CORONARY ARTERY DISEASE IN INDIAN WOMEN

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ABSTRACT

BACKGROUND
Cardiovascular disease is the leading cause of death among women regardless of race or ethnicity accounting for deaths of 1 in 3 women.

The aim of the study is to identify the important risk factors contributing to the coronary artery disease in Indian women.

MATERIALS AND METHODS
Study conducted on 120 women patients of age >40 yrs. visiting a female outpatient department of Jawahar Lal Nehru Medical College, Bhagalpur, who presented with complaints related to CAD cases diagnosed from the electrocardiogram findings, clinical features and biochemical marker as per World Health Organization guidelines.

RESULTS
50-59 years age group is most effected group in study with 44.2%. Most of the women are of postmenopausal age group. The maximum number of cases was seen in upper lower socioeconomic status (37.5%) followed by lower (19.2%). CAD incidence was minimum in upper class. Chest pain was the main complaint in patients, next in frequency was sweating and followed by breathlessness. The major risk factors in the study group were hypertension (74.1), diabetes (63.3), sedentary habits (49.1), stress (34.2), family history (29.2) and tobacco consumption (21.8). 25 patients had obesity and 54 peoples were overweight. In our study, 48 patients had 3 children, 19 had more than 3 children. 61.7% of the patients are with hypercholesterolaemia, which most of the patients found with 2 vessel block is most common blocks observed.

CONCLUSION
Despite this delay in onset, mortality from coronary heart disease is increasing more rapidly among women than men.

KEYWORDS
Postmenopausal, Hypertension, Dyslipidaemia.

BACKGROUND
According to a report of World Health Organization (WHO) in 2005, Cardiovascular Disease (CVD) caused 17.5 million (30%) of the 58 million deaths that occurred worldwide.[1] There has been an alarming increase over the past two decades in the prevalence of CHD and cardiovascular mortality in India and other south Asian countries. India is going through an epidemiologic transition whereby the burden of communicable diseases have declined slowly, but that of Non-Communicable Diseases (NCD) has risen rapidly, thus leading to a dual burden. There has been a 4-fold rise of CHD prevalence in India during the past 40 years. Current estimates from epidemiologic studies from various parts of the country indicate a prevalence of CHD to be between 7%

and 13% in urban[2-4] and 2% and 7% in rural[5] populations. Epidemiologic studies have shown that there are at present over 30 million cases of CHD in this country. The Global Burden of Diseases Study reported that the disability adjusted life years lost by CHD in India during 1990 was 5.6 million in men and 4.5 million in women; the projected figures for 2020 were 14.4 million and 7.7 million in men and women, respectively.[6]

In India, mortality attributable to CVD is expected to rise by 103% in men and by 90% in women from 1985 to 2015.[7] More importantly, the disease catches Indians young. Therefore, to stop the ruthless assault of CVD in developing countries, there is an urgent need to represent the disease in the health agenda of these countries.

Much of the knowledge of risk factors for Coronary Artery Disease (CAD) has been acquired from studies conducted in the Western population. It is widely believed that the association of these risk factors with CAD in other populations needs to be ascertained and there is speculation that differences might range from the frequency of presence of classical risk factors to their total absence or irrelevance in these populations. Therefore, it is imperative to undertake large population-based prospective studies in developing

countries such as India to identify CAD risk factors, both conventional and novel.

We discuss the conventional risk factors prevalent in young Indian CAD patients. We have restricted ourselves to well-established CAD-associated risk factors as these are the immediate targets for cardiac event risk reduction worldwide. To make up the deficiencies in data, we have tried to supplement the information from India with studies from other Asian countries.[8] This study is conducted to identify the important risk factors contributing to the coronary artery disease in Indian women.

MATERIALS AND METHODS

We conducted a study on 120 women patients of age >40 yrs. visiting a female outpatient department of medical college who presented with complaints related to CAD.

The CAD cases were diagnosed from the electrocardiogram findings, clinical features and biochemical marker as per World Health Organization Guidelines.[9]

Following patients were excluded from study. Patients with valvular heart diseases, pericarditis and inflammatory, malignant pericardial effusion, aortic aneurysm, renal disease, liver disease, hypothyroid/hyperthyroid disease, anaemia, chronic obstructive lung disease and connective tissue disorder.

