Gender difference in risk factors associated with ischemic heart disease in Lahore

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ABSTRACT

Background: Ischemic heart disease (IHD) is one of the leading causes of mortality in Pakistan. With advancement in research, multiple causes have contributed in development of web of causation of this public health issue. The objective of this study was to assess gender differences in risk factors associated with ischemic heart disease in patients presenting at the biggest cardiology hospital of Lahore.

Patients and methods: A comparative cross-sectional study was carried out in Punjab Institute of Cardiology, Lahore from January to August, 2018 on a sample of 296 diagnosed patients of IHD, through non-probability consecutive sampling technique. Data was collected on pretested questionnaire. The data was analyzed using SPSS version 22. Chi-Square test of significance was applied and a p-value ≤0.05 was considered statistically significant.

Results: The mean age of participants was 45±12 years with predominance of male patients (71.3%). Frequency of risk factors for IHD included increase body mass index (83.8%), hypertension (61%), insufficient physical activity (43%), diabetes (38.5%) and smoking (23%). Increase serum cholesterol was reported in 95% and triglycerides in 99% of the participants. Gender difference was significant with females residing in urban population (p=0.054) and exercise routine (p=0.034). Males showed high tendency of IHD with smoking pattern (p<0.001) contrary to presence of diabetes in females (p=0.05), hypertension (p=0.054), BMI (p=0.0379) and stressful event in life (p=0.002). Males showed regular intake of medicines (p =0.045) after diagnosis as compared to female population.

Conclusion: There is more frequency of ischemic heart disease in males as compared to females. Significant association was observed with residence in urban area, presence of diabetes, hypertension, high BMI and stressful event in life in occurrence of ischemic heart disease in female population.

Keywords:
Ischemic heart disease; Risk factors; Gender difference

INTRODUCTION

Ischemic heart disease (IHD) is one of the leading causes of high mortality worldwide affecting 17.5 million people, annually.[1] It is predicted that by the year 2020, the death toll with ischemic heart disease will rise highest in South East Asia.[2] South Asian ethnicity, representing 1/4th of the population, is associated with highest incidence of ischemic heart disease.[3] Recent statistics published in USA showed that 15.5 million patients suffered from coronary heart disease annually.[4] Difference in incidence rates among two genders is shown by the results of a recent study conducted in America which revealed that globally 340 per 100 000 males are affected with ischemic heart compared to 180 females.[5] In low income countries, the annual incidence of fatal cardiovascular disease was 4/1000 reported in

India and Pakistan.[6] In Bangladesh alone cardiovascular disease accounts for 17% of the deaths.[7] In India the difference in mortality rates of two genders with ischemic heart disease was reported as 349/100,000 in men and 265/100,000 in women.[6] Similarly, Pakistan has a high disease burden of IHD as well. It is estimated that approximately 5.09 million population is affected with this disease.[8] One out of each 5th middle aged man suffers from IHD in Pakistan.[7] Multiple risk factors are linked with this high incidence categorized non-modifiable and modifiable factors.[8] International literature shows that increasing age, race, family history, diabetes, obesity, sedentary life style, deranged lipid profile and uncontrolled blood pressure serve as major risk factors of IHD worldwide.[9-11] This evidence is supported by a large number of local studies as well.[12,13] Literature search shows that males have higher incidence of ischemic heart disease as compared to females in younger age group because of the protective effects of sex hormones. Strong evidence is available on gender difference in incidence of IHD but still there is dearth of knowledge in assessment of difference

between risk factors of both genders. This study was planned to assess gender difference in risk factors associated with ischemic heart disease in patients presenting with Ischemic heart disease in population of Lahore.

PATIENTS AND METHODS

A comparative cross-sectional study was conducted between January to August 2018 in Punjab Institute of Cardiology, Lahore. Two hundred and ninety-six patients with known diagnosis of IHD were included in this study. Patients visiting the OPD or admitted in Punjab Institute of cardiology with diagnosis of Ischemic heart disease, irrespective of their gender were interviewed for the presence of risk factors. During inclusion of these patients, only recent episode of IHD, within six months was considered. All those patients who were below 18 year of age, or with congenital heart malformation, or valvular heart diseases were excluded from the study. These patients were recruited after approval by Institutional Review Boards of Punjab Institute of Cardiology (PIC) and Akhtar Saeed Medical and Dental College, Lahore. Non-probability consecutive sampling technique was employed to collect the desired number of patients in sample. The data was collected on a structured questionnaire through interview technique. Interviews were conducted by the data collectors after training them. Questionnaire contained both quantitative and qualitative variables. The data was entered, coded, cleaned and analyzed with SPSS version22. Quantitative variable were categorized into qualitative nominal variables for analysis. Chi-Square test of significance was applied and p value ≤ 0.05 was considered statistically significant to assess the gender difference in risk factors.

