ORIGINAL ARTICLE

Prevalence of Coronary Risk Factors among Population Aged 35 Years and Above From Rural Maharashtra, India

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Abstract:

Background: It is predicted that cardiovascular diseases will be the most important cause of mortality in India by the year 2015. Since the key to combating the increased incidence of coronary artery disease (CAD) is the control of known risk factors by a population based strategy aimed at comprehensive risk reduction, it is pertinent to study the magnitude of the risk. *Aim:* The present study was therefore conducted to assess the prevalence of certain coronary risk factors among rural population aged 35 years and above in Maharashtra. *Methods:* The present community based cross sectional survey was carried out in the rural area of Pune district on 272 subjects using a structured questionnaire, clinical examination followed by lab investigations. SPSS version 17.0 was used for analysis. *Results:* Tobacco consumption was found to be prevalent in 51.83% of the study subjects followed by physical inactivity which was prevalent among 31.61% whereas high diastolic blood pressure was found to be prevalent in 29.41% of the study subjects. Obesity and alcohol consumption were found to be prevalent among 13.97% of the study subjects. Among the biochemical parameters studied, hypertriglyceridemia was found to be prevalent in 22.05% followed by raised fasting blood sugar in 15.44% of the study subjects. *Conclusion:* Behaviour change communication strategies targeting these modifiable known high risk factors need to be emphasized to lower coronary heart disease (CHD) related morbidity burden in the community.

Keywords: Coronary Risk Factors, Prevalence, Rural.

Introduction:

An increasing number of developing nations are acquiring atherogenic lifestyles which include the adoption of atherogenic dietary habits similar to those seen in industrialised societies. This appears to be consistent with economic development [1]. It is predicted that cardiovascular diseases will be the most important cause of mortality in India by the year 2015 [2, 3]. Contemporary research has indicated that the rise in CADs (Coronary artery disease) reflects a significant change in diet habits, physical activity levels, and tobacco consumption worldwide as a result of industrialization, urbanization, economic development and food market globalization [4]. People are consuming a more energy-dense, nutrient-poor diet and are less physically active. Imbalanced nutrition, reduced physical activity and increased tobacco consumption are the key lifestyle factors [5].

Since the key to control the rising incidence of CAD is the control of known risk factors by a population based strategy aimed at comprehensive risk reduction, it is pertinent to study the magnitude of the risk. Rising trend of CAD and paucity of data with respect to the risk in rural settings warrant this study. The present study was therefore conducted to assess the prevalence of certain coronary risk factors among rural population aged 35 years and above in Maharashtra.

Material and Methods:

The present community based survey was carried out

in the rural area of Pune district using a structured questionnaire, clinical examination followed by lab investigations. The area selected was the field practice area of a tertiary medical centre in Pune. It's around 40 km from Pune on the Sholapur Highway. It has been adopted by this tertiary medical centre for rural training of under graduate and post graduate students in community medicine and for providing health services to the villagers.

The sample size estimation was based on the village population of about 1600 with about 700 persons more than 35 years of age. About 25 per cent is an assumed prevalence of coronary risk factors in a rural setting, with 5% absolute error of margin and 95 per cent confidence interval following formula was used for calculating the minimum sample size, taking into account the 'Finite population' [6].

$n = NZ^2 pq / \{d^2 (N-1) + Z^2 pq\}$

Accordingly, the sample size was worked out to be 204. All the residents of the village aged 35 years and above (both male and females) were serially listed and subjects for the study were chosen by simple random sampling from the sampling frame using random number table. A detailed questionnaire was framed under supervision and consultation with the experts for the purpose of capturing socio-demographic information, personal and family history (h/o alcohol and tobacco consumption and physical activity, diabetes mellitus and hypertension etc.) and other relevant information. Anything less than 45 minutes of physical activity of moderate-intensity for at least 5 days in a week was considered physical inactivity. Moderate physical activity includes walking briskly (about 3½ miles per hour), climbing, gardening/yard work, dancing, walking short distances for fetching milk and vegetables, bicycling (less than 10 miles per hour), and weight training (a general light workout), yogasanas and pranayama, playing with children.

Blood pressure of all the subjects will be measured according to JNC 7 / American Heart Association (AHA) recommendations. Left arm systolic and diastolic blood pressure levels (SBP and DBP) were measured in sitting position using mercury sphygmomanometer. Three readings separated by over 2 minutes were taken. First one was discarded and the next two were averaged. Blood pressure cut-offs considered in our criteria was similar to the JNC VII cut-offs (SBP≥140 mmHg and or DBP ≥90 mmHg). Cut off's for Asian population were considered of BMI more than 25 kg/m sq was taken as obese. Cut off's value of fasting plasma glucose ≥ 126 mg/dl was considered for Diabetes Mellitus (DM).

The questionnaire was designed in English initially and later translated in Marathi and retranslated to English to check validity of questions contained. Before the interview, the subjects were informed about the scope and nature of the study and were fully assured strict confidentiality. Minor changes were made in the questionnaire following the pilot study.