Detailed clinical history, clinical examination and investigations

A detailed clinical workup incorporating details of age, presenting complaints, diet, smoking, alcohol consumption, physical activity, reproductive history, socioeconomic status, body mass index and pedigree chart was made. Risk factors for CAD-like hypertension, diabetes, dyslipidaemia and family history of CAD was evaluated. Site of infarction and type of presentation as could be assessed by electrocardiogram was also evaluated.

Statistical analysis done by independent variables (risk factors) and main outcome variable (CAD) were treated as categorical variables. These are represented by numbers and percentages.

RESULTS

Age Intervals in Years	No. of Patients	Percentage
40-49 yrs.	21	17.5
50-59 yrs.	53	44.2
60-69 yrs.	34	28.3
70-79 yrs.	9	7.5
>80 yrs.	3	2.5
Total	**120**	**100**
Socioeconomic Status		
Upper	12	10
Upper middle	21	17.5
Lower middle	19	15.8
Upper lower	45	37.5
Lower	23	19.2
Total	**120**	**100**

Table 1. Demographic Distribution

50-59 yrs. age group is most effected group in study with 44.2%. Most of the women are of postmenopausal age group. The maximum number of cases was seen in upper lower socioeconomic status (37.5%) followed by lower (19.2%). CAD incidence was minimum in upper class.

Symptoms	Number of Cases
Chest pain	86
Sweating	71
Breathlessness	51
Vomiting	26
Palpitation	21
Other	12

Table 2. Symptoms in Patients Studied

Chest pain was the main complaint in patients, next in frequency was sweating and followed by breathlessness.

	No. of Cases	Percentage
Hypertension	89	74.1
Diabetes mellitus	76	63.3
Sedentary habits	59	49.2
Stress	41	34.2
Family history of CAD	35	29.2
Tobacco consumption	25	21.8

Table 3. Risk Factors Associated in Study

The major risk factors in the study group were hypertension (74.1), diabetes (63.3), sedentary habits (49.1), stress (34.2), family history (29.2) and tobacco consumption (21.8).

Body Mass Index	Body Mass Index (kg/m2)	Number of Cases	%
Underweight	<18.5	7	5.8
Normal weight	18.5-24.9	34	28.3
Overweight	25-29.9	25	20.8
Class 1 obesity	30-34.9	21	17.6
Class 2 obesity	35-39.9	19	15.8
Extreme obesity	>40	14	11.7
		120	100

Table 4. Association of Body Mass Index with CAD

In present study, 25 patients had obesity and 54 peoples were overweight.

Number of Children	0	1	2	>3
Number of cases	10	14	29	48

In our study, 48 patients had 3 children, 19 had more than 3 children.
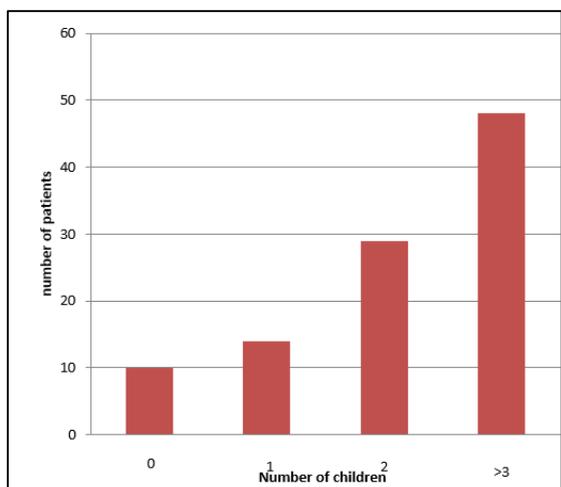
Figure 1. Parity in Present Study

Type of Dyslipidaemia	No. of Cases	Percentage
Hypercholesterolaemia (>200 mg/dL)	74	61.7
Hypertriglyceridaemia (>150 mg/dL)	56	46.7
High-density lipoprotein cholesterol(130 mg/dL)	39	32.5
Low-density lipoprotein cholesterol(>130 mg/dL)	32	26.7
Table 5. Dyslipidaemia in Females with CAD		

61.7% of the patients are with hypercholesterolaemia, which most of the patients found with.

