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RISK FACTORS FOR ISCHEMIC HEART DISEASE IN SOUTHERN PUNJAB

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Date Received: May 16,2013
Date Revised: May 28,2013
Date Accepted: June 10,2013

Contribution
All the authors contributed significantly to the research that resulted in the submitted manuscript.

All authors declare no conflict of interest.

ABSTRACT

Objective: To find out the most common risk factor in ischemic heart disease (IHD) in Southern Punjab.

Methodology: This retrospective cross sectional descriptive study was conducted at private clinic of consultant cardiologist at Bahawalpur from June 2009 to December 2011. A total of 3285 patients were registered during the period and only 605 patients were diagnosed as case of ischemic heart disease. So we separated 605 CAD patients and analyze their risk factors as whole and various age groups.

Results: This study contains 605 patients in which female patients are 283 (46.85%) and males are 322(53.2%). The mean age was 57.84±11.72 years. The age of the patients ranges from 25 to 95 years. According to the age, patients were divided into three groups. Group I contains patients <40 years of age and consists of 28 patients. Group II contains 40 - 60 years of age and consists of 351 patients and group III contains >60 years of age and contain 226 patients. Hypertension was more common 451 (74.55%) of patients, followed by diabetes mellitus (DM) 223 (36.85%) and smoking91(15.04%). Forty seven (7.76%) patients were suffering from anxiety neurosis and stress. Sixty four (10.6%) patients were obese, hypertension and DM was more common in female and smoking was more common in male.

Conclusion: This study showed the increased frequency of hypertension, followed by diabetes mellitus and smoking as risk factors for IHD cases at private clinic in one of the remote area of Pakistan.

Key Words: Ischemic Heart disease, Risk Factor, Hypertension, Diabetes Mellitus, Smoking, Cholestan

INTRODUCTION

Cardiovascular diseases account for more than 15 million deaths every year in the world. Many who die are under the age of 65 and given today's increased life span, these deaths are premature.[1]

Diseases like hypertension (HTN) and diabetes mellitus (DM) are well-known risk factors for coronary artery disease (CAD).Other risk factors and behaviors associated with CAD have been identified e.g. cigarette smoking, sedentary habits, dyslipidemia, male gender, age, positive family history, obesity, elevated blood homocysteine and hypoestrogenemia.[2] Control of these risk factors has resulted in a substantial reduction in morbidity and mortality of coronary heart disease.[2] In Pakistan, mortality from coronary heart disease is 410/100000.[3] According to the National Health Survey of Pakistan (NHSP), the prevalence of hypertension is 17.9% and that of diabetes is 10%.[4] The prevalence rates for obesity in an urban Pakistani population are 22% and 37% in males and females, respectively, while high blood cholesterolis prevalent in 13% of Pakistani adults.[4] Tobacco use has been documented in 29% of adult Pakistani men.[4] The increasing prevalence of these risk factors points to the fact that Pakistan shares the encroachment that non-communicable disease risk factors have been making in most developing countries.

Moreover, it is the urban population that is affected more than the rural population regarding prevalence of hypertension, obesity, hypercholestrolemia and cigarette smoking.[4] In survey, the prevalence of current tobacco smoking in Pakistan is 19.1% (32.4 in males vs. 5.7% in females).[5]

Therefore, the urban population of Pakistan constitutes the "high risk" group for CAD. The knowledge of these risk factors of CAD such as, hypertension, cholesterol, smoking and family history may help guide policy making for its effective control in the urban community. Thus, risk assessment becomes quite important in the prevention and management of CAD. Southern area (especially Rahim Yar Khan, Bahawalpur and Bahawalnagar) of the Punjab is usually considered backward area due to poverty and lack of job opportunity. So the prevalence of CAD risk factor may be differ from the other big cities of Pakistan. There fore, this study was conducted to see whether the risk factors of ischemic heart disease are same or different from the rest of the country.

