Research Article

Prevalence of Risk Factors of Coronary Artery Disease among Women

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Abstract

Aim: Coronary artery disease (CAD) is one of the major causes of death worldwide. This study aimed to determine the prevalence of risk factors of CAD among women.

Materials and Methods: A descriptive survey design was used to collect data from women (35–55 years) residing in a selected community in Kerala, India.

Results: Majority of the women (35.3%) were between 35-39 years, 63.7% were educated up to 10th standard and 55.9% were household workers. In the present study, unhealthy dietary practices were reported among 35.0% of women, inadequate physical activity was prevalent among 72.5% and moderate or severe stress was observed among 75.4% of women. Majority of the women (63.7%) had obesity (BMI≥25Kg/m^2) and 87.3% had (WC ≥80cms) in the present study. Among the study subjects, 63.7% had overweight (>25Kg/m^2) 87.3% had abdominal obesity (≥80cms). The present study reports that 19.6% of women had a systolic blood pressure ≥140 mm of Hg and 22.5% had a diastolic blood pressure of ≥90 mm of Hg. This study reports that the fasting blood sugar level of 37.2% of women was above 100mg% and among that 12.7 % had FBS ≥126mg% also observed that 39.2% of women had high total cholesterol levels (>200mg%).

Conclusion: Risk factor identification is the key to prevent CAD.

Keywords: Women, Prevalence of risk factors, Coronary artery disease

Introduction

Coronary artery disease (CAD) is the number one cause of death in adults worldwide.[1] The non-modifiable risk factors of CAD are advancing age, male gender, family history, and race. The modifiable risk factors include smoking or tobacco use, excess consumption of alcohol, inadequate fruits and vegetable consumption, physical inactivity, hypertension, diabetes mellitus, overweight, obesity, dyslipidemia, and stress.[2] In comparison with the people in European countries, the condition affects Indians at least a decade earlier and in their most productive middle age.[3] Furthermore, high prevalence of risk factors had been reported from India.[4] The INTERHEART study conclusively states the role of behavioural and conventional risk factors in the prediction of coronary heart disease risk among Indians.[5] Leading cause of death among keralites is cardiovascular diseases as by ICMR report 2017.[6] Dramatic changes in lifestyle over a period of two decades and rapid urbanization have led these growing burdens of coronary risk factors.[7]

CAD is found to be the leading cause of mortality for women worldwide in both industrialized nations and developing economies.[8] The risk factors are found to be highly prevalent among women as per the studies conducted in India.[9-12] There is a need for detailed studies in younger age group to support the need for preventive cardiology at early years of life.[13] Physical

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inactivity, unhealthy eating habits, and heightened stress existed especially among women.[9] Depression, perceived stress at home, low locus of control and major stressful life events are the psychological factors that put women at risk for ischemic heart disease and myocardial infarction. Emotional stress is more likely to trigger an acute coronary event in women than physical exercise when compared to men.[14]

Statement of the problem

A study was to identify the prevalence of risk factors of CAD among women in a community in Kerala, India.

Objective of the study

The objectives of the study are as follows:

1. To identify the risk factors of CAD among women
2. To determine the association of risk factors of CAD with selected demographic variables.

Materials and Methods

Research approach

Quantitative approach was employed.

Research design

Non experimental survey design was employed.

Sample size

The sample size was 102.

Sampling technique

Non-probability, consecutive.

Setting

Two wards of selected Gramapachayath of Ernakulam district, Kerala.

Data collection

Data were collected by door-to-door survey from women of 35 to 55 years of age. Informed consent taken, confidentiality and anonymity maintained. The tools were tested, validity and reliability were done. The anthropometric measurements were done by adopting standard protocols. Unstretchable measuring tape was used to measure the height and waist circumference (WC). The weight was measured by a calibrated digital weighing machine. When the body mass index (BMI) is 23.1–24.9 kg/m^2 it is overweight and obese when BMI is ≥25 kg/m^2 and abdominal obesity when WC is ≥80 cm.[15]

The WC of the women was measured without holding their breath using the same measuring tape and confirmed that they have used light clothing. The measurement was taken at the end of expiration. The measurement was made at the approximate midpoint between the lower margin of the last palpable rib and the top of the iliac crest. The blood pressure (BP) was monitored by the standard protocols. The BP was taken from the left arm in the sitting position with two measurements 15 min apart and a third measurement after 24 h. The average of the measurements was taken. High BP is when systolic BP value ≥120 mm of Hg and diastolic BP ≥80 mm of Hg in two consecutive measurements using calibrated equipment.[16] They were asked to fast for overnight for the collection of blood samples. The blood samples were drawn in the next morning (2nd day) and BP was monitored again. When the fasting blood sugar (FBS) level ≥100 mg%,[17] it is elevated. When the total cholesterol (TC) level ≥200 mg%, triglycerides level ≥150 mg%, low high-density lipoprotein (HDL) ≤40 mg%, and high low-density lipoprotein (LDL) ≥100 mg%.[18]

