

Coronary Artery Disease Risk Factors in Urban and Rural Indian Population

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Abstract

Objective:

To analyse the risk factors in patients with established CAD in urban and rural population.

Material and methods:

A cross-sectional study of all patients with IHD coming to Sri Jayadeva Institute of Cardiovascular Sciences and Research, Mysore from urban and rural areas presenting with known or suspected IHD with chest pain suggestive of IHD and various investigations suggestive of IHD have been screened. Patients with evidence of CAD on coronary angiogram have been included in the study.

Results:

Total 500 subjects were included in the study. Male patients were 76% and Female 24%. Risk factor for Coronary Artery disease (CAD), such as Physical inactivity, Diabetes, Dyslipidemia and Hypertension were more prevalent in urban population than rural. Obesity is more common in urban population than rural population though not statistically significant. Family History of IHD is equally prevalent between urban and rural population. Smoking is more common among rural population.

Conclusion:

Our preventive measures should focus on modifying risk factors such as Physical inactivity, Diabetes, Hypertension, Dyslipidemia, Obesity and Smoking in urban and rural population.

Key words:BMI- Body Mass Index, CAD-Coronary artery disease,CVD-Cardiovascular disease, IHD-Ischemic heart disease

Introduction:

Nearly 60% of deaths in India are due to Non-communicable diseases. Among Non-communicable diseases CAD is one of the major cause^{1, 2}. CAD accounts for 15.5% of total deaths globally^{3,4}. In India, CAD accounted for 26.9% of medically certified deaths in 2015 and 1,200,000 deaths in 2012^{5,6}. However, these figures are likely underrated when compared to the real situation due to the absence of consistent mortality data, non-accounting of silent myocardial infarctions and asymptomatic CAD deaths⁷.

In India there was a two and a sixfold increase in CAD in rural areas and in urban areas respectively from 1960 to 2002 and CAD has been considered to be of epidemic proportion in India⁸. The systematic review done by Rao et al. demonstrated that prevalence of CAD in urban areas was 2.5–12.6% and in rural areas, 1.4–4.6%. Moreover, they concluded that the high prevalence of CAD risk factors, treatment delays and suboptimal use of evidence based treatment when managing CADs are common in India^{9, 10, 11}.

India accounts for more than one-fifth of total CVD deaths, according to WHO study, and therefore reduction of global cardiovascular mortality greatly depends on India, where cardiovascular disease develops a decade earlier in life than in high-income countries¹².

CAD and coronary risk factors were two or three times higher among the urban patients compared with the rural patients, which may be due to greater sedentary behaviour in the urban population¹².

The relatively low level of conventional risk factors in the rural populations presents a window of opportunity for different preventive Strategies. Giving more importance to balanced vegetarian diet, increasing the levels of physical activity, and cessation of smoking would be crucial in containing the rise of risk factors and CAD

prevalence induced by urbanization and industrialization¹².

Objective:

To analyse the risk factors in patients with established CAD in urban and rural Indian population.

Sample size: 500 Subjects

Material and methods:

A cross-sectional study of all patients with CAD coming to SriJayadeva Institute of Cardiovascular Sciences and Research, Mysore from urban and rural areas presenting with known or suspected IHD with chest pain suggestive of IHD and various investigations suggestive of IHD. Patients with evidence of CAD on coronary angiogram were included in the study.

Definition of study population:

1. Urban and Rural population were defined according to census of India data¹³.
2. Coronary artery disease (CAD)¹⁴: defined as per WHO cardiovascular survey methods criteria.
3. Hypertension¹⁵: defined as per 2020 International Society of Hypertension Global Hypertension Practice Guidelines.
4. Diabetes mellitus¹⁶: according to Classification and Diagnosis of Diabetes: Standards of Medical Care in Diabetes 2020
5. Body mass index¹⁷: Body mass index (BMI) was calculated as weight in kg divided by square of height in metres and overweight and obesity defined as BMI $\geq 25 \text{ kg/m}^2$.
6. Dyslipidemia¹⁸: 2018AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/ PCNA guideline on the management of blood cholesterol
7. Physical inactivity¹⁷: Adults (≥ 18 years): Not achieving 150 min of moderate-to-vigorous-intensity physical activity per week or 75 min of vigorous-intensity physical activity per week or an equivalent combination of moderate- and vigorous-intensity activity.
8. Tobacco consumption¹⁹: Users of all types of tobacco products and present and past smokers have been included in smoker category. The diagnostic criteria for tobacco use as well as other coronary risk factors adopted were in accordance with American College of Cardiology clinical data standards.
9. Family History of CAD²⁰: People with one or more close relatives who have or had early coronary artery disease (CAD) are at an increased risk for CAD. For men, early CAD is being diagnosed before age 55 years. For women, early CAD is being diagnosed before 65 years.

Inclusion criteria:

Patients with Coronary angiogram confirmative of CAD were included.

Exclusion criteria:

Patients with Coronary angiogram not confirmative of CAD were excluded.

Number of vessels diseased²¹: The number of diseased vessels is measured according to coronary artery surgery study (CASS) criteria.

Ethics Committee:

Ethics committee approval was taken from Sri.Jayadeva Institute of Cardiovascular Sciences and Research, Mysore.

Statistical Analysis:

The data were entered in Microsoft Excel sheet and appropriate tests like chi-square, 't'-test and ANOVA were applied. In all the above test P value less than 0.05 were taken to be statistically significant. The data was analyzed using SPSS package.