METHODOLOGY

This is a retrospective cross sectional descriptive study done at the private clinic of a consultant cardiologist in Bahawalpur. Database Software on Microsoft Access was made for clinic in mid-2009 and all patients coming to private clinic entered in this software. All patient's basic profile like age, sex, profession, height and weight, cardio vascular risk factor, others ailment and clinical examination was routinely entered. After those ECG findings, any other abnormal investigation findings and then medicines were entered routinely for all patients. At the end of the 2011 total

Table 1: Demographic Data of Patients

Risk Factor	Female	Male	Total	P-value
Age in years (mean±1SD)	58.54±10.77	57.25±12.49	57.84±11.72	
Hypertension n(%)	238 (52.77)	213 (47.22)	451(74.55)	<0.001
Diabetes Mellitus n(%)	122 (54.70)	101 (45.29)	223 (36.85)	0.003
Chronic Smoker n(%)	3 (3.30)	88 (96.7)	91 (15.04)	<0.001
Anxiety neurosis and stress n(%)	40 (85.10)	7 (14.89)	47 (7.76)	<0.001
Cerebrovascular accident n(%)	15 (60.00)	10 (40.00)	25 (4.13)	0.220
Hyperlipidemia	3 (33.33%)	6 (66.66)	9 (1.49)	0.513
Obesity	40 (62.5)	24 (37.5)	64 (10.6)	0.008

3285 patients were registered. Amongst the 3285 patients only 605 patients were diagnosed case of ischemic heart disease. So we separated 605 CAD patients and analyze their risk factors.

Clinical characteristics were summarized in terms of frequencies and percentages for categorical variables. For numerical variables, mean±1SD were used. Statistical analysis was done by using statistical software SPSS version 16.

RESULTS

This study contains 605 patients in which female patients were 283(46.85%) and males were 322(53.2%). The mean age was 57.84±11.72 years. The age of the patients ranges from 25 to 95 years. According to the age, patients were divided into three groups. Group I had patients<40 years of age and consists of 28 patients. Group II contains 40-60 years of age with 351 patients and group III contains >60 years of age and contain 226 patients.

As shown in Table1, the major risk factor for ischemic heart disease is hypertension. Out of 605 patients 451 (74.55%) were hypertensive, 223 (36.85%) were diabetic patients and 91 (15.04%) were smokers. Forty seven (7.76%) patients were suffering from anxiety neurosis and stress. Sixty four (10.6%) patients were obese as reflected in Table 1. HTN and DM is more common in female and smoking is more common in male. Analysis of these risk factors on age group is shown Table 2. In group I among the 18 hypertensive patients 10 (55.55%) were males and 8 (44.44%) were females. In group II among 261 patients, there were138 (52.87%)females and 123 (47.12%)males were suffering from hypertension. At age group III 92 (53.48%) females and 80 (46.52%) male patients were hypertensive. Furthermore, the second major risk factor reflecting from Table 1 is diabetes mellitus Group I consist of 6 patients in which 3 (50%) were females and 3 (50%) were males. And on the other hand in age group II, out of 125 patients 71 (56.80%) were females and 54(43.20%) were males which were suffered from diabetes mellitus. And group III there were total 92 patients, out of which 48 (42.17%) were females and 44 (47.82%) were males. Obesity patients were 5 (0.83)as in group I in which 2 (40%) were females and 3 (60%) were males. Group II consist of 36 (5.95%) obese patients, females were 21 (58.33%) and males were 15 (41.67%). In group III, 23 (3.80%) were found obese, in which 17 (73.91%) were females and 6 (26.08%) were males.

Table 2: Age Group Distribution of Patients

Risk Factors	Age < 40years				Age 40-60years				Age >60years			
	Female n(%)	Male n(%)	Total n(%)	P-value	Female n(%)	Male n(%)	Total n(%)	P-value	Female n(%)	Male n(%)	Total n(%)	P-value
Hypertension	8 (44.44)	10 (55.55)	18 (4.0)	0.098	138 (52.87)	123 (47.12)	261 (57.87)	0.000	92 (53.48)	80 (46.51)	172 (38.13)	0.012
Diabetes Mellitus	3 (50)	3 (50)	6 (2.69)	0.352	71 (56.80)	54 (43.20)	125 (56.05)	0.005	48 (52.17)	44 (47.82)	92 (41.25)	0.418
Chronic Smoker	0	7 (100)	7 (7.69)	0.062	2 (3.22)	60 (96.77)	62 (68.13)	0.000	1 (4.55)	21 (95.45)	22 (24.17)	0.000
Anxiety neurosis and stress	2 (50.00)	2 (50.00)	4 (8.5)	0.574	26 (83.87)	5 (16.12)	31 (65.95)	0.000	12 (100.00)	0	12 (25.53)	0.000
Cerebrovascular accident	0	0	0	0	7 (50.00)	7 (50.00)	14 (56)	1.000	8 (72.72)	3 (27.27)	11 (44)	0.128
Hyperlipidemia	0	1 (100.00)	1 (11.11)	1.000	1 (25.00)	3 (75.00)	4 (44.44)	0.626	2 (50.00)	2 (50.00)	4 (44.44)	1.000
Obesity	2 (40)	3 (60)	5 (7.81)	1.000	21 (58.33)	15 (41.67)	36 (56.25)	0.160	17 (73.91)	6 (26.08)	23 (35.93)	0.014
Total	**28(4.29)**				**351(58.01)**				**226(37.35)**			

