JPSIM Journal of Pakistan Society of Internal Medicine

Original Article

Frequency of Risk Factors of Coronary Heart Disease in Patients with Acute Coronary Syndrome and its Comparison in Males and Females

Qais ul Malook, Samrah Afzal, Samrah Khalid, Saad Ansar, Osama Abdur Rehman, Sania Sarwar, Sana Fatima, Sania Akram, Osama Afzal, Rana Muhammad Ali, Iman Fatima

Mayo Hospital Lahore

Abstract

Objective: The current study aimed at finding out frequency of various risk factors of CHDs in patients of ACS and their gender based comparison.

Methods: Sample size of 95 patients with ACS was estimated by using 95% Confidence Interval. Data regarding risk factors were collected from five tertiary care hospitals of Lahore including study subjects of both genders, aged 23-80 years, pre-diagnosed with Acute Coronary Syndrome. The diagnosis of the subjects was based on clinical evaluation, Electrocardiography findings and cardiac enzymes assay. The comatose and critically ill subjects were excluded. Data were analyzed using SPSS v.25.0

Results: Amongst 95 ACS patients (67 male, 28 female), 82% of the patients had been diagnosed with myocardial infarction having equal ratio of STEMI and NSTEMI patients whereas 16.8% with Unstable angina. More females than males had USA (28.6% females, 11.9% males). Mean age at diagnosis was lower in females. Amongst risk factors, hypertension and obesity in females whereas smoking and physical inactivity in males were found to be more prevalent ($p < 0.05$). Atypical presentation, chiefly contributed by nausea along with shortness of breath, was more common in females. Of all study subjects, 97% of the patients had at least 1 risk factor for CHD while 70.5% of the patients had ≥3 risk factors. Moreover, females had higher frequency of combined cardiovascular risk factors.

Conclusion: Male patients present with disease at a later age than females with predominant risk factors being smoking and physical inactivity. Atypical presentation of ACS is relatively more common in females with their predominant risk factors being hypertension and obesity.

Keywords: Risk Factors, Coronary Heart Disease, Acute Coronary Syndrome, Gender differences.

How to cite this:

Malook QU, Afzal S, Khalid S, Ansar S, Rehman OA, Sarwar S, Fatima S, Akram S, Afzal O, Ali RM, Fatima I. Frequency of Risk Factors of Coronary Heart Disease in Patients with Acute Coronary Syndrome and its comparison in Males and Females. J Pak Soc Intern Med. 2022;3(2): 145-148

Corresponding Author: Dr Qais ul Malook **Email:** qaisulmalook@kemu.edu.pk

Introduction

Cardiovascular diseases (CVDs) are a leading cause of morbidity and mortality throughout the world both in males and females.[1] According to a recent report issued by World Health Organization (WHO), there are 17.9 million deaths every year due to Cardiovascular Diseases, an estimated 32% of all deaths worldwide. A recent study conducted in Karachi, Pakistan, shows that one in five middle aged adults in urban Pakistan may have some form of underlying CVDs.[2] A Major proportion of these CVDs associated deaths is contributed by Coronary Heart Diseases (CHDs). CHDs are group of disorders caused by occlusion of coronary arteries leading to compromised blood supply and oxygen availability to the cells which in turn causes pain of angina and myocardial infarction. A major manifestation of CHDs is Acute Coronary Syndrome which is comprised of Unstable Angina, ST-segment Elevation MI, and Non-ST-segment elevation MI.[3]

Acute coronary syndrome is comparatively more common in males, that's why it is often referred to as disease of the males and is one of the reasons to underestimate CHDs in females despite of the fact that more women (35%) than men (32%) die of CHDs according to a

survey in 2013.[4] Previous studies have shown considerable discrepancies in the age of onset, presentation of the disease, its risk factors and even in the treatment strategies for acute coronary syndrome in males and females.[5] On average, women get the disease 10 years later than their male counter-parts.[6] Framingham's Heart study is well known for describing the risk factors of CHDs among general population but very little data are available about the prevalence of these risk factors in our community and especially about the gender differences of risk factors

This study aims to determine this difference in the frequency of various risk factors of ACS in males and females. Once we are able to highlight more prevalent risk factors in our study settings and their gender differences, policies can be devised to modify and reduce the intensity of those risk factors to delay the onset of the disease beforehand.

