Original Research Article

Estimation of prevalence of risk factors for coronary artery disease in a rural population in Howrah, West Bengal

Ujjwal Pattnayak[1], Debdutta Banerjee[2]*, Kishore P. Madhwani[3], Jitendra Kumar Singh[1]

Department of Community Medicine, [1]KPC Medical College and Hospital, Kolkata, West Bengal, [2]American International Institute of Medical Sciences, Udaipur, Rajasthan, [3]Occupational Health Consultant, Mumbai, Maharashtra, India

*Correspondence:
Dr. Debdutta Banerjee,
E-mail: b.debdutta86@gmail.com

ABSTRACT

Background: Coronary artery disease (CAD) is a major cause of death globally in both developed and developing countries. Coronary artery disease which was once thought to be a disease of the urban population is now involving the rural community in an increased number. So a study of major coronary risk factors in rural communities will help to adopt various strategies particularly behavior change and communication relevant for these communities to prevent these risk factors and lower CAD related mortality and morbidity. Objective was to estimate rates of the various risk factors for CAD and identify the high-risk groups in the rural community.
Methods: A community based cross sectional study was carried out in a rural area in the Howrah district of West Bengal. Four hundred and eighteen (418) persons (212 males and 206 females) were subjected to study using structured, pretested and predesigned schedule. Coronary artery disease risk factors were assessed. Statistical analysis was done with the help of statistical software, the SPSS 20.0 for windows.
Results: The study observed that prevalence of tobacco use among the study population was the most significant risk factor (42.3%). The prevalence of other coronary risk factors ranged from 10-20%. Tobacco use, alcohol consumption and sedentary life style were significantly more amongst males. Whereas truncal obesity and systolic hypertension more among females.
Conclusions: Various comprehensive strategies particularly behavior change and communication targeting these high risk population need to be emphasized to lower CAD related morbidity burden in the community.

Keywords: Coronary artery disease risk factors, Rural community, Prevalence rates, Behavior change communication strategies

INTRODUCTION

Coronary artery disease which was once thought to be a disease of the urban populations now involving the rural community in an increased number. The global burden of coronary artery disease (CAD) is well documented. In most industrialized countries, CAD are leading cause of disability and death. Developing countries with previous low rates of CAD are now registering increased rates as economy develops. Therefore understanding the epidemiology of CAD is essential for reducing the mortality and morbidity risk and so improving the global public health status and risk factors measurement is an important predictor of coronary artery disease in currently healthy individuals.[1]

Cardiovascular diseases (coronary heart disease, stroke and hypertension) contribute to 45% of all non-communicable diseases (NCD) deaths followed by

chronic respiratory diseases (22%), cancers (12%) and diabetes (3%).[2]

The overall prevalence of ischemic heart diseases in India is 37 per 1000 population.[3]

Premature mortality in terms of years of life lost because of CVD in India increased by 59%, from 23.2 million (1990) to 37 million (2010). Despite wide heterogeneity in the prevalence of cardiovascular risk factors across different regions, CVD has emerged as the leading cause of death in all parts of India, including poorer states and rural areas.[4]

Deaths due to coronary heart diseases and strokes were more common among the urban population at the turn of the century. But the trend has reversed since then. Between 2000 and 2015, the age-standardized rate of mortality (per 100,000 person years) due to coronary heart diseases increased among rural men by over 40% even as it declined among urban men. For females, the increase was over 56% in rural India.

In the high-burden states of the North-East, West Bengal and Chhattisgarh, stroke mortality rates were about three times higher than the national average.[5]

Family history of coronary artery disease and having hyperlipidemia, hypertension, diabetes, obesity and tobacco use are known major risk factor for coronary artery disease.

In this context, the present study has been undertaken with the objectives of studying the prevalence rates of coronary risk factors as well as age and sex specific high-risk groups in a rural community.

METHODS

A community based cross sectional study was carried out to investigate the prevalence of risk factors for CHD among subjects of 30 years and above residing in the Howrah district (West Bengal).