The frequencies of alone HTN and DM as well as combined DM and HTN is given in Table 3.

Table 3: Frequencies of Hypertension & Diabetes Mellitus

Risk Factor	Female n(%)	Male n(%)	Total n(%)
Hypertension	129 (49)	133 (51)	262 (43.2)
Diabetes Mellitus	13 (38)	21 (62)	34 (5.6)
DM & HTN	109 (58)	80 (42)	189 (31.2)

DISCUSSION

The purpose of the study was to find out the commonest risk factors for ischemic heart disease in Bahawalpur. Ischemic heart disease is the most common cause of death in human beings. It is well established reason of morbidity and mortality. According to WHO millions of deaths every year in the world due to ischemic heart disease.[1]

The most common risk factors in this study are hypertension 74.5%,diabetes mellitus 36.85%,chronic smoking 15.0% and obesity 64(10.6%).

High blood pressure is an independent risk factor for cardiovascular disease and can increase the risk by 2-3 fold.[6] High blood pressure also call as silent killer. This silent killer found to be one of the major risk factor for IHD in our region i.e. 74.5% which is much higher from other studies. While one study which was done in Rawalpindi is showing 39% which is lower than our study.[7] In the study of Iqbal et al, the percentage of hypertensive patients is 18.9%, in another study done in Peshawar 18.8% to be hypertensive which figures are very low than our study.[8,9] An international study of India also reflecting 31.3% patients to be hypertensive.[10] The reasons for high percentage of hypertension in our region is associated with the presence of arsenic in drinking water as compared to other area.[11] Most of the studies showed association between arsenic and Hypertension.[12] Most of the population of this area is belong to poor socioeconomic status and employment resources are very rear, people cannot meet needs of their routine life, food, medication etc. Other factors are our political situation of country which increases the stress, anxiety unemployment and rising prices in the country.

Diabetes mellitus affects approximately 180 million people worldwide, and the number is expected to double by 2030.[13] Of those with diabetes, 90% have type 2 diabetes, approximately 80% of whom live in low- and middle-income countries. Future growth will be highest in developing regions such as Asia.[14] Insulin resistance and diabetes rank among the major cardiovascular risk factors. Although hyperglycemia associates with microvascular disease, insulin resistance itself promotes atherosclerosis even before it produces frank diabetes, and available data corroborate the role of insulin resistance as an independent risk factor for atherothrombosis.[15] Diabetes mellitus is second most common risk factor in our study which is 36.8%, other national studies showed different picture. Like a study of Rawalpindi is reflecting only 8% patients as diabetic.[7] Another study of Karachi is showing 15% patients to be diabetic.[8] Only 21% reflecting as diabetic in India.[10] Another international study of India reflecting a little higher percentage 39% which is comparable with our study which showing 36.85% to be diabetic.[16]

