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Research Article

Clinical Profile of Ischemic Heart Disease in Women with Special Reference to the Risk Factors

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Abstract: Ischemic heart disease is the leading cause of death in women from developing countries. Among health care professionals there is apparent lack of awareness about this disease in women. All the research based evidence regarding treatment of ischemic heart disease is gathered by experimenting on men. There is lack of studies on ischemic heart disease in women in our nation. The objective of our study was to assess the clinical profile and the risk factors in 100 women presented with ischemic heart disease. Study protocol included detailed clinical history, clinical examination and investigations. The major risk factors of ischemic heart disease in women were hypertension, diabetes mellitus, sedentary habits, stress, low socio economic status, old age, family history of ischemic heart disease, tobacco consumption, dyslipidemia, obesity, multiparity, and menopausal status. Some of these risk factors can be modifiable by changing lifestyle, females who are prone for ischemic heart disease need to be screened, counselled and treated. A more extensive prospective cohort study in future is required to know the link between multiparity and ischemic heart disease.
Keywords: Diabetes mellitus, Dyslipidemia, Hypertension, Ischemic heart disease, Obesity, Menopause.

INTRODUCTION

Ischemic heart disease (IHD) is the biggest killer of women globally.IHD causes 8.6 million deaths among women annually, a third of all deaths in women worldwide. Every year more women than men die of IHD. Women in low and middle income countries have worse situation than men, experiencing higher proportion of IHD deaths than men [1]. Women continue to be under represented in research on heart disease. Most of the studies conducted on IHD are based on male population and whether we should implement the same guidelines on women counterparts is an unanswered question [2]. With more data from Women's Ischemia Syndrome Evaluation Study (WISE), as well as other new studies during the past several years, an evolving knowledge regarding sex differences in IHD has emerged. Women and men with heart disease tend to differ in their presenting symptoms, access to investigations, treatment and overall prognosis [3]. Women present with more atypical symptoms than men like back pain, shortness of breath, burning in the chest, nausea, or fatigue, which makes the diagnosis more difficult. Risk factors for IHD vary between males and females [4]. Diabetes mellitus is a stronger IHD risk factor in women than in men. Hypertension is associated with a two to threefold increased risk for IHD in women. In women, low levels of high density lipoprotein are strong predictors of higher IHD risk than high levels of low density lipoprotein [5]. Studies have shown complex relationship between IHD risk, estrogen, menopause and serum cholesterol in women [6, 7]. Antiestrogenic effect of tobacco and smoking increases the risk of IHD in premenopausal women [8]. Studies have shown, in women cardiovascular risk profiles improve with increasing levels of physical activity [9]. In women central obesity was observed as one of the major risk factor for IHD [10]. Despite differences between the sexes in risk factors, presentation, and response to treatment, women in our country continue to receive similar treatments to men on the basis of trials that include mainly male participants. As few data were available on IHD in females from our country [8, 11-13], this study is conducted to identify the important risk factors contributing to the IHD in women.

MATERIALS AND METHOD

Consecutive 100 adult female patients admitted in the medicine and cardiology department of territory care hospital with signs and symptoms suggestive of IHD were considered for this descriptive observational study. Ethics committee approval was taken for the study.

The IHD cases were diagnosed from the electrocardiogram findings, clinical features and biochemical marker as per World Health Organization guideline [14].

Following patients were excluded from study

- Patients with valvular heart diseases
- Patients with pericarditis and inflammatory, malignant pericardial effusion
- Patients with aortic aneurysm
- Patients with renal disease
- Patients with liver disease
- Patients with hypothyroid/hyperthyroid disease
- Patients with anaemia,chronic obstructive lung disease
- Patients with connective tissue disorder

Study protocol included detailed clinical history, clinical examination and investigations. A detailed clinical work up 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 IHD like hypertension, diabetes, dyslipidemia, family history of IHD was evaluated. Site of infarction and type of presentation as could be assessed by electrocardiogram was also evaluated.