Results:

Total 500 subjects were included in the study and mean age of the study population was 53.51 yrs. Male patients constituted 76% and Female patients 24% of total study population.

Table1:Age distribution of the study subjects.

Age	RURAL (n=250)		URBAN (250)		Total	
	Numbers	Percentage	Numbers	Percentage	Numbers	Percentage
<31	6	2.4%	5	2.0%	11	2.2%
31-40	37	14.8%	34	13.6%	71	14.2%
41-50	58	23.2%	69	27.6%	127	25.4%
51-60	79	31.6%	77	30.8%	156	31.2%
61-70	51	20.4%	52	20.8%	103	20.6%
71-80	16	6.4%	13	5.2%	29	5.8%
>81	3	1.2%	0	0.0%	3	0.6%
Total	250	100.0%	250	100.0%	500	100.0%

Table2: Sex Distribution of the study subjects.

Gender	RURAL (n=250)		URBAN (250)		Total	
	Numbers	Percentage	Numbers	Percentage	Numbers	Percentage
FEMALE	60	24.0%	66	26.4%	126	25.2%
MALE	190	76.0%	184	73.6%	374	74.8%
Total	250	100.0%	250	100.0%	500	100.0%

Risk factor for Coronary Artery disease (CAD), such as physical inactivity, Diabetes, Dyslipidemia and Hypertension were more prevalent in urban population than rural. Obesity is more in urban population than rural though not statistically significant. Family History of CAD is equally prevalent between urban and rural population. Smoking is more common among rural population.

Table3: Risk factors distribution among study subjects

<u>Risk Factors</u>	RURAL (n=250)		URBAN (250)		Total	Pearson Chi-Square
BMI (>25)	62	25%	75	30%	137	.192
DM	72	29%	101	40%	173	.006
HTN	70	28%	100	40%	170	.005
Smoking	78	31%	65	26%	143	.198
F/H of CAD	74	30%	75	30%	149	.922
Dyslipidemia	123	49%	146	58%	269	.039
Physical inactivity	52	21%	93	37%	145	.000

Coronary Angiogram Pattern:

Number of vessel disease 0 and 1 is more common among rural population, where as 2 and 3 are more common in urban population. Suggestive of More severe disease in urban population compared to rural population.

Table4: Coronary Angiogram Pattern among study subjects.

No. of disease Vessels	RURAL (n=250)		URBAN (250)		Total	
0	31	12.4%	15	6.0%	46	9.2%
1	119	47.6%	94	37.6%	213	42.6%
2	55	22.0%	65	26.0%	120	24.0%
3	45	18.0%	76	30.4%	121	24.2%
Total	250	100.0 %	250	100.0 %	500	100.0 %

DISCUSSION:

Total 500 subjects were included in the study and mean age of the study population was 53.51 yrs. Male patients constituted 76% and Female patients 24% of total study population. Xavier D et al²² in their study Mean age of the patients was 57 years which is comparable to our study. Most of our patients were in 51-70 years age group (51.8%) comparable to that shown by Xavier D et al²² (56.7%).

In our study males comprised 74.8%, which is comparable to 76.4% males in a study by Xavier D et al²². In our study Risk factor for Coronary Artery disease (CAD), such as Physical inactivity, Diabetes, Dyslipidemia and Hypertension were more prevalent in urban population than rural. Obesity is more common in urban population than rural population though not statistically significant. Other risk factors were equally prevalent between urban and rural. Smoking was more common among rural population.

In a study by Rajith KS²³ et al obesity as indicated by BMI ≥ 25 kg/m² and sedentary life style, was more in the city population than in the rural study populations, while smoking was more common among rural population. Other risk factors like diabetes mellitus, hypertension, family history of CAD, and Dyslipidemia was equally prevalent among the city, urban and rural population.

Number of vessel diseased 0 and 1 is more common among rural population, where as 2 and 3 are more common in urban population. Suggestive of More severe disease in urban population compared to rural population. In a study by Rajith KS et al²³ Number of vessels diseased, 3 vessel disease was less in rural population compared to other groups. Quality of life' is significantly playing a major role in the causation of CHD. Most of the men & women are working in agriculture in rural and involving heavy physical activity. While most of the urban men and women have sedentary habits as shown by Chada et al²⁴.

Recent studies have concluded that the rates of CHD, hypertension, diabetes, dyslipidemia and obesity are low among the rural population of India, and high in urban population²⁵. The lifestyle in the rural is still traditional. Vegetarian diet and not much fried food is consumed. Further, agricultural work demands strenuous physical activity and leaving little room for obesity.

Traditional way of life is advisable in order to prevent risk factors of CHD. In spite that smoking is more common in the rural population; the prevalence is lower than urban population. Lack of physical activity and consumption of more food resulted in higher level of obesity, dyslipidemia, diabetes and hypertension²⁵.

Conclusion:

Coronary artery risk factors such as Physical inactivity, Diabetes, Hypertension and Dyslipidemia are more common in urban population. Obesity is more in urban population than rural though not statistically significant. Family History of CAD is equally prevalent between urban and rural population. Smoking is more common among rural population. Our preventive measures should focus on modifying risk factors such as sedentary life style, Diabetes, Hypertension, Dyslipidemia, Obesity in urban and Smoking in rural population.

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