A rating scale was used for assessing physical activity and diet practices. It is a seven-point scale (daily [7], 5–6 days/week [6], 2–4 days/week [5], 1-day week [4], 2–3 days/month [3] once in month [2], and not at all [1]) contains 30 items from different areas such as diet practices, physical activity, habits, sleep, rest and stress reduction measures. Maximum score is 210 and score above 60% was taken as healthy and 60% and below is unhealthy.

The stress was assessed using perceived stress scale-10. It is a reliable and standardized questionnaire for assessing stress. It consists of 10 closed questions (ratings range from 0 to 4) in Likert scale. Each woman is asked to indicate whether she experienced the same in the last month and how often she felt. Six items are positively stated and four items are negatively stated. The total scores can be calculated from the adding of all scores which may range from 0 to 40. Scores up to 13 indicates low or minimal stress, 14–26 is moderate stress, and 27–40 is severe stress.

Major Findings

Sample characteristics

Majority of the samples of the present study were between 35 and 39 years of age (35.3%) and most of the participants were housewives (55.9%). Among the women, 45.1% were educated up to high school level.

Risk factors of CAD

Non-modifiable and behavioral risk factors

The present study reports that 47.1% of women were above 45 years of age. Family history of CAD was noted among 34.3% of women. Menopause was attained by 26.5% of women both naturally as well as surgically. No one ever used oral contraceptive pills (OCP) in the present study. No one in the present study smoke or use tobacco but 26.5% of women expose to passive smoking either at residence or workplace.

In the present study, unhealthy dietary practices were reported among 35.0% of women. Among women studied, 76.5% not consume a single fruit and 34.3% not consume a single serving of vegetables daily. However, 15% of women consume fried foods daily. In this study, physical inactivity was prevalent among 72.5% of samples. Moderate or severe stress was observed among 75.4% of women in the present study.

Table 1 shows that 63.7% of the women had obesity (BMI ≥25 kg/m^2) and 87.3% had abdominal obesity (WC ≥80 cm).

Table 2 depicts that 19.6% of women had a BP ≥140 mm of Hg systolic and 22.5% had ≥90 mm of Hg diastolic. It also shows that the FBS level of 37.2% of women was above 100 mg% and among that 12.7% had FBS ≥126 mg%.

Table 3 presents that 39.2% of women high total TC and 14.7% with low levels of HDL and 67.6% with high LDL levels.

Association of risk factors with socio-demographic variables

Table 4 shows that age is associated statistically with systolic BP, TC, and LDL level at $P < 0.05$ level. Level of education is associated statistically with WC ($P < 0.01$). Occupation is associated statistically with physical activity level ($P < 0.05$).

Discussion

The present study reports that 47.1% of women were above 45 years of age. Family history of CAD was noted among 34.3% of women. In a study conducted by Krishnan *et al*.[19] in Kerala, 16.9% of samples reported family history while 30% was reported in a study done in Punjab.[20] Menopause was attained by 26.5% of women both naturally as well as surgically. The usual age of menopause in India is 50–51 years but nowadays, the early surgical menopause is increasing. No one ever used OCP in the present study. In a study conducted in Kerala, the prevalence of use of OCP was 6.9% and majority of the couple either use traditional methods or surgical methods as a method of family planning.[21]

No one in the present study smoke or use tobacco but 26.5% of women expose to passive smoking either at residence or workplace. The findings are similar in almost all studies conducted which shows negligible prevalence of smoking among women.[4,9,19,22-24] Few reported the use of smokeless tobacco.[22,25,26] However, one study conducted in North India reported contradictory finding as 55.2 % prevalence of smoking seen among women.[27] The public should be educated about the hazards of passive smoking and Government should plan appropriate policies.

In the present study, unhealthy dietary practices were reported among 35.0% of women. Among women studied, 76.5% not consume a single fruit and 34.3% not consume a single serving of vegetables daily. However, 15% of women consume fried foods daily. Very similar findings were observed in several studies.[4,9,24-26,28-30] In a study conducted recently in Chennai,[24] it is reported 0.04% of prevalence of adequate fruits and vegetable intake. Most of these studies did not report separately the prevalence of vegetables and fruits intake. One reason for such low intake of fruits and vegetables may be due to the lack of knowledge, unavailability of fresh fruits and vegetables, fear of pesticides in the fruits and vegetables, and high prices for this in the market.

