Original Research Article

Coronary Heart Disease risk profile among women attending Tertiary Care Hospital in Southern Karnataka, India

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ABSTRACT

Background: Present study was conducted to assess the risk factors of CHD in women who had undergone Coronary Angiography for CHD evaluation. Objectives of the study were to assess the CHD Risk profile among women attending Tertiary Care Hospital at Mysore city and to enlist the clinical presentation of women admitted to tertiary care Hospital. Settings and Design: Hospital based cross sectional study.
Methods: All the women who were admitted to the Department of Cardiology from April 2015 to January 2016 were interviewed using pre structured proforma. Details of the female patients who had undergone Angiography from September 2013 to March 2015 were also collected from Medical Record Section of the Hospital. Statistical Analysis: Proportion and mean were used for relevant univariate analysis and significance of association was tested using appropriate tests of significance.
Results: 17% of women were known cases of CHD. 87.4% of women were admitted with the symptom of chest pain. 44% of women who presented with IHD belonged to normal and underweight BMI category. Among the clinically suspected or diagnosed to be cases of CHD, 75% had blocks in their coronaries. Single artery block (29.7%) and triple artery block (22.5%) were predominant. Left anterior descending artery had significant block (>70%) in 36% of women. Left circumflex artery and right coronary arteries showed significant blocks in 26% and 22.5% participants.
Conclusions: Earlier age of presentation, higher proportion of coronary blocks in majority of study women belonging to normal or underweight BMI category are alarms of changing pattern of CHD in Indian women.

Keywords: Women, Coronary artery disease, Angiography

INTRODUCTION

Women are described as the real architects of the society. The role of Indian women is changing from just a home maker to an important partner in the holistic growth of the family and country. In this never ending struggle for prosperity, women toil both in and out of the house. In satisfying the needs of her loved ones, she gives little time for herself and her health. This in olden days manifested in the form of nutritional deficiencies. But in past few decades, it's not just the anemia or cancer cervix which is killing her, but Lifestyle diseases like hypertension, diabetes mellitus (DM) and coronary heart diseases (CHD) are coming to the forefront as leading killers.

Although heart disease was earlier thought of as a Man's disease, around same number of women and men die each year of heart disease in many countries. Despite increase in awareness over the past decade, only 54% of

women in United States recognize that heart disease is their number one killer. To worsen the situation, 55% of all cardiac deaths mortality occurs in first hour, emphasizing the importance of early evaluation of CHD which accounts for 25% of the deaths in women in most western countries.[1]

In India, the prevalence of CHD is 3.7%.The prevalence is 6.1% and 6.7% in urban India in males and females respectively and 2.1% in males and 2.7% in females in rural India.[2] The risk increases with age, especially in women after the menopause because of decreasing levels of estrogen.

Though men are considered to develop CHD earlier than women, the latter develop CHD more rapidly after menopause. Nowadays, smoking or tobacco consumption is increasing in women. As smoking and diabetes are strong predictors of coronary events in both genders, the risk is two to four folds greater in women.[1]There is a significantly lower age-specific risk of CHD in women than men. Risk of death due to CHD in women is roughly similar to that of men 10 years younger. Despite their marked advantage in age-specific risk of CHD death, the greater likelihood of survival of women to advanced ages produces nearly equal numbers of actual deaths due to CHD in men and women.[3]

Major risk factors for the CHD events are blood pressure, dyslipidemia, smoking, high alcohol consumption, diabetes, obesity, sedentary lifestyle etc. Indians have greater prevalence of CHD since the occurrence of above mentioned risk factors are more commonly associated with low educational level and SES.[2]

Several reports have documented a worse prognosis for women with CHD than for men with CHD, which likely reflects increased severity of illness at presentation, increased age, and co-morbidity in women.[4]

There is very few published literature about the CHD risk profile among women in India. Considering the changing lifestyle, dietary habits and work pattern of women in India, it is imperative to know the risk factor and clinical profile of women presenting with CHD, so that timely preventive and control measures can be taken to reduce the impact of CHD.

Objectives

1. To assess the CHD Risk profile among women attending Tertiary Care Hospital at Mysore city
2. To enlist the clinical presentation of women admitted to tertiary care Hospital.

METHODS

Study design

Cross sectional descriptive study.

Study setting and population

Women who got admitted to the Department of Cardiology of JSS Hospital from Mysore and its neighbouring districts, with suspected IHD were included in the study. 111 such women were interviewed and 186 previously admitted women's records were screened and data were collected on sociodemography, diet, lifestyle, physical exercise, personal habits, laboratory investigations and angiographic details.

Inclusion criteria

Women clinically suspected or diagnosed as cases of CHD and undergone coronary angiography.

Exclusion criteria

Women critically ill and not in a position to share the information.