RESULTS

Two ninety-six patients suffering from IHD were included in the study. According to age distribution in years maximum participants were between 51-60 years of age constituting 91 (30.7%) followed by 41-50 years constituting 83 (28%). There were 211 (71.3%) males and 85 (28.7%) female participants. Educational status of participants showed that majority of them, 133 (45%) were illiterate. Majority of the participants, 188 (63.5%) lived in urban area. One hundred and thirty-eight participants (46.6%) belonged to nuclear families. Out of 296 participants, 96(32.42%) were laborer by profession. Family history of IHD was positive in 136(46%) participants. One hundred and ninety-three (65.2%) participants had first episode of IHD (Table 1).

Table 1. Univariate analysis of socio-demographic profile of patients

Characteristics	Frequency	Percentage
Age in years		
Under 30	8	2.7
30-40	60	20.3
41-50	83	28
51-60	91	30.7
More than 60	54	18.2
Gender		
Male	211	71.3
Female	85	28.7
Educational status of participants		
Illiterate	133	44.9
Primary	74	25
Secondary	56	18.9
Higher	33	11.1
Area of residence		
Rural	108	36.5
Urban	188	63.5
Family distribution of participants		
Nuclear	138	46.6
Extended	158	53.4
Occupational status		
Laborer	96	32.42
Banker	3	1.01
Business man	4	1.35
Engineers/diploma	24	8.11
Farmer	6	2.02
Government worker	14	4.72
Housewife	70	23.64
Poultry farm	4	1.35
Pvt. worker	13	4.4
Retired government servants	9	3.04
Shopkeeper	25	8.45
Teacher	18	6.08
Technician	12	4.05
Family history of Ischemic heart disease		
Present	136	46
Absent	160	54
Distribution of Ischemic heart disease		
No family member	161	54.4
Father	55	18.2
Mother	38	12.8
Siblings	31	10.5
Maternal family	7	2.4
Paternal family	4	1.4
Past history of Ischemic heart disease		
First episode	193	65.2
Recurrent admission	103	34.8

Table 2. Univariate analysis of risk factors in patients with ischemic heart disease

Characteristics	Frequency	Percentage
Smokers	155	52.4
Alcoholic	9	3
Diabetics	114	38.51
Hypertensive	181	61
Hypercholesteremia	281	95 *
High Triglycerides	293	99**
Obesity	296	100***
Working for more than 12 hours	116	39.2
history of stressful event in last six months	190	64.2
Sleep less than 8 hours	183	62
Insomnia, difficulty in falling asleep or interrupted sleep	80	27
History of hypertension on maternal risk	26	8.7
History of hypertension of paternal side	14	4.7
History of diabetes in family	36	12.2

Presence of risk factors among patients presenting with IHD was estimated and it showed that 69 (23.3%) participants were smokers where 21 (7.1%) were smoking more than 20 cigarettes per day. Only 9 (3%) showed history of alcohol intake. Results showed that 114 (38.51%) were diagnosed case of diabetes and only 36 (12.2%) had positive family history for diabetes. Hypertensive participants were 181 (61%), out of these, 113 (38%) participants were hypertensive for last 5 years. Out of 296, 281 (95%) participants had high cholesterol levels and 293 (99%) participants had high levels of TGs. Out of 296, 248 (84%) were moderately obese and only 37 (12.5%) were below 60kg weight. **(Table 1)** Pattern of working hours showed that 37 (12.5%) participants worked for more than 12 hours daily. One hundred and ninety (64.2%) had experienced stressful events. Sleep pattern of participants revealed that 154 (52%) complaint of snoring during sleep. Results of exposure to environmental factors showed that 50(16.9%) were exposed to gases, 35 (11.8%) participants had chemical exposure while 111 (37.5%) were exposed to noise.