Vessel Block in Number	No. of Cases	%
1	17	14.2
2	58	48.3
3	45	37.5
	120	
Table 6. Number of Vessels Block in Coronary Vascular Disease		

Two-vessel block is most common blocks observed.

DISCUSSION

Risk factors for CAD in females were categorised into modifiable and non-modifiable. Modifiable risk factors consists diabetes mellitus, high blood pressure, elevated serum cholesterol, obesity, sedentary habits, stress and tobacco consumption. Non-modifiable risk factors include age, sex, family history and genetic factors.[10] Effects of coronary risk factors differ between the sexes. Female has additional factors like hormonal status and parity.[11]

In our study, maximum number of cases was seen in 6th decade. This increase in incidence of CAD with age is observed in Framingham heart study.[12] Protection from CAD in younger women is due to endogenous oestrogen. At the age of 50-60, the level of atherogenic lipids increase and risk of CAD doubles for women. In this study, maximum numbers of patients were from lower socioeconomic status. The similar results were found in Shruthi Bettegowda et al study.[13] This association maybe due to more number of poor people in the area were our study conducted. Chest pain was

the main complaint in 88 patients, 15 patients had giddiness and other nonspecific symptoms correlates with study done by Shruthi Bettegowda et al study and several studies showed similar pattern of symptomatology.[13,10] Women present less with typical angina and more with atypical symptoms like fainting, fatigue, weakness and dyspnoea. These differences should be kept in mind during evaluation of chest pain in females. Hypertension was the commonest risk factor in our study. There were 74.1% patients of hypertension. Similar association was observed in Shruthi Bettegowda et al study and other studies.[10,13] Hypertension is strongly correlated with obesity in females with BMI more than 30 in comparison to females with less than 20 BMI.

In this study, 63.3% females were diabetic. Similar association of diabetes with CAD was observed in Shruthi Bettegowda et al study and other studies.[11,13] Diabetes carries a greater risk in females completely eliminating the "female advantage." Diabetes removes the oestrogens protective effects and eliminates the normal sex difference in the prevalence of CAD.[14] Diabetes equalises the risk of CAD between premenopausal diabetic women and nondiabetic men of same age. Diabetes is associated with other CAD risk factors like obesity, dyslipidaemia, hypertension and insulin resistance. Lastly, diabetes is associated with various coagulation abnormalities like endothelial dysfunction and platelet abnormalities, additional contributors to CAD.

In this study, 32 patients had increased Low-Density Lipoprotein (LDL) cholesterol and High-Density Lipoprotein (HDL) cholesterol was low in 39 patients. Hypertriglyceridaemia was found in 74 patients. Similar findings were noted in other studies.[8] Elevated total cholesterol and LDL are important risk factors for CAD in men, but in women, low HDL and high triglycerides are important risk factors.[15] In present study, 55 patients were obese. Obesity is associated with increased risk of hypertension, diabetes, dyslipidaemia and CAD. Body Mass Index (BMI) is single best measure of obesity. Data revealed that mortality due to CAD in obese women was fourfold higher than lean ones.[16] In this study, 59 patients had sedentary lifestyle. In females, increasing level of physical activity and physical fitness will improve their cardiovascular risk profile.[17]

In this study, 48 patients had more than three children. Studies have emphasised two possible biological mechanisms for the association between parity and IHD in women. In the first, it is proposed that each pregnancy permanently resets ovarian function leading to a reduced lifetime exposure to oestrogen. A second biological mechanism suggests that because normal pregnancy is a state of relative insulin resistance, repeated pregnancies may result in permanent detrimental effects on lipid and glucose metabolism.[18]

CONCLUSION

It can be safely concluded from the findings of this study that hypertension, diabetes mellitus, dyslipidaemia, obesity, family history of IHD, tobacco consumption, physical

inactivity, stress, menopause and low socioeconomic status are important coronary risk factors. Multiple risk factors are common and risk increased with the number of risk factors. Similarly, preventive measures should address not only single risk factors, but should be more holistic.

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