Statistical analysis

Data was entered into excel sheet and analysed using SPSS 22.1 software. Univariate analysis included proportion, mean and standard deviation, median range of the variables. Bivariate analysis was done using student t test to find the difference in mean values. Ethical clearance for the study was obtained from Institutional ethical committee of JSS Medical College, Mysore. Informed written consent of each woman was obtained before start of the study.

RESULTS

111 women were interviewed and 186 women's records were screened for the evaluation of risk factors and angiographic findings. As complete and reliable details were available only on lab investigations and to avoid information bias, only hemoglobin, lipid profile and angiographic details were noted down from the previous case sheets (186) and they have been analyzed together with respective details of women who were interviewed by the researchers. The results of these combined data (287 women) have been presented at the end of the results section separately.

Among the interviewed women (n=111), minimum age of study participant was 25years and maximum 95 years and 19.8% of the study population were below 50 years of age and 33.3% of the were in the age group of 51 to 60 years.41.4% of the study participants were non literate in the present study. According to B.G. Prasad scale of socioeconomic classification, 31.5% of study participants belonged to class V as shown in Table 1.

Mean (SD), age (years) at menarche, marriage and menopause was 14(1.33), 17(3.80) and 47(3.74) respectively. Physical activity of 58.6% women was meeting the WHO recommendations of metabolic

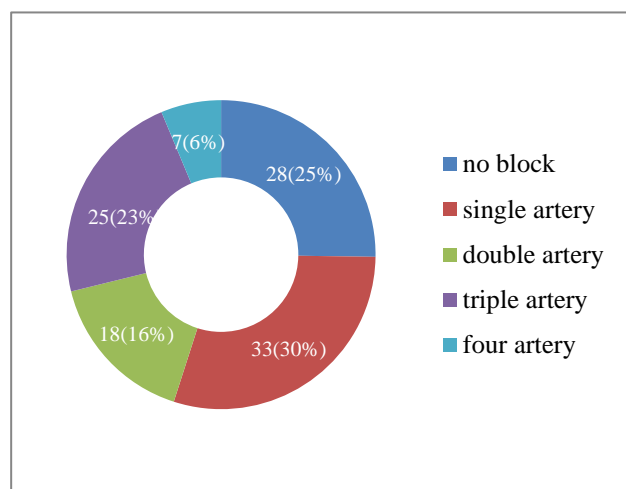equivalents (MET) of more than 600 MET-minutes per week.

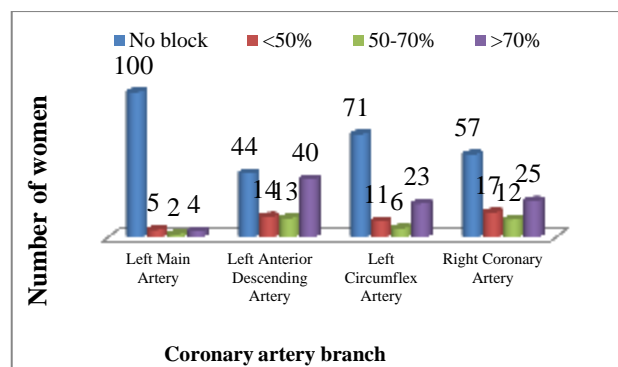Figure 1: Study subjects showing number of coronary artery blocks (N=111).

Figure 2: Distribution of study subjects based on location and extent of coronary artery blocks (N=111).

17% of women were known cases of CHD and two thirds of them were diagnosed for more than two years. 42.3% and 59.5% of women were known case of Diabetes and Hypertension respectively. 65% of the hypertensives and 76% of the Diabetics were diagnosed for more than five years.

Table 1: Sociodemographic profile of the interviewed study subjects (N=111).

Age in years	Frequency	Percent
<40	03	2.7
41-50	19	17.1
51-60	37	33.3
61-70	37	33.3
>70	15	13.5
Total	111	100
Education status		
Non-literate	46	41.4
Primary	44	39.6
High school and PUC	13	11.7
Degree	08	7.2
Total	111	100
Occupation		
Homemaker	81	73
Laborer	22	19.8
Others	08	7.2
Total	111	100
Socio economic status(SES)		
class I	20	18.0
class II	16	14.4
class III	17	15.3
class IV	23	20.7
class V	35	31.5
Total	111	100

underweight category. The mean BMI was 26.02 with SD of 4.71. Waist circumference was more than cut off in 92% of women. 48.6% of study participants were having the neck circumference more than 34 cm (considered as risk for CHD). The mean waist hip ratio was 0.89 with SD of 0.05 and the mean neck circumference was 33.3 with SD of 2.08.

Mean haemoglobin percentage was 11.9% with SD of 1.68. 66% of women were anaemic. Among the study

participants who were clinically diagnosed as to be cases of CHD, 75% had blocks in their coronaries. Single artery block (29.7%) and triple artery block (22.5%) were predominantly seen.