Bivariate analysis was applied to see the difference in gender distribution of risk factors associated with Ischemic heart disease. Results showed that there was no significant difference in age distribution of two genders, type of family, pattern and family history of disease and educational status. Significant difference was seen with area of residence as majority of females having ischemic heart disease belonged to Urban area (p=0.054). Similarly, it was observed that females suffering with IHD has less physical activity in terms of exercise as compared to males (p=0.034). Contrary to this smoking was a major risk factor present in males as compared to females (p<0.001). Females with diabetes were at high risk of suffering with Ischemic heart disease as compared to males. Males were not particular in intake of medicines associated with IHD as compared to females (p=0.045). Females with higher BP had more association with IHD as compared to male population (p=0.054). Higher BMI has also shown preponderance of IHD in female participants (p=0.0379). Females with IHD has shown more relation with history of stressful event in life as compared to male participants (p=0.002). No significant difference was observed in other factors including serum cholesterol and TGs levels in both genders (Table 3).

DISCUSSION
Ischemic Heart Disease remains one of the leading causes of morbidity and mortality worldwide. In 2015, 16% of all deaths in both men and women were contributed by Ischemic Heart Disease.[14] Gender distribution reveals high prevalence of ischemic heart disease among males as compared to females. A study conducted in the Eastern region of the Kingdom of Saudi Arabia revealed that 26% of total deaths were attributed to coronary vascular diseases (27 % of death of male and 23% of females).[15] There is more prevalence of Ischemic Heart Disease in people of age group 51-60 years old (30.7%). In a metanalysis of cohort studies, it was observed that there is increased risk of Ischemic Heart Disease in elder people and less chance in young adults and both genders show same pattern of disease with advancing age.[16] Results of this study showed more prevalence of risk of Ischemic Heart Disease in urban areas. Gender differences showed that females belonging to urban population has more risk as compared to men. Other studies also support the fact that urbanization affects higher prevalence of heart disease in both genders.[17]

There was low prevalence of Ischemic Heart Disease in multiplex siblings 31 cases were associated with Ischemic Heart Disease out of total 296. Another study conducted previously showed that multiplex sibling as a strongest risk factors for Ischemic heart disease.[18] Physical activity has significant effect in reducing morbidity and mortality from Ischemic Heart Disease. Studies have shown that regular physical activity proves beneficial in reduction of rate of Ischemic Heart Disease.[19] Smoking is also one of the major risk factors for cardiac problems. In this study 23% of patients were found to be smokers. Other studies also showed that smoking is a risk factor for development of ischemic heart disease as reduction in smoking also reduces the risk of IHD.[20] There was more prevalence of Ischemic Heart Disease in non-alcoholic patients as compared to alcoholic. Alcohol shows negative association in a research conducted in North America and Europe in which there is low prevalence of Ischemic Heart Disease in alcoholic persons. A study showed association of alcohol consumption with heart disease as moderate drinking had a protective effect on heart.[21] Some other studies revealed that binge drinking as compared to routine limited drinking nullify the protective mechanism of alcohol and binge drinkers had 2 fold higher risk of mortality.[22] Two hundred and ninety six persons were enrolled for the research out of which 38.51 % were diabetic and 61.49% were non diabetic. Similar results were shown in other study which was conducted on 1.9 million people in which 17.9% of diabetic patients

Table 3. Gender difference in pattern of risk factors associated with Ischemic heart disease