The study was carried out for a period of six months (15th June 2018 to 15th November 2018). An adequate sample (418 subjects of 30 years and above) was drawn to carry out the present study and stratified multistage random sampling has been used.

We conducted a field survey on a cluster sample with probability proportionate to size (PPS sample) of 200 households from the area. Altogether the sample consisted of 418 individuals who were more than 30 years of age. The data was recorded in a structured predesigned and pre-tested schedule.

Inclusion criteria: Those who agreed to participate in the study.

Exclusion criteria: Those who not willing to participate in the study and severely ill.

Presence of diabetes mellitus (DM) in any of the first-degree relatives was taken as positive family history for DM. Height, weight, waist circumference and hip circumference were measured as per standard guidelines laid down by World Health Organization (WHO).[6] A cut off point of body mass index (BMI) more than or equal to 25 kg/m^2 was considered as risk factor for CHD.[7] Truncal obesity was calculated by estimating waist hip ratio (WHR). WHR more than or equal to 0.95 in males and 0.85 in females was taken as the cut off point for diagnosing truncal obesity.[8] Socio–economic status (SES) was calculated based on Prasad's scale of social stratification for rural areas. It is based on per capita income per month in Rupees.[9] Blood pressure was measured and classified as suggested by WHO.[10] Physical activity of subjects was assessed taking into consideration the occupational as well as non-occupational physical activity. Based on this, a score of physical activity status was calculated as suggested by Singh et al.[11] For estimation of alcohol consumption, the quantity frequency index developed by Strauss and Bacon was used.[1] Users of all types of tobacco products were included in the category of tobacco users.[12]

Data was analyzed with the help of statistical software, the SPSS 20.0 for windows.

RESULTS

A total of 418 subjects (212 males and 206 females) were studied. Table 1 shows percentage of coronary risk factors and a comparison of these between males and females. The percentage of tobacco use was observed to be the highest amongst all the risk factors i.e. 42.3%. Positive family of DM was found in 9.3% of subjects. The prevalence of all other coronary risk factors like sedentary life style, alcohol consumption, BMI more than or equal to 25 kg/m^2, upper social classes, truncal obesity, systolic and diastolic hypertension ranged between 10–20%. The coronary risk factors like tobacco use, sedentary life style and alcohol consumption were significantly higher among males as compared to females (p<0.001). While the risk factors like truncal obesity and hypertension were significantly higher among females (p<0.001).

Table 2 shows age wise percentage of coronary risk factors among males. Sedentary lifestyle was significantly higher in the age group of 60 years and above (p<0.001). Alcohol consumption was seen significant among 30–39 years of age (p<0.05).

Table 3 shows age wise percentage of coronary risk factors among females. Truncal obesity was significantly higher among 40–49 years and also 60 years and above age groups (p<0.001). Hypertension was significant among elderly females of 60 years and above (p<0.001).

Table 1: Prevalence of coronary risk factors.

S. no	Risk Factor	Males (212)		Females (206)		Total (418)		P value
		No.	%	No.	%	No.	%	
1.	Family history of DM	18	46.2	21	53.8	39	9.3	NS
2.	Tobacco use	125	70.6	52	29.4	177	42.3	<0.001*
3.	Sedentary lifestyle	33	64.7	18	35.3	51	12.2	<0.001*
4.	Alcohol consumption	98	94.2	6	5.8	104	24.9	<0.001*
5.	BMI≥25 kg/m^2	43	41.0	62	59.0	105	25.1	NS
6.	Upper social classes	86	53.8	74	46.3	160	38.3	NS
7.	Truncal obesity	23	23.7	74	76.3	97	23.2	<0.001*
8.	Hypertension	56.0	37.6	93.0	62.4	149.0	35.6	NS

BMI=Body mass index, SBP=Systolic blood pressure, DBP=Diastolic blood pressure, NS=Not significant.
*Significant at 5% level of significance.