All those who did not give informed consent for participating in the study and those who were known to be suffering from the coronary heart disease (supported by history or relevant documents) were excluded from the study. Permission from Institutional Review Board and ethics committe were sought before the commencement of the present study.

The entire procedure was completed in two steps; firstly completion of interview schedule by house to house survey and secondly clinical examination and collection of blood samples the next day at the morbidity clinic. The interview schedule was standardized and on an average, it took around 35 - 40 minutes for each individual. Questionnaire was presented and factual data recorded by the investigator. The subjects were requested to come on the next day for the physical examination in complete privacy in the morbidity clinic in the village. The examination included anthropometric parameters like height measurement, weight measurement, waist and hip circumference besides the general and physical examination. They were requested to come on empty stomach so that the blood samples were collected by the investigator

himself and transported on the same day to be analyzed for fasting blood sugar and total lipid profile in the Department of Biochemistry of the Medical College. The results of these tests were entered in the interview schedule of the respective individuals.

All the questionnaires were manually checked and edited for completeness and consistency and were then coded for computer entry. Finally they were compiled and summarized. The collected data was entered in Microsoft Excel. Coding of the variables was done. SPSS version 17.0 was used for analysis. Interpretation of the collected data was done by using appropriate statistical methods.

Results:

The present cross sectional study, carried out in a rural community in Maharashtra included a total of 272 subjects in the age group >35 years. There were 144 males and 128 females in the study sample with their mean age 57.33 years and 50.52 years respectively. Majority of the study subjects belonged to socio-economic scale (SES) class 5 followed by class 4 of Prasad scale. Three-fourth of the study subjects were illiterate and out of those educated, majority were educated up to the primary level only.

Tobacco consumption (all forms) was found to be prevalent in 51.83% of the study subjects followed by physical inactivity which was prevalent among 31.61% whereas high diastolic blood pressure was found to be prevalent in 29.41% of the subjects. This was followed by obesity (based on BMI) and alcohol consumption both of which were found to be prevalent among 13.97% of the study participants.

Among the biochemical parameters studied, hypertriglyceridemia was found to be prevalent in

Table 1: Prevalence of Selected Coronary Risk Factors

Coronary Risk Factors		Male (%) (N=144)	Female (%) (N=128)	Total (%) (N=272)	95% CI of Total
Physical Inactivity		42 (29.17)	44 (34.38)	86 (31.61)	26 - 38
Tobacco Consumption		86 (59.72)	55 (42.96)	141 (51.83)	46 - 58
Alcohol Consumption		22 (15.27)	16 (12.50)	38 (13.97)	10 - 18
High Blood Pressure	SBP ≥ 140 mm Hg	07 (04.86)	06 (04.68)	13 (04.77)	02 - 06
	DBP ≥ 90 mm Hg	43 (29.86)	37 (28.90)	80 (29.41)	24 - 34
Obesity	Based on BMI	21 (14.58)	17 (13.28)	38 (13.97)	10 - 18
	Based on WHR	35 (24.31)	51 (39.85)	86 (31.61)	26 - 37
	Based on Waist Circumference	12 (08.34)	32 (25.00)	44 (16.17)	12 - 20
*Fasting Blood Sugar ≥ 126		13 (18.57)	08 (12.12)	21 (15.44)	09 - 21
*Total Serum Cholesterol ≥ 240 mg/dl		08 (11.43)	04 (06.06)	12 (08.82)	04 - 14
*Serum Triglycerides ≥ 200 mg/dl		16 (22.85)	14 (21.21)	30 (22.05)	15 - 29
*LDL ≥ 160 mg/dl		05 (07.14)	02 (03.03)	07 (05.14)	01 - 09
*HDL < 35 mg/dl		07 (10.00)	05 (07.57)	12 (08.82)	04 - 14
*TC : HDL Ratio ≥ 5		12 (17.14)	08 (12.12)	20 (14.70)	09 - 21

BMI=Body Mass Index, WHR=Waist Hip Ratio, WC=Waist Circumference;
**All biochemical tests were done on a sub sample; N= 136: males = 70, females = 66.*