Methods

This is a comparative cross sectional study that was conducted on the population of Lahore. The study lasted for 6months (from 1st Feb 2019 to 31st July 2019.) Patients from five tertiary care hospitals were included in the study. These included Mayo hospital, Sir Ganga Ram hospital, Sheikh Zayed hospital, Jinnah hospital & Punjab institute of cardiology. A total of 95 patients of ACS were studied. The inclusion criteria for patients were past diagnosis of ACS by Clinical evaluation, Electrocardiography or Cardiac Enzymes Assays. Critically ill patients and patients on ventilators, who were unable to answer the questions asked according to the structured questionnaire, were excluded from the study.

Data Collection

A cross sectional study was conducted in the above mentioned study settings using a short structured questionnaire which was specifically designed to inquire about possible risk factors of acute coronary syndrome. Questionnaire was pre-tested on a few patients for assessment of its validity for the collection of desired data. Patients were interviewed in the wards after formally taking written as well as verbal consent and explaining briefly the purpose of this study.

Patients were asked about basic demographic details and disease specific details. Leading questions were asked about presenting complaints, Hypertension, Diabetes Mellitus, Smoking history (active smoking as well as passive smoking), history of Ischemic heart disease in family members or 1st degree relatives, physical activity and dietary habits. Record of lipid profiles was attained from investigation files of the patients. Patients' heights and weights were measured using height scales and weighing machines respectively, available in the wards and BMI was calculated. Women were asked about history of menstruation and menopause. All the parameters asked in the questionnaire were made measurable in accordance with the international guidelines for every parameter. Later on, an online Google response form was designed on the same pattern.

Data Analysis

Both descriptive and inferential statistical analyses were done in statistical package for social sciences version 25. The presence of 7 risk factors, hypertension, diabetes mellitus, dyslipidemia, smoking, family history, physical activity, body mass index and one additional risk factor, menopause in females only, was coded as 1 and absence was coded as 0. A new variable was computed by adding the values a person had for these 8 risk factors. It corresponded to the number of risk factors a patient had out of these 8 risk factors. This variable was further dichotomized as ≤2, and ≥3. Proportions were calculated for categorical variables and mean ± SD for continuous variables. To compare men and women regarding categorical variables, chi-square test was done and p-values were calculated. $P < 0.05$ was considered significant.

Results

A total of 95 patients were studied including 67 males and 28 females with mean age for males being 57.30 ± 1.336 years and being 54.57 ± 1.941 years for females with all the patients lying in an overall age limit of 23 to 80 years old. Myocardial infarction was a more common diagnosis (p=0.023). Though just one fifth of the total patients had a diagnosis of unstable angina yet it was relatively more prevalent in females (p = 0.048). Almost eighty percent of the patients had presented in emergency department and just a very few presentations in the outdoor patient departments. 3/4th of the patients (57 males, 19 females) were presented with the typical presenting complaints of typical chest pain, pain radiating to jaw, shoulder and left arm and profuse sweating while remaining 1/4th of the patients (10 males, 9 females) were presented with atypical presentation, not directly suggestive of ACS – thus making atypical presentation a more common finding in females (32.1%) than in males (14.9%). Atypical symptoms such as nausea, vomiting, shortness of breath and apprehension were strongly associated with typical disease presentation. Similarly, atypical disease presentation was associated with profuse sweating – traditionally considered to be a feature of typical disease presentation.

Out of 8 risk factors assessed in this study, 93 patients had at least one risk factor, ranging from minimum of zero to maximum of seven risk factors present in a single patient. Only two female patients had no measurable risk factor out of these 8. More than two third of the

patients had a combined prevalence of three or more risk factors while rest of the patients had only one or two measurable risk factors. Combined prevalence of risk factors was strongly associated with female gender than in males (p = 0.010).

Dyslipidemias were overall the most common risk factor in our study population (95.9%), precisely speaking – decreased levels of HDL were more common of all dyslipidemias (82.6%). Hypertension (p = 0.010) and obesity (p = 0.001) were very strongly associated with female gender whereas smoking (p = 0.000) and low physical activity (0.001) are strongly associated with male gender. Though rest of the risk factors are also more common in one gender than the other but haven't been proven statistically significant. More than 3/4th of the females were menopausal with mean age of menopause being 49.17 ± 3.86 years for our study population and the minimum and maximum ages for menopause were 40 years and 57 years respectively.