As seen in Table 2, statistically significant higher chance of blockage was seen among women with lower educational level. Manual labourers were having

significantly lesser risk of CHD than homemakers and other sedentary works. Among women with waist circumference of increased risk for CHD (>80cm), 96% showed blocks and among women with substantial risk (>88 cm) 65% showed blocks. Increasing waist circumference showed significantly higher risk of CHD. Among 54 women with neck circumference more than expected (>34 cm), 68% showed coronary artery blocks.

Table 2: Distribution of study participants according CHD status and various risk factors (N=111).

Education	Coronary artery		Total	P value
	No blocks(%)	Blocks(%)		
Nonliterate and primary	19(21)	71(79)	90	0.039
Highschool and above	9(42)	12(58)	21	
Occupation				
Homemaker	14(18)	67(82)	81	<0.001
Laborer	13(60)	09(40)	22	
Others	01(13)	07(87)	08	
Residence				
Urban	13(24)	42(76)	55	0.702
Rural	15(27)	41(73)	56	
Type of diet				
Vegetarian	11(30)	26(70)	37	0.440
Mixed	17(23)	57(77)	74	
Menopause				
Not yet	4(40)	6(60)	10	0.174
Attained	18(20)	68(80)	86	
Haemoglobin				
Normal	16(32)	34(68)	50	0.042
Anemia	07(15)	41(85)	48	
Waist Hip ratio				
Normal	2(11)	16(89)	18	0.132
Abnormal	26(28)	67(72)	93	
Waist circumference				
No risk	03(44)	06(66)	09	
Increased risk(>80cm)	01(04)	31(96)	32	0.003
Substantial risk(>88cm)	24(35)	46(65)	70	
Neck circumference				
Normal	11(19)	46(81)	57	0.140
Risk	17(32)	37(68)	54	
Known Diabetic since				
<5years	3(27)	8(73)	11	0.027
>5years	25(25)	75(75)	100	

Combined analysis result

Among 297 subjects majority were in the age group of 51-60 years. More than 60% were in the age group of more than 50 years. 3% of women were in the age group less than 40 years.

Laboratory reports of lipid profile of only 70 women were found. 47% of women were having total cholesterol

levels more than normal levels. HDL cholesterol level was low in 35 %of women. Around 80% of women were having abnormal levels of LDL cholesterol and more than 45% of women triglyceride levels were not ideal.

Analysis of combined data showed that among women who presented with the symptoms suggestive of CHD and admitted for angiography, majority showed blocks in their angiographic reports. Angiography revealed

blockade in LMA, LAD, LCA and RCA among 26%, 62%, 37% and 49% of the patients respectively.

DISCUSSION

Nearly 20% of the study populations were below 50 years of age and minimum age was 30 years. Among women aged less than 50 years, 66% had blocks in their coronaries. The pattern of decreasing age at onset of the CHD seen in present study, was also observed by Supriya Bajaj et al where the average age was 62 years.[5]

Almost equal proportions of study women belonged to urban and rural locality indicating uniform preference of study hospital by both urban and rural population. Percentage of coronary artery block was almost similar in urban and rural patients (76% vs. 73%). Similar findings have been reported in a community based study by Abhinav Goyal and Salim Yusuf, where prevalence of CHD had increased both in urban and rural population (by 3%). They observed little higher increase in prevalence among urban population compared to rural population (7% to 9.7% Vs. 2.5% to 4.5% respectively).[6,7] As present study is hospital based, we cannot comment on the prevalence of the disease, but equal distribution indicates similar increase in the burden of the disease which is comparable to the above study.

Significant difference was observed between patterns of coronary artery blockage in women of low education level (below primary) and higher educational level. Rajeev Gupta et al showed that coronary heart disease and coronary risk factors were significantly associated with the lower level of education in a cohort of rural population in India. Studies from Europe and the United States also showed that during the past 30years CHD and coronary risk factors have become more prevalent among uneducated people and people of low social class.[8,9]

Manual labourers were having significantly lesser risk of CHD than homemakers and other sedentary workers. Among homemakers and labourers, 82% and 40% women showed coronary blocks. Most of the published literature describes association of occupation and CHD through the physical activity in that occupation. Considering homemakers as moderate physical activity, findings of the present study are consistent with studies like Hu G et al where Hazard ratios (HRs) of CHD events associated with low, moderate, and high occupational activity were1.00, 0.75, and 0.80 respectively. Similar findings were quoted by Mozumdar et al, where they found that insufficient Leisure Time Physical Activity (LTPA) was significantly associated with greater prevalence of 'high risk' of CHD and there is absolute necessity of LTPA in women who are sedentary.[10,11]

Higher chances of CHD were seen in middle SES women though it was not statistically significant. This could be because of the reduced physical activity compared to lower and higher SES women who worked as labours and tend to be more aware of the risk factors respectively.