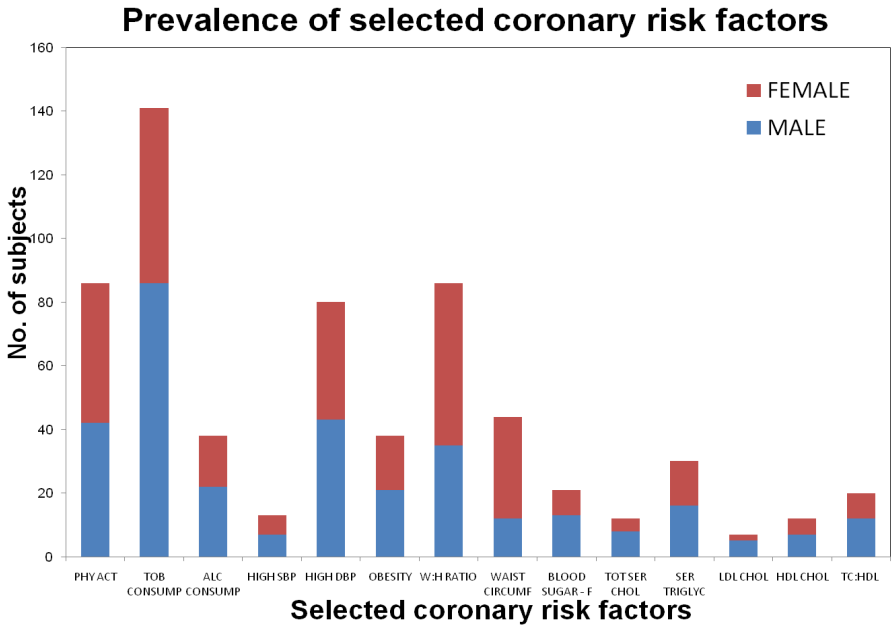

Fig 1: Prevalence of Selected Coronary Risk Factors

22.05% followed by raised fasting blood sugar in 15.44% of the study subjects analyzed for it. (Table 1, Fig. 1).

Discussion:

The present study revealed that, physical inactivity was prevalent among 29.17% males and 34.38% females. Global estimate of "insufficiently active" has been found out to be 41%, ranging from 20% to 70% [7]. The current study contradicts the observation of another study from Jaipur [8] on this particular aspect. The prevalence of physical inactivity was 36.3% (males) and 31.5% (females) according to that study. This could be due to the difference in population composition and socio-cultural environment. The population under study, though a rural population has an urban influence due to its proximity to a major city.

In the present study it was observed that, tobacco consumption in all forms either smoked or chewed tobacco was found to be prevalent in 59.72% males and 42.96% females. According to annual report of Ministry of Health and Family Welfare 2006, tobacco use in rural areas (61% of men and 13% of women) is quite common [9]. Male tobacco use prevalence in 2005 - 06 was 57.0 % vs. 3.1 % among females according to the NFHS-3 [10]. The findings in this study with respect to the prevalence in males is slightly less but the prevalence in the female population in our study was found to be much higher than the findings of NFHS-3. Difference in rates may be due to different local customs and variable socio-cultural environment across India.

Regarding alcohol consumption, we found that it was prevalent in 15.27% males and 12.50% females as compared to the findings from NFHS-3 which showed that about 32% of the study subjects were current users of alcohol [10]. The proportion of users among rural and urban population was very similar (32% and 31% respectively) according to NFHS-3 [10, 11]. Difference in rates may be due to differing age groups constituting the study population and the socio-economic condition which is tilted towards the lower income group.

It was found in this study that, high systolic blood pressure was detected among 4.86% males and

4.68% females. High diastolic blood pressure was found to be prevalent in 29.41% of the study subjects. In most countries, up to 30% of adults suffer from high blood pressure [12] which is quite similar as observed in this study though the pooling of various other epidemiological studies shows that hypertension is present in 10% of the rural subjects in India [13]. Recent studies in urban settings have shown a high prevalence of hypertension among 30% and 33% adult men and women respectively, in Jaipur [14] which are consistent with the findings of our study.

In our study, BMI > 25 kg/m^2 was found to be prevalent among 13.97% of the study subjects. Increased waist-hip ratio was found to be prevalent in 31.61%. Chaddha et al have recorded a high BMI among 9.85% of the study subjects in a rural population [14] whereas Deshmukh et al have reported increased waist-hip ratio in 24.6% in rural population [15]. These studies contradict the observations on this aspect of the study. The difference in rates may be due to different cut off marks in determining the level of these indices and also differing age groups constituting the study population. Genetic factors may have some influence as well, in causing this difference.

Regarding raised fasting blood sugar level, it was found to be prevalent in 18.57% males and 12.12% females as compared to a prevalence of 30.43% of diabetes mellitus in India [9]. In Jaipur Heart Watch 3 (JHW-3), a study gave diabetes prevalence at 17.7% for males and 14.2% for females [14] which is quite similar to the findings of our study. Difference in rate with the overall prevalence in India could be because of the wide degree of regional variation besides the socio-cultural factors and probable genetic role in the causation of the disease as well.

In the present study, hypercholesterolemia and hypertriglyceridemia was found to be present in 8.82% and 22.05% of the study population respectively. Raised levels of LDL, HDL and TC: HDL ratio was observed in 5.14%, 8.82% and 14.70% of the study subjects respectively. These parameters are far below than findings of JHW-3 study [8] and the findings of another study from Andhra Pradesh [16]. A possible explanation for the difference in rates might be because of variation in the socio-economic and cultural conditions prevalent in these populations besides different age groups constituting them.

Conclusion:

To conclude, findings of the present study demonstrate a higher prevalence of selected coronary risk factors especially high tobacco consumption in the study population. Behaviour change communication strategies targeting these high risk factors need to be emphasized to lower CHD related morbidity burden in the community.

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