Table 1: *Comparison of variables*

Variables	All N=95 %	Men N = 67 n (%)	Women N = 28 n (%)	p-Value*
Age ⩾ 45 years	84	61	23	0.216
Mode of Admission				0.330
OPD	15	9 (13.4)	6 (21.4)	
Emergency	80	58 (86.6)	22 (78.6)	
Diagnosis				**0.023**
MI	79	59 (88.1)	20 (71.4)	
USA	16	8 (11.9)	8 (28.6)	
Presentation				0.056
Typical	76	57 (85.1)	19 (67.9)	
Atypical	19	10 (14.9)	09 (32.1)	
Hypertension	45	26 (38.8)	19 (67.9)	**0.010**
Diabetes Mellitus	40	25 (37.7)	15 (53.6)	0.143
Dyslipidemia	70	49 (94.2)	21 (100)	0.261
Decreased HDL	57	39 (81.3)	18 (85.7)	0.653
Raised LDL	21	17 (34.7)	04 (20.0)	0.229
Hypercholesterolemia	23	18 (34.6)	05 (23.8)	0.368
Hyperlipidemia	33	24 (46.2)	09 (42.9)	0.798
Smoking	38	35 (52.2)	03 (10.7)	**0.000**
Family History	47	32 (47.6)	15 (53.6)	0.606
Low/No Physical Activity	18	17 (25.4)	01 (3.6)	**0.001**
BMI ⩾ 25.1	46	27 (40.3)	19 (67.8)	**0.001**
Risk Factors ⩾ 3	67	42 (62.7)	25 (89.3)	**0.010**

Discussion

This study has found out that there is significant difference in the gender distribution of various risk factors of acute coronary syndrome identified by Framingham's heart study. Certain risk factors i.e. hypertension and obesity are more prevalent in females (p = 0.010 and p = 0.001 respectively) whereas smoking and lack of physical activity are more prevalent risk factors in males (p = 0.000 and p = 0.001 respectively). These findings are not exactly the same as shown by a previous studies, which had shown higher prevalence of diabetes mellitus and hypertension in females.[3] A randomized control trial was conducted in Karachi including 3143 study subjects, that had also concluded diabetes mellitus, hypertension and hyperlipidemia being more prevalent in females whereas smoking as a common risk factors amongst males.[2]

Exclusion of diabetes mellitus from this list shows a trend shift over the passage of time most probably due to a better awareness among masses about diabetes mellitus and a better and timely management approach. Although our results for smoking were in the right direction, but it's very unlikely that no female has ever smoked or been in an environment of passive smoking. According to the national health survey of Pakistan (1990 – 1994) 28.6% of men aged equal to or greater than 15 years in general population were smokers whereas 3.4% of the women were documented to be smokers.4 Prevalence of different risk factors among men and women suggests difference in the onset of disease, course of the disease and management strategies of IHD in both men and women.[5,6]

Though dyslipidemia still remains the most common risk factor in our study population, which is a consistent finding with the previous studies, however previous studies show increased TAG levels as the most common form of dyslipidemia whereas our study shows it's the low levels of HDL and not the hypertriglyceridemia.[3] However we have found no significant difference in dyslipidemia among males and females which is a finding in contrast to the previous studies.[7,8] This shows a trend shift over the passage of time.

Among our study subjects, 97% of the subjects had at least one risk factor, which is the same finding as shown in a study by Aymon J. Hammoudeh 9 in 2003, Khot et. al. analyzed 14 RCTs having 122448 patients with Coronary Heart disease and concluded that at least one of the four conventional risk factors is present in 84.6% of women and 80,6% of men.10 This study shows that the combined prevalence of risk factors is more common in females than in males (p = 0.010) and this is a consistent finding as in the previous studies.[11,12]

Conclusion

Majority of the patients with acute coronary syndrome have at least one of the risk factors described in Framingham's Heart Study. Women have higher

combined prevalence of cardiovascular risk factors. Smoking and low physical activity are major risk factors for males whereas hypertension and obesity are major ones for females. Diabetes Mellitus, dyslipidemias and family history are not statistically significant in terms of their different frequencies and prevalence in males and females. Atypical presentation is more common in females. Further research is needed for the better understanding of this gender based difference in prevalence of risk factors.