In the present study, inadequate physical activity was prevalent among 72.5% of samples. This high prevalence of physical inactivity was similar to what is reported in many studies.[4,9,19,24,25,27-30] Studies done all around the world also give almost similar reports.[31-34] Contradictory to the above findings, another study done in Kerala among women, moderate activity was self-reported by 73.4% of samples.[35] The main reason for physical inactivity among women is the fast urbanization and availability of labor-saving technologies at home that significantly reduces manual work of women and women may

Table 1: Frequency distribution and percentages of women based on categories of BMI and WC (*n*=102)

Risk factors	f	%
BMI (kg/m^2)		
<18.5	2	2.0
18.5–23.0	24	23.5
23.1–24.9	11	10.8
25–29.9	49	48.0
≥30	16	15.7
WC		
<80 cm	13	12.7
80–85 cm	7	6.9
>85 cm	82	80.4

BMI: Body mass index, WC: Waist circumference

Table 2: Frequency distribution and percentages of women based on categories of systolic BP, diastolic BP, and FBS (*n*=102)

Risk factors	f	%
Systolic BP (mm of Hg)		
<120	37	36.3
120–139	45	44.1
140–159	12	11.8
≥160	8	7.8
Diastolic BP (mm of Hg)		
<80	43	42.2
80–89	36	35.3
90–99	20	19.6
≥100	3	2.9
FBS (mg%)		
<100	64	62.8
100–125	25	24.5
≥126	13	12.7

BP: Blood pressure, FBS: Fasting blood sugar

Table 3: Frequency distribution and percentages of women based on lipid profile (*n*=102)

Lipid profile	f	%
Total cholesterol (mg%)		
<200	62	60.8
200–239	35	34.3
≥240	5	4.9
Triglycerides (mg%)		
<150	73	71.6
150–199	21	20.6
≥200	8	7.8
HDL (mg%)		
<40	15	14.7
40–49	34	33.3
50–59	31	30.4
≥60	22	21.6
LDL (mg%)		
<100	33	32.4
100–129	39	38.2
130–159	22	21.6
160–189	6	5.9
≥190	2	2.0

HDL: High density lipoprotein, LDL: Low density lipoprotein

Table 4: Chi-square, degrees of freedom, and *P*-value of sociodemographic variables and risk factors of CAD among middle-aged women (*n*=102)

Sociopersonal variable	Risk factors of CAD	χ^2	df	*P*
Age	BMI	1.5	2	0.47
	WC	0.576	2	0.75
	Systolic BP	8.74	3	0.03*
	Diastolic BP	1.0	3	0.79
	FBS	1.3	2	0.52
	TC	8.9	2	0.01*
	TG	3.5	2	0.17
	HDL	0.212	2	0.89
	LDL	11.0	4	0.03*
	Diet practices	3.5	1	0.06
	Physical activity	1.3	1	0.25
	Stress	3.5	2	0.18
Education	BMI	9.2	4	0.06
	WC	16.5	4	0.00**
	Systolic BP	11.7	6	0.07
	Diastolic BP	5.6	6	0.46
	FBS	5.2	4	0.27
	TC	1.4	4	0.84
	TG	4.2	4	0.38
	HDL	8.3	4	0.08
	LDL	3.5	8	0.89
	Diet practices	1.55	2	0.46
	Physical activity	1.5	2	0.48
	Stress	2.6	4	0.63
Occupation	BMI	7.5	4	0.11
	WC	4.1	4	0.38
	Systolic BP	7.6	6	0.27
	Diastolic BP	5.9	6	0.43
	FBS	3.7	4	0.45
	TC	2.1	4	0.71
	TG	3.1	4	0.54
	HDL	3.2	4	0.53
	LDL	10.6	8	0.22
	Diet practices	0.43	2	0.81
	Physical activity	13.1	2	0.001**
	Stress	4.2	4	0.38

BMI: Body mass index, WC: Waist circumference, BP: Blood pressure, FBS: Fasting blood sugar, TC: Total cholesterol, TG: Triglycerides, HDL: High-density lipoprotein, LDL: Low-density lipoprotein CAD: Coronary artery disease. *P<0.05 level, **P<0.01

not ready to go out for a walk or join a sports club. The setting of the present study was an area where there is high population density and limited scope for yard work.