Table 2: Age wise prevalence of coronary risk factors significant among males.

Age (in years)	Tobacco use		Sedentary lifestyle		Alcohol consumption	
	No.	%	No.	%	No.	%
30-39	32.0	28.6	8.0	24.2	23.0	34.3
40-49	33.0	29.5	6.0	18.2	24.0	35.8
50-59	21.0	18.8	5.0	15.2	11.0	16.4
≥60	26.0	23.2	14.0	42.4	9.0	13.4
Total	112.0	100.0	33.0	100.0	67.0	100.0
Chi-square	0.815		54.211		9.012	
P value	NS		<0.001*		<0.05*	

NS=Not significant.
*Significant at 5% level of significance.

Table 3: Age wise prevalence of coronary risk factors significant among females.

Age (years)	Truncal obesity		Hypertension	
	No.	%	No.	%
30-39	8.0	16.0	7.0	15.6
40-49	14.0	28.0	8.0	17.8
50-59	11.0	22.0	11.0	24.4
>60	17.0	34.0	19.0	42.2
Total	50.0	100.0	45.0	100.0
Chi-square	0.714		51.321	
P value	NS		<0.001*	

NS=Not significant.
*Significant at 5% level of significance.

DISCUSSION

The total prevalence rate of coronary risk factors in this rural community ranged from 9.3 to 42.3%. Agrawal et al reported a similar range of 7.4% to 47% in a study carried out in a rural community near Pune.[13] Prevalence of tobacco use in the study population was 70.6% in males and 29.4% in females. This is high when compared to other studies. Gupta et al reported tobacco use to be 51% in males and 5% in females.[14] Agrawal et al found that 25.7% male and 4.8% females were using one or the other form of tobacco in their study.[13] Kaur et al reported an overall 33% of smoking and tobacco use.[15]

Prevalence of hypertension was 35.6% which was less than that reported by Gupta et al (42%), but more than double that observed by Wander et al (14.5%).[16,17]

Sedentary physical activity were found in overall 12.2% which is less than that reported by Agrawal et al (18.5%); Gupta et al (85%) and Kaur et al (84%).[13-15] People were having BMI more than or equal to 25 kg/m^2 were 25.1%. Similar finding was reported by Agrawal et al (23.1%), but Kaur et al found a higher prevalence of 43%.[13,15] Prevalence of truncal obesity was 23.2% (23.7% in males and 76.3% in females). Gupta et al observed that it was 57.4% in males and 68.4% in females.[18] Both the studies agree that prevalence is higher among females, but Agrawal et al observed that it was 20.7% in males and 15.9% in females.[13]

Significant coronary risk factors among males were tobacco use, sedentary lifestyle and alcohol consumption, whereas factors like truncal obesity (23.2%) and hypertension (35.6%) were significantly higher. Similar finding 23.6% and 36.1% were reported by Agrawal et al.[13] 38.3% of the study population belongs to upper social class which was not statistically significant.

CONCLUSION

It is concluded that tobacco use was the important prevalent coronary risk factor in the present study (42.3%). Other coronary risk factors like family history

of DM, sedentary lifestyle, alcohol consumption, BMI, truncal obesity and hypertension were observed in the order of 10–20% in study population. The prevalence rate of coronary risk factors was significantly higher in males compared to females.

Thus promotion of healthy life style like avoidance of tobacco, alcohol and sedentary habits and balanced diet along with early diagnosis and management of diabetes, hypertension and obesity will go a long way in preventing the coronary artery diseases. Behavior change communication strategies targeting these risk factors specifically among young age groups are required to be given due emphasis to reduce the burden of coronary heart disease in the community. Operational guidelines should be developed for risk assessment, screening, referral and follow-up and it should be incorporated as a part of the comprehensive primary health care.

Considering the vastness and multicultural and multi-ethnic rural community in India larger study involving the various parts is India will give a better insight of risk factors association for coronary artery diseases in India.