Cigarette consumption is the leading preventable cause of death worldwide. Historically, cigarette consumption was prevalent in men before women and, at least in the United States, smoking prevalence remains lower in women than men same as in our study. Beyond acute unfavorable effects on blood pressure and sympathetic tone, and a reduction in myocardial oxygen supply, smoking affects athero-thrombosis through several other mechanisms. In addition to accelerating atherosclerotic progression, long-term smoking may enhance the oxidation of low-density lipoprotein (LDL) cholesterol and impair endothelium-dependent coronary artery vasodilation. In addition, smoking has adverse hemostatic and inflammatory effects, including increased levels of CRP, soluble intercellular adhesion molecule-1 (ICAM-1), fibrinogen, and homocysteine. Smoking may provoke spontaneous platelet aggregation, increased monocyte adhesion to endothelial cells, and adverse alterations in endothelial-derived fibrinolytic and antithrombotic factors, including tissue-type plasminogen activator and tissue pathway factor inhibitor. Compared with nonsmokers, smokers have an increased prevalence of coronary spasm and reduced thresholds for ventricular arrhythmia.[15] Chronic smoking which is third commonest risk factor in ischemic heart disease. Our study showing only 15.04% patients to be smoker. Some national studies are showing higher smoking rate than our study. Like 21.4% patients are smoker in the study of Karachi which is high than our percentage.[8] An international study done in India is showing very high score than our study which is 25.9%.[10] In this region smoking is less relevant than other area.

Controversy remains as to whether obesity itself is a true risk factor for cardiovascular disease, or whether its impact on vascular risk derives solely from interrelations with glucose intolerance, insulin resistance, hypertension, physical inactivity, and dyslipidemia.[17] Midlife obesity, however, strongly presages hospitalization and future complications of coronary heart disease, even among those with few or no other major risk factors.[18] Among U.S. adults,

the prevalence of obesity (defined as a BMI of 30 kg/m^2 or higher) has doubled over the past decade, now reaching more than 30% across the population. In this study obesity(BMI of 30 kg/m^2 or higher) is showing as 64(10.6%) while study of India is showing obesity as 33% which is higher than our study.[10] So lower frequency of obesity in this region may be due to poverty and less sedentary work.

Both depression and mental stress predispose to increased vascular risk. The adrenergic stimulation of mental stress can augment myocardial oxygen requirements and aggravate myocardial ischemia. Mental stress can cause coronary vasoconstriction, particularly in atherosclerotic coronary arteries, and hence can influence myocardial oxygen supply as well. Studies have further linked mental stress to platelet and endothelial dysfunction, metabolic syndrome, and the induction of ventricular arrhythmias.[15] Depression increases the risk of coronary artery disease by 1.5-2 times in otherwise physically healthy individuals.[19] Our study reflecting 7.76% patients to stressed. Although actual figure of depression and mental stress may be very high because we did not evaluated on psychiatric evaluation score and usually patients deny his /her stress on history.

Hyperlipidemia is also showing as 1.49% which is low from the study of Peshawar which is showing 2.4%.[9] An international study of India is showing very high percentage which is 29%.[10]

One of the reason of lower frequency of hyperlipidemia in our study is that we did not perform lipid profile of every patients. We just took history and then labeled as hyperlipidemia.

HTN and DM is reflecting 189 (31.2%) patients, out of these 109 males and 89 females as a risk factor. This percentage is comparable with the study of Javed et al, which is showing 27% patients as combine hypertensive and diabetic.[7]

Fortunately, the incidence of myocardial infarction (MI) and symptomatic CAD in young adults is low; most studies show that only about 3% of all CAD cases occur in this age range.[20] Our study also showed comparable result i.e. 4.29% (only 28 out of 605 patient). The frequency of CAD in age >60 years is 37.35% (226 out of 605 patient). Maximum frequency is found between age 40-60years of age i.e. 58.1% (351 out of 605 patient). Again the reason of less frequency among the age >60 years is possibility of early age death in Pakistan. Average age in our country is around 70 years. Similarly when compared with risk factor like HTN, DM, and smoker, it is also found that frequency is for less in under 40 years of age i.e. 4%, 2.69 % and 7.69% respectively as compared to age between 40-60years i.e. 57.87%, 56.05% and 68.13%. Extreme aged patient in this area is very low like only 3 patients are less than 30 years of age and only 2 patients are above 90 years. Age between 80-90 years, there are only 12 patients.

CONCLUSION

This study showed the increased frequency of hypertension, followed by diabetes mellitus and smoking as risk factors for IHD cases at private clinic in one of the remote area of Pakistan. Risk factor for IHD and itself IHD is more common between 40-60 years of age as compared to below 40 years and above 60 years. So prevention, modification and improvement of these risk factors especially hypertension in middle age group can decrease numbers and severity of IHD in Cholestan area.

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