Definition of terms

Patients on oral hypoglycemic drugs, Insulin or those having fasting blood sugar > 126 g/dl were regarded as having diabetes mellitus. Those with blood pressure > 140 / 90 mmHg taken twice or those on antihypertensive drugs were defined as hypertensive. A diagnosis of hyperlipedemia was made if total Cholesterol is > 160 mg/dl, Triglycerides > 150 mg/dl, and LDL > 130 mg/dl. Height, waist and hip circumference were measured in centimetres by using a non-stretchable standard tape with a metal buckle at one end over the light clothing. Waist circumference was measured in the centre of the iliac crest and the coastal margin, and hip circumference was measured at the widest point on buttocks below the iliac crest. . Patients were divided in to non-obese and obese on the basis of body mass index (BMI). A BMI of 27.3 Kg/m^2 or more in female indicates obesity.

$$BMI=\frac{\text{Body weight (Kg)}}{\text{Height}^2 \text{ (meters)}}$$

Females with history of ischemic heart disease in first degree male relatives of less than 55 years or in female relatives less than 65 years were regarded as having history of premature coronary artery disease in the family. Menopause were considered to be present when there was no history of menstrual periods for the last one year. Current smokers were defined as those who smoked any form of tobacco in the previous 6 months while former smoker were those who had quit more than 6 months earlier. Subjects were asked about duration of tobacco intake and amounts consumed and were divided in two groups, tobacco chewer and non-tobacco chewer. Socio- economic statuses of the patients were divided according to kuppuswamy classification [15]. Physical activity of patient was measured as heavy, medium and light/sedentary according to modified Minnesota leisure time questionnaire [16].

Statistical Analysis

Independent variables (Risk factors) and main outcome variable (IHD) were treated as categorical variables. These are represented by numbers and percentages

RESULTS

Age Incidence

In our study of 100 patients maximum incidence of IHD occurred in sixth decade (Table 1).

Table 1.Age incidence

Age groups in years	Number of females	Percentage
40-49	18	18%
50-59	26	26%
60-69	38	38%
70-79	16	16%
80-89	2	2%

Socioeconomic status

The maximum number of cases was seen in upper-lower socioeconomic status (SES) (30%) followed by lower (26%). IHD incidence was minimum in upper middle SES (Table 2).

Table 2: Socioeconomic status

Socioeconomic status	Number of cases	Percentage
Upper	14	14%
Upper middle	10	10%
Lower middle	20	20%
Upper lower	30	30%
Lower	26	26%

Symptomatology

Chest pain was the main complaint in 88 patients, next in frequency was sweating, and followed by breathlessness (Table 3).

Ischemic heart disease risk factors

The major risk factors in the study group were hypertension (73), diabetes (50), sedentary habits (48), stress (32) family history (26), and tobacco consumption (20) (Table 4).

Table 3: Symptomatology

Symptoms	No. of cases
Chest pain	88
Sweating	38
Breathlessness	16
Vomiting	14
Palpitation	10
Other	15

Table 4: Ischemic heart disease risk factors profile in females

Risk factors	Number of females	Percentage
Hypertension	73	73%
Diabetes mellitus	50	50%
Sedentary habits	48	48%
Stress	32	32%
Family history of IHD	26	26%
Tobacco consumption	20	20%

Dyslipidemia

In our study 60 patients had increased cholesterol, 50 patients had altered triglyceride and high density cholesterol was low in 38 patients. Low density cholesterol was high in 36 patients (Table 5).

Obesity

In present study 22 patients had obesity and 30 people were overweight (Table 6).

Table 5: Dyslipidemia in females with IHD

Type of dyslipidemia	Number of females	Percentage
Hypercholesterolemia (>200mg/dl)	60	60%
Hypertriglyceridemia (>150mg/dl)	50	50%
High density lipoprotein cholesterol(<35mg/dl)	38	28%
Low density lipoprotein cholesterol(>130mg/dl)	36	36%

Table 6: Association of Body Mass Index with IHD

Category	Body mass index(kg/m^2)	Number of cases	Percentage
Under weight	<18.5	10	10%
Normal weight	18.5-24.9	38	38%
Over weight	25-29.9	30	30%
Class 1 obesity	30-34.9	20	20%
Class 2 obesity	35-39.9	2	2%
Extreme obesity	40	0	0%

Menopausal status

There were 12 premenopausal patients and 88 postmenopausal patients in this study (Table 7).

Parity

In our study 35 patients had 3 children, 20 had more than 3 children (Table 8).

Table 7: Menstrual status

Menstrual status	Number of cases	Percentage
Pre menopausal	12	12%
Post menopausal	88	88%

Table 8: Parity

Number of children	0	1	2	3	>3
Number of cases	5	10	30	35	20

Patients in this study were not using any oral contraceptive pills and not on hormonal replacement therapy.

Type of IHD

In this study 68 women were presented with acute myocardial infarction and chronic stable angina in 24 patients (Table 9).