Moderate or severe stress was observed among 75.4% of women in the present study. In a study[36] conducted in Kerala, it is reported that 23.0% of sample had stress. A study conducted in Chennai[37] among housewives reports 69.5% stress among housewives of reproductive age group. A study done in Pakistan[31] reports 74.5% of stress among females and he added that stress is more prevalent among women. The women will be more stressed between family and workplace and also due to marital discords and conflicts in family.

Majority of the women (63.7%) had obesity (BMI≥25Kg/m^2) and 87.3% had abdominal obesity (WC ≥80 cm) in the present study. In the ICMR study conducted in three states and one union territory reports that the overall prevalence of generalized obesity (BMI ≥25 kg/m^2) was significantly higher among women compared to men and it ranged from 38.7% to 11.5% in various states of India. The prevalence of abdominal obesity (WC ≥80 cm) was also similar to generalized obesity.[38] This finding shows that the prevalence of obesity is increasing every day.

A prevalence of 34.3% of obesity in urban females compared to 23.2% in their rural counterparts was observed in a recent study conducted in Punjab.[29] A prevalence of 50.7% was reported by Jaipur heart watch[4] a study conducted among urban middle-class population in India in 2012 and that may be underlying reason for high prevalence. A study done in Kerala among rural females reported findings very close to the present study as 46.6% of overweight, 15% of obesity and 92.5% of central obesity.[11] Another study from Kerala as per WHO BMI guidelines for Asians, 44.7% of females were obese compared to 33% of males and about 51% of women and 35% of men had high WC.[39] However, a recent study from Uttar Pradesh among rural population reported a low prevalence of obesity of 10.7%.[26] This is contradictory to the findings of the present study. Another study done among rural, urban-poor, and urban-middle-class women the prevalence of overweight/obesity (BMI ≥25 kg/m^2) is 22.5, 45.6, and 57.4% and WC (>80 cm) is 28.3, 63.4, and 61.9%, respectively.[10] A study conducted in Kerala in 2009 reported prevalence of obesity as 26% and abdominal obesity as 32%.[9] A recent study done in Kerala reported 68.5% of prevalence of obesity.[30]

The situation is similar all around the world. A study among Latinas in US also reports high prevalence of overweight/obesity, 83% of the cohort was overweight or obese (BMI ≥25 kg/m^2) and 73% had central obesity[40] and another study from US also reports that 55% of the participants were overweight or obese.[41] Studies from Nepal[33] and Pakistan[31] also report same findings. The various available technologies even in the rural households of Kerala to simplify the work, lack of knowledge and motivation, lack of family, and community support to indulge in preventive measures contribute to such a high prevalence of obesity in Kerala.

Among the subjects, 19.6% had a BP ≥140 mm of Hg systolic and 22.5% had ≥90 mm of Hg diastolic. The studies conducted in various places of India show high prevalence of hypertension varies from 16% to 32.3%.[9,4,10,42,43] The study conducted in US reports that 70% had BPs ≥120/80 mm Hg and 27% had BPs ≥140/90 mm Hg.[40] Other countries in the world also had similar findings like study in Nepal.[33]

The present study reports the FBS level of 37.2% of women was above 100 mg% and among that 12.7% had FBS ≥126 mg%. A recent controlled trial conducted by Sathish *et al*.[30] among 1007 (47.2% of subjects were women) reports 69% of pre-diabetes among a group. The studies showed an increasing prevalence of diabetes in India from 0.4% to 14.3%.[19,44] Several other international studies also report a high prevalence of increased blood sugar.[33,40] The present study reports 39.2% of high total TC and it is similar to a study conducted

by ICMR that reported 79% of subjects had any of the lipid abnormalities.[45] Studies conducted in Nepal[33] and US[40] also reports similar results. In India, a study done in Punjab[42] reported 13.5% and study done by Mohan *et al*.[10] reported high TC of 52% and low level of HDL cholesterol of 49% among women. Recent study by Sathish *et al*.[30] reported 85.4% prevalence of dyslipidemia in Kerala. The present study reports that age is significantly associated with systolic BP, TC, and LDL at $P < 0.05$ level of significance. Many studies report the same findings.[9] The level of education is associated statistically with WC and occupation is associated statistically with physical activity level.

Conclusion

The findings revealed that the risk factors are highly prevalent in India, especially in Kerala and this may be due to the rapid urbanization of the state. The fast transition from rural to urban state due to the overall development in the state is dangerous on the other side.

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Conflicts of Interest

Nil.

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