REFERENCES

1. Luepker RV, Evans A, McKeigne P, Reddy SK. Cardiovascular Survey Methods. 3RD ed. World Health Organization, Geneva; 2004.
2. WHO. Burden of NCDs and their risk factors in India. (Excerpted from Global Status Report of NCDs –2014). Available at: http://www.searo. who.int/india/topics/noncommunicable_diseases/ncd_situation_global_report_ncds_2014.pdf. Accessed on 2 January 2019.
3. PIB. NPCDCS: Managing Non-Communicable Diseases. Press Information Bureau, GOI. Available at: http://pib.nib.in/newsite/efeatures.aspx?relid =76249. Accessed on 2 January 2019.
4. Prabhakaran D, Jeemon P, Roy A. Cardiovascular Diseases in India: Current Epidemiology and Future Directions. circulation. 2016;133(16):1605-20.
5. Ke C, Gupta R, Xavier D, Prabhakaran D, Mathur P, Kalkonde YV, et al. Divergent trends in ischaemic heart disease and stroke mortality in India from 2000 to 2015: a nationally representative mortality study. Lancet. Lancet Glob Health. 2018;6(8):914-23.
6. World Health Organization: Physical status: The use and interpretation of anthropometry: WHO Tech Rep Series; 1995: 424-438.
7. Park K. Park's Textbook of Preventive and Social Medicine. 18th edition, M/s Banarasidas Bhanot Publishers: Jabalpur; 2005.
8. Walia M, Agarwal AK, Shah P, Yadav R, Singh CP, Yadav P. Prevalence of coronary risk factors in non-insulin dependent (type–2) diabetes. J Assoc Physicians India. 1999;47:1051-5.
9. Kulkarni AP, Baride JP. Prasad's method of social classification. Text Book of Community Medicine, 2nd edition, Vora Medical Publishers; 2002: 29.
10. World Health Organization: Hypertension Control: WHO Tech Rep Series; 1996: 862.
11. Singh RB, Ghosh S, Niaz MA, Rastogi V. Validation of physical activity and socio-economic status questionnaire in relation to food intakes for the five city study and proposed classification for Indians. J Assoc Physicians India. 1997;45(8):603-6.
12. Cannon CP, Battler A, Brindis RG, Cox JL, Ellis SG, Every NR, et al. Key elements and data definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes: a report of the American College of Cardiology Task Force on Clinical Data Standards. J Am Coll Cardiol. 2001;38:2114-30.
13. Agrawal VK, Basannar DR, Sing RP, Dutt M, Abraham D, Mustafa MS. Coronary risk factors in a rural community. Indian J Public Health. 2006;50(1):19-23.
14. Gupta R, Prakash H, Gupta VP, Gupta KD. Prevalence and determinants of coronary heart disease in a rural population of India. J Clin Epidemiol 1997; 50 (2): 203-9.
15. Kaur J, Bains K. A study of the risk factor profile of cardiovascular diseases in rural Punjabi patients. Indian J Public Health. 2006;50(2):97-100.
16. Gupta R, Prakash H, Majumdar S, Sharma S, Gupta VP. Prevalence of coronary heart disease and coronary risk factors in an urban population of Rajasthan. Indian Heart J. 1995;47(4):331-8.
17. Wander GS, Khurana SB, Gulati R, Sachar RK, Gupta RK, Khurana S, et al. Epidemiology of coronary heart disease in a rural Punjab population--prevalence and correlation with various risk factors. Indian Heart J. 1994;46(6):319-23.
18. Gupta R, Gupta VP, Sarna M, Bhatnagar S, Thanvi J, Sharma V, et al. Prevalence of coronary heart disease and risk factors in an urban Indian population: Jaipur Heart Watch. Indian Heart J. 2002;54(1):59-66.

Cite this article as: Pattnayak U, Banerjee D, Madhwani KP, Singh JK. Estimation of prevalence of risk factors for coronary artery disease in a rural population in Howrah, West Bengal. Int J Community Med Public Health 2019;6:1793-6.