Table 9: Type of IHD

Type of IHD	Number of cases	Percentage
Chronic stable angina	24	24%
Unstable angina	8	18%
Acute myocardial infarction	58	58%

DISCUSSION

IHD remains the leading cause of death in men and women worldwide [4]. Several studies have reported that Indians have high incidence of IHD [8, 11, 17]. Risk factors for IHD in females were categorised in to 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 [11, 12, 17]. Effects of coronary risk factors differ between the sexes [4]. Female has additional factors like hormonal status and parity [3, 5].

In our study maximum number of cases was seen in 6^{th} decade. This increase in incidence of IHD with age is observed in Framingham heart study [17]. Protection from IHD in younger women is due to endogenous estrogen. At the age of 60, the level of atherogenic lipids increase and risk of IHD doubles for women [6, 7].

In this study maximum numbers of patients were from lower socioeconomic status. The similar results were found in Minnesota survey [18]. This association may be 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 non specific symptoms. Several studies showed similar pattern of symptomatology [3, 8, 13, 19, 20]. 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 [4].

Hypertension was the commonest risk factor in our study. There were 73 patients of hypertension. Similar association was observed in other studies [11, 21]. Hypertension confers a fourfold risk of IHD in females versus threefold in males [5]. The systolic blood pressure continues to increase disproportionately in females until the age of 80.

Hypertension is strongly correlated with obesity and is six fold higher in females with BMI more than 30 in comparison to females with less than 20 BMI. Weight reduction of 10 kg decreases systolic blood pressure by six mmHg and diastolic by three mmHg in hypertensive females [22].

In this study 50 females were diabetic. Similar association of diabetes with IHD was observed in other studies. [11, 12, 17, 21]. Diabetes carries a greater risk in females, completely eliminating the ‘‘female advantage’’ [23]. Diabetes removes the estrogens protective effects and eliminates the normal sex difference in the prevalence of IHD [24].

Diabetes equalises the risk of IHD between premenopausal diabetic women and non diabetic men of same age. [13]. Diabetes is associated with other IHD risk factors like obesity, dyslipidemia, hypertension, and insulin resistance. Lastly diabetes is associated with various coagulation abnormalities like endothelial dysfunction and platelet abnormalities, additional contributors to IHD [23].

In this study 36 patients had increased low density lipoprotein (LDL) cholesterol and high density lipoprotein (HDL) cholesterol was low in38 patients. Hypertriglyceridemia was found in 50 patients. Similar findings were noted in other studies [11-13]. Elevated total cholesterol and LDL are important risk factors for IHD in men, but in women low HDL and high triglycerides are important risk factors [25-27].

In present study 22 patients were obese. Obesity is associated with increased risk of hypertension, diabetes, dyslipidemia, and IHD. Body mass index (BMI) is single best measure of obesity. Data from Nurses health study revealed that mortality due to IHD in obese women was fourfold higher than lean ones [28].

In this study 48 patients had sedentary life style. In females increasing level of physical activity and physical fitness will improve their cardiovascular risk profile [29].

Tobacco consumption was present in 20 females either in the form of smoking or chewing. Smoking increases the IHD risk in females by its synergistic action with oral contraceptive use, especially in women aged more than 35years.women with smoking attains early menopause, another IHD risk unique to females [30, 31].

Family history of premature IHD was present in 26 patients. Similar finding was observed in other studies [13, 32]. A family history of premature IHD in a sister carries 12fold higher risk for IHD in comparison to six fold for a brother and three fold for a parent [13].

There were 12 premenopausal patients and 88 postmenopausal patients in this study. Similar findings were found in Balakrishnan study [33]. In premenopausal women endogenous estrogen provide protection from IHD. Additionally estrogen enhances elasticity of vessel wall, reduces hypertrophy of cells, and has anti-inflammatory and antioxidative properties [34].

In our study 32 patients had stress. A study revealed that transient global myocardial ischemia in response to mental stress is more in females than in males [35].

In this study 35 patients had three children. Studies have emphasized 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 estrogen. 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 [36].

In our study 58 patients presented with myocardial infarction and 42 had angina as their presentation. Majority of males with IHD present with myocardial infarction or sudden death as their first manifestation of disease, where as female may have angina pectoris as their first symptom [37].

CONCLUSION

This study shows that hypertension, diabetes mellitus, dyslipidemia, 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. As these risk factors can be modifiable by simple lifestyle measures, dietary restriction and exercise should be encouraged. These measures are economically feasible in our developing nation. Whether parity, a unique risk factor in women act as an additional risk factor needs to be studied further. Identification and reduction of risk factors is important step to prevent morbidity and mortality due to IHD in women.

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