as compared to group-II 1.6% (76) {9.5 vs 1.6, p=0.001}. In group-I frequency of hypercholesterolemia was 25% (63) and 12.4% (583) in group-II, {25 vs. 12.4, p= 0.001}. Similarly frequency of hypertriglyceridemia was 27% (68) in group-I and 25.4% (1188) in group-II patients {27 vs 25.4, p=0.001}. Family history of CHD was present in 17.1% (43) and 9.1% (426) patients respectively in group-I and group-II, {17.1 vs. 9.5, p=0.001} as shown in Table 2.

Hypertension and Diabetes was more frequent in older age group. In group-I, frequency of hypertension was 22.6% (57) while in group-II, it was 35.6% (1666) {22.6 vs 35.6, p= 0.001}. Similarly frequency of diabetes was 11.5% (29) in group-I, and was 22.6% (1059) in group-II {11.5 vs 22.6, p= 0.001}. There were statistically significant ($p < 0.001$) differences in all the risk factors between the two age groups.

We analyzed number of risk factors (except advancing age & male gender) in both groups. We observed that no risk factor was present in 24.6% vs. 17%, p= 0.01 in group-I vs. group-II respectively. Two, four and more than one risk factors were present significantly higher in group-I as compared to group-II {(28% vs. 38%, p=0.001), (0.6% vs. 12%, p=0.0001), (36.6% vs. 74.7%,p=0.001)}, respectively. Presence of three risk factors were not much different in group-I (8.4) and group-II patients (10.5) {p=0.1} as shown in Table 3.

Table 1: Gender wise distribution within the age groups

Gender	Age group-1	Age group-2**	Total	Percent
Male	79.4% (200)	65.9% (3088)	3288	66.6
Female	20.6% (52)	34.1% (1595)	1647	33.4
Total	5.1% (252)	94.95% (4683)	4935	100

*age1-39 years, ** age ≥40 years

Table 2: Frequencies of conventional risk factors

	Age group-I*		Age group-II**		Gp-I Vs Gp-II	p-value
Risk Factor	Present	Absent	Present	Absent	Percent	
Smoking	24	228	76	4607	9.5 Vs 1.6	0.001
Hypercholesterolemia¶	63	173	583	3943	25 vs 12.4	0.001
Hypertriglyceridemia§	68	156	1188	3345	27 vs 25.4	0.001
Family history	43	209	426	4257	17.1 vs 9.1	0.001
Hypertension	57	195	1666	3017	22.6 Vs 35.6	0.001
Diabetes mellitus	29	223	1059	3624	11.5 vs 22.6	0.001

*age1-39 years, ** age ≥40 years,

¶ indicates data missing from record; in Gp-I=16 patients & in Gp-II= 157 patients

§ indicates data missing from record; in Gp-I=28 & Gp-II=150 patients.

Table 3: Total Number of risk factors by age group

No. of Risk Factors*	Group-1 (%)	Group-II (%)	P valve
No risk factor	24.6	17	0.01
1	38.4	22.5	0.001
2	28	38	0.001
3	8.4	10.5	0.1
4	0.6	12	0.0001
More than one Risk Factor	36.4	74.7	0.001

* Except advancing age & gender

DISCUSSION

We observed that the mean age of our patients presenting with acute myocardial infarction was younger (58.4 ±12.37 years) as compared to the European population[14], this is consistent with frequent premature CHD disease occurrence in south Asian population[15]. There was a clear male predominance (male to female ratio of 1.9:1) in our study, which is in agreement with previous studies, suggesting that it is predominantly a disease of men[16]. Middle-aged men have a 2 to 5 times higher risk than women, but this risk ratio differs between populations[17].

The present study showed that smoking, dyslipidemia and family history were more frequent in younger patients as compared to older. Smoking was reported in 9.5% of younger patients (group-I) as compared to older patients (group-II) 1.6%. Although this frequency of smoking was much lesser than western population (up to 70%)[18] and the reason could be NASWAR chewing which was not included as a risk factor in our study. A higher incidence of male gender and smoking was observed in younger patient with ACS as compared to older age group[19]. Thus, elimination of cigarette smoking is of utmost public health importance because it could delay the onset of CHD by a decade[20].

It was also evident from the present analysis that hypercholesterolemia (25% vs. 12.4%) and hypertriglyceridemia (27% vs. 25.4%) was more prevalent in younger age patients which is consistent with other studies. Hoshida et al reported hyperlipidemia in 52% patients of younger age group (≤66 years) and 36% patients of older age group (>66 years) presenting with AMI[19]. Family history of CHD was more pertinent in younger age patients (17.1%) as

compared to older one (9.1%). In fact, a family history of CHD, traditionally believed to be due to a shared genetic predisposition, may simply represent a shared exposure to a higher prevalence of conventional risk factors[21].

Contrary to the above, prevalence of hypertension and diabetes mellitus is increasing with advancing age. Our study showed that hypertension (35.6% vs. 22.6%), and diabetes mellitus (22.6% vs. 11.5%) were more frequent in older age patients. In other studies there is diverse data regarding it prevalence. Hyman et al observed that approximately 32% of patients with hypertension are unaware that they are hypertensive[22]. Higher rates of unawareness, approaching 50%, have been documented for hyperlipidemia and diabetes[23]. Thus, detailed assessment for conventional risk factors using contemporary targets will almost certainly lead to higher prevalence rates than those reported in the present study. Gikas et al found 25.7% and 10.3% prevalence of hypertension and diabetes mellitus respectively in patients presenting with AMI[24]. But Hoshida et al reported higher prevalence of hypertension (54% & 59% in age ≤66 years & >66 years age respectively) and diabetes (33% & 36% in age ≤66 years & >66 years age respectively)[19].

We observed that more patients (24.6% vs. 17%) were free of risk factors in younger age group. Similarly, more than one risk factor other than male gender and advancing age was present in 34.4 vs. 74.7% patients. Thus advancing age not only a risk factor by itself, it also clusters CHD risk factors. This was consistent with data published recently from the same institute[25] as well as previously by Umesh et al[18]. The World Health Organization Monitoring Trends and Determinants in Cardiovascular Disease (WHO-MONICA) studies, as well as the Japanese epidemiological studies, have previously shown that the risk of cardiovascular diseases increases with clustering of risk factors, such as hypertension, hyperlipidemia and diabetes mellitus[26,27].

The recent Inter-Heart study showed that conventional risk factors also are predictive of the risk of MI in non-Western populations[28]. Adherence to a healthy life style may prevent many cases of coronary heart disease. Therefore, targeting risk reduction by life style modification for individuals who have clusters of risk factors seems a sensible primary goal for outpatient preventive cardiovascular practice[29].

LIMITATIONS

We did not have a control group of population without CHD for Risk factors comparison. Our study also has a survival bias because only patients with acute myocardial infarction who survived to hospitalization were included. Our study also relied on patient self-report of risk factors, which may not accurately compare with more objective measurements involving physical examination and laboratory testing.

CONCLUSION

This study suggests that positive family history, smoking, hypercholesterolemia and hypertriglyceridemia for CHD are more frequent in younger age patients while hypertension and diabetes mellitus are the predominant risk factors in older age patients, presenting with acute myocardial infarction.

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CONTRIBUTORS

SK conceived the idea, planned and wrote the manuscript of the study. MAK, MNK, IS and MH helped in the write up and analysis of the study. MH supervised the study. All the authors contributed significantly to the research that resulted in the submitted manuscript.