According to Ghaffar et al people in lower socioeconomic strata from South Asian Region are developing higher burden of CHD, attributable to use of tobacco products.[7,12]

80% of women who had attained menopause were having coronary artery blocks compared to 60% who did not. Similar results were reported by Gruchow, who examined the angiographic records of 933 postmenopausal women and noted that the degree of occlusion among estrogen users was significantly lower than that among nonusers. This supports the view that oestrogen could protect against CHD.

Among women with diabetes, 83% showed blocks in their coronaries compared to 69% of non-diabetics. Duration of DM and Hypertension was directly proportional to the severity of blockage. Peters et al observed that the relative risk for incident CHD associated with diabetes compared with no diabetes was 2.82 (95% CI 2.35, 3.38) in women.[13]

Among women who gave family history of CHD, Diabetes and hypertension, Coronary blocks were found in 75%, 74% and 62% of women respectively. According to Ann K Sullivan et al., family history of coronary artery disease was more frequently encountered in women (71%) compared to men (51%) with coronary artery disease.[14]

Chest pain as major presenting complaint (85%) followed by Breathlessness (5%). Among women who presented with chest pain, 73% were having blocks. Ann K Sullivan et al states in their study that 41% of women referred with chest pain who subsequently underwent coronary angiography were found to have normal coronary arteries.[19] Whereas in the present study among women who had presented with chest pain, 27% showed no blocks. John G. Canto reports that the proportion of MI patients who presented without chest pain was significantly higher for women.[5,15]

Dexter Canoystated in their study that the frequency of occurrence of a first coronary event over a 20 year period from age 55 years increases with increase in BMI.[16] The present study supports the above statement, as the majority of women in the age group of 50 years and above, who presented with CHD symptoms, were overweight and obese. The present study showed that among the women who were belonging to normal, overweight, pre-obese and obese category, 65%, 68%,83%and 73% were having the blocks in coronary arteries.

Dexter Canoy et al have found out that even among lean individuals with body mass index <25 kg/m[1], those with

higher waist-hip ratio had 50% higher risk for CHD than those with lower waist-hip ratio.[16] Similarly in the present study though there was no association established, 63% of women with low or normal BMI and higher waist hip ratio were found to be having coronary blocks.

Jagadamba Aswathappa et al observed in their study that neck circumference is significantly higher in diabetics and there was a positive correlation between neck circumference and BMI which is a major risk factor for CHD.[17] Similarly in the present study, 57% of women with diabetes showed higher neck circumference compared to 42% of women without diabetes and there was moderate positive correlation between Neck Circumference and BMI.

Out of 70 women 37 were having ideal levels of total cholesterol among whom 75% women were having coronary artery blocks. Among the women with borderline cholesterol levels, 82% of them had coronary blocks. According to Peter et al, 22% of CHD risk was attributable to total cholesterol of 240 mg/dL in women. The attribute able risk percent for TC level 200 mg/dL was 34% in women.[18]

According to GPAQ homemakers are considered as moderate worker, since in the present study majority of the participants were homemaker, almost all the study subjects met the criteria of physical activity and no significant difference was seen. I-Min Lee stated in their study that vigorous activities were associated with lower risk of CHD, even walking without vigorous activities showed lower risk of CHD among women.[19]

Coronary Angiographic report showed that in 47 % of study participants, more than one vessel were involved.26% of women were having single artery block, 21% with double artery block and 23%of women were with triple artery blocks. In 5% of women, all the four arteries were blocked. 25% of women were not having any blocks. According to Supriya Bajaj et al single vessel disease was the most common lesion found (56% in females), while multiple vessel disease was found in 30% females. Normal coronaries or insignificant CAD was found in 14% females. Females with multiple vessel disease were found to have co-morbid conditions like Diabetes (66%). Normal coronaries/insignificant CAD were found in 14% females as compared to 2% males[5]

Nesligüle et al conducted a study comparing two age groups where group 1 (<40 years) showed a preponderance of single-vessel disease whereas patients of group 2 (>40 years) showed dominance of multivessel disease. Whereas in the preset study women in the age group more than 50 years showed both single artery and triple artery blocks in almost equal proportions. There were only three women who were less than 40 years age group and similar pattern was seen in them as well.[20]

CONCLUSION

Present study has revealed earlier age at presentation, higher proportion of occurrence of coronary blocks in normal or underweight BMI category. Women who belonged to normal categories of waist hip ratio, waist circumference and neck circumference, majority had coronary artery blocks, signifying increased CHD risk despite of normal values of risk factors calls for diagnostic evaluation of all women above 50 years, even when they present with simple clinical features of chest pain and/ or breathlessness.

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