Limitations: The reporting of risk factors and symptoms may be subject to some degree of recall bias. The study comprises of observations made on a relatively small group of patients. Hence the power of study to detect some differences might be suboptimal. Moreover, non-affordability regarding lipid profile testing in some patients prevents us to generalize the findings to a larger population. Effective data base access with better availability of resources can help us expand our research with better results

Acknowledgments: We are really thankful to Prof Saira Afzal, Chairperson Department of Community Medicine KEMU Lahore and to Dr Fariha Salman, Assistant Professor Department of Community Medicine KEMU Lahore, for their constant support, mentorship and guidance since the very beginning.

Conflict of Interest: None

Funding Source: None

References

1. Duan JG, Chen XY, Wang L, Lau A, Wong A, Thomas GN, et al. Sex differences in epidemiology and risk factors of acute coronary syndrome in Chinese patients with type 2 diabetes: A long-term prospective cohort study. PLoS One. 2015;10(4):1–11.
2. Jafar TH, Qadri Z, Chaturvedi N. Coronary artery disease epidemic in Pakistan: More electrocardiographic evidence of ischaemia in women than in men. Heart. 2008;94(4):408–13.
3. Butt Z, Shahbaz U, Hashmi AT, Naseem T, Khan MZ, Bukhari MH. Frequency of Conventional Risk Factors in Patients with Acute Coronary Syndrome in Males and Females. Ann King Edward Med Univ. 2010; 16(1): 2008–11.
4. Ahmad K, Jafary F, Jehan I, Hatcher J, Khan AQ, Chaturvedi N, et al. Prevalence and predictors of smoking in Pakistan: Results of the National Health Survey of Pakistan. Eur J Cardiovasc Prev Rehabil. 2005;12(3):203–8.
5. Howard B V., Lee Elisa T, Fabsitz RR, Robbins DC, Yeh JL, Cowan LD, et al. Diabetes and coronary heart disease in American Indians the strong heart study. Diabetes. 1996;45(S-3):6-13.
6. Jamc C, Pilote L, Dasgupta K, Guru V, Humphries KH, Mcgrath J, et al. A comprehensive view of sex-specific issues related to cardiovascular disease. 2007;176(6): S1-44.
7. UN K, MB K, CT B, SK S, EM O, SJ B, et al. Prevalence of conventional risk factors in patients with coronary heart disease. JAMA. 2003;290(7):898–904.
8. Castanho VS, Oliveira LS, Pinheiro HP, Oliveira HCF, De Faria EC. Sex differences in risk factors for coronary heart disease: A study in a Brazilian population. BMC Public Health. 2001; DOI: 10.1186/1471-2458-1-3
9. Hammoudeh AJ, Al-Tarawneh H, Elharassis A, Haddad J, Mahadeen Z, Badran N, et al. Prevalence of conventional risk factors in Jordanians with coronary heart disease: The Jordan Hyperlipidemia and Related Targets Study (JoHARTS). Int J Cardiol. 2006;110(2): 179–83.
10. Rinkuniene E, Petrulioniene Ž, Laucevičius A, Ringailaite E, Laučyte A. Prevalence of conventional risk factors in patients with coronary heart disease. Medicina (B Aires). 2009;45(2):140–6.
11. Lee CY, Ting KL, Lu HT, Ali RM, Fong AYY, Wan Ahmad WA. Sex and gender differences in presentation, treatment and outcomes in acute coronary syndrome, a 10 year study from a multi-ethnic Asian population: The Malaysian National Cardiovascular Disease Database-Acute Coronary Syndrome (NCVD-ACS) registry. PLoS One. 2021;16(2):1–23.
12. Dey S, Flather MD, Devlin G, Brieger D, Gurfinkel EP, Steg PG, et al. Sex-related differences in the presentation, treatment and outcomes among patients with acute coronary syndromes: The Global Registry of Acute Coronary Events. Heart. 2009;95(1):20–6.