Characteristics	Gender		p-value
	Male	Female	
Age in year			
Under 30	5 (2.4%)	3 (3.7%)	0.734
30 - 40	44 (21.3%)	16 (18.3%)	
41 - 50	62 (28.9%)	21 (25.6%)	
51 - 60	61 (29.4%)	30 (35.4%)	
More than 60	39 (18%)	15 (17.1%)	
Family			
Nuclear	103 (47.4%)	35 (40.2%)	0.926
Extended	108 (51.7%)	50 (58.5%)	
Area of Residence			
Urban	130 (60.7%)	58 (70.7%)	0.054
Rural	81 (38.9%)	27 (28.0%)	
Family History of Ischemic Heart Disease			
Present	97 (41.7%)	39 (45.1%)	0.09
Absent	114 (53.6%)	46 (54.9%)	
Exercise in routine			
Yes	127 (49.8%)	43 (34.1%)	0.034
No	84 (39.3%)	42 (76%)	
Smoking			
Never smoked	80 (38.4%)	75 (86.6%)	0.000
Ex-smoker	67 (30.8%)	5 (6.1%)	
Current smoker less than 20 cigarettes per day	44 (20.9%)	4 (4.9%)	
Current smoker more than 20 cigarettes per day	20 (9.5%)	1 (01%)	
Diabetes			
Yes	74 (35.5%)	40 (45.1%)	0.055
No	137 (55.9%)	45 (40.2%)	
Are you taking medication			
Not Taken	146 (76.0%)	46 (24.0%)	0.045
Regularly	55 (61.8%)	34 (38.2%)	
Irregularly	10 (66.7%)	5 (33.3%)	
History of Hypertension			
Yes	122 (57.8%)	59 (69.4%)	0.054
No	89 (42.1%)	26 (30.5%)	
BMI (kg/m2)			
18.5-22.9	20 (10.4%)	16 (15.9%)	0.0379
23-29.7	182 (11.8%)	66 (11.0%)	
29.8 and above	9 (4.3%)	3 (3.7%)	
Educational Status			
Illiterate	92 (44.1%)	41 (48.8%)	0.245
Primary	52 (24.2%)	22 (24.4%)	
Secondary	40 (19.0%)	16 (18.3%)	
Higher	27 (12.8%)	6 (7.3%)	
History of Stressful event			
No history of stress	71 (34.6%)	35 (39.0%)	0.002
Death of spouse	11 (4.7%)	11 (13.4%)	
Pregnancy	0 (0.0%)	2 (2.4%)	
Son or daughter leaving home	2 (0.9%)	0 (0.0%)	
Change in financial state	21 (9.5%)	3 (3.7%)	
Death of family member	27 (12.8%)	20 (24.4%)	
Divorced or separation	4 (1.4%)	1 (1.2%)	
Major illness/ injury/ surgery	24 (11.4%)	7 (8.5%)	
Marriage	2 (0.9%)	0 (0.0%)	
Dismissal from work	31 (14.7%)	3 (3.7%)	
Illness in family	16 (7.6%)	2 (2.4%)	
Moving to a new town/ city / country	2 (0.9%)	1 (1.2%)	

showed presentation with cardiovascular disease.[23] Stress is also recognized as risk factor for IHD. There were multiple types of stress but most prevalent was stress due to death of family member and it account for 15.9% of total in this study. In other study it is unveiled that psychological stress chip in its role in the development of cardiovascular disease particularly in long-term development of coronary heart disease and acute triggering of cardiac events.[24] Hypertension was found in 61.21% patient in this research. Likewise, another study showed that HTN is a risk factor for IHD.[12] Patient with less hours of sleep and snoring

problem during sleep are at more risk of developing Ischemic Heart Disease. During this research patient with sleep of 5-6 hours/day were 37% and with snoring were 52%. In studies there is positive association of sleep and snoring with Ischemic Heart Disease in western population.[25] Cholesterol has a direct relationship to Ischemic Heart Disease. There was 94 % of patient with high level of cholesterol and they have Ischemic Heart Disease. Studies have showed that important association between serum cholesterol and Ischemic Heart Disease.[26] In this research study person with high level of triglycerides showed more prevalence of Ischemic Heart Disease. The results showed 98.99% participants with high triglycerides developed Ischemic Heart Disease. Various studies in Western populations have consistently indicated moderate and highly significant associations between triglyceride values and Ischemic Heart Disease risk.[27] The results shows that individuals(32.42%) who work for long hours 55 hours per week have higher risk of Ischemic Heart Disease as compared to those working standard hours. Recent meta-analysis of large data performed by Kiviak et al reported that there was no statistically significant association between longer working hours and Ischemic Heart Disease.[28]

CONCLUSION

Prevalence of ischemic heart disease is more in males as compare to females, in 51-60 years of age group and in urban population. Significant difference was observed in risk factors associated with female population. Gender difference was significant with females residing in urban population and had no exercise routine. Males showed high tendency of IHD with smoking pattern contrary to presence of diabetes in females, hypertension, BMI and stressful event in life. Males showed regular Intake of medicines after diagnosis as compared to female population. There was no significant difference in other risk factors included in this study between two genders. There was no significant difference observed in occurrence of high cholesterol and TGs levels in both genders. This study was conducted in a Lahore based tertiary care hospital so the results cannot be generalized. Furthermore, we used convenience sampling so results can also not be generalized

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