Study of the Effect of Urbanization on Coronary Heart Disease

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ABSTRACT

Urbanization has been accompanied by a rise in the rate of coronary heart disease (CHD). This trend has gone hand in hand with an increased consumption of processed, energy-dense food and dependence on machines for physical work. This rapid urbanization and accompanying lifestyle changes in India lead to transition in non-communicable disease risk factors. Rapid urbanization and industrialization drives the rising burden of Non-Communicable Diseases (NCDs) worldwide that are characterized by uptake of unhealthy lifestyle such as tobacco and alcohol use, physical inactivity and unhealthy diet. In India, the prevalence of various NCDs and its risk factors shows wide variations across geographic regions necessitating region-specific evidence for population-based prevention and control of NCDs.

BACKGROUND

The burgeoning burden of CHD in India can be explained by the alarming rise in the prevalence of coronary risk factors like diabetes, hypertension, atherogenic dyslipidemia, smoking, central obesity and physical inactivity. Rapid urbanization and change in lifestyle that occurred during the past two decades have led to the growing burden of coronary risk factors in India. Previous studies conducted in migrant Indians were misinterpreted to indicate that conventional risk factors do not account for the high prevalence and premature occurrence of CHD among Indians India has one of the largest populations of diabetics (over 32 million) with a projected escalation to 57.2 million in 2025. The prevalence of type 2 diabetes in urban Indian adults has been reported to have increased from less than 3.0% in 1970 to about 12.0% in 2000. On the basis of recent surveys, the Indian Council of Medical Research (ICMR) estimates the prevalence of

diabetes in adults to be 3.8% in rural areas and 11.8% in urban areas. Similarly the count of hypertensives is expected to rise from 118 million in 2000 to 214 million in 2025 however to assess the link between the demographic variable i.e. location with risk of coronary artery disease, a survey has been done in accordance with various previous studies related to topic.

PREVALENCE   OF CAD AND RISK FACTORS FROM VARIOUS LARGE INDIAN STUDIES

The relationship between socio-economic status and coronary heart disease appear to evolve over time as the epidemic of CHD matures. In developed countries where the epidemic has been there for many decades, high incidence of CHD first occurred in high socio-economic group followed by a reversal of the trend. Studies in India over the past half century have revealed a similar trend towards a progressive reversal of the social gradient for CHD. Although studies conducted from the 1960s to the early 1990 suggested a direct relationship between income and CHD risk, studies conducted in the last decade have reported an inverse relationship between education and/or income with prevalent or incident CHD.

In the issue of the Journal, Gupta et al have reported the results of a survey of coronary risk factors among the administrative employees and their families of a major hospital in Delhi (2012;64:356–363). The study reports a relatively high prevalence of coronary risk factors among a sample of relatively young population. The prevalence of hypertension, hypercholesterolemia, obesity, physical inactivity, poor intake of fruit and vegetables has been particularly high. However, the study is limited by small sample size and the method of sampling. The paper fails to mention the size and characteristics of the total population under study, and as a result meaningful inferences are hard to make. However, the study underlines the fact that despite proximity to health care and financial support for health-related expenditure, the prevalence of risk factors for coronary artery disease remains high.

A similar study by Kamili et al in a selected relatively young male population in an industrial setting from north India also revealed high prevalence of coronary risk factors. In a cross-sectional survey of all employees in the 20–59 years' age group in an organized sector industry, a total of 2935 employees (344 women and 2591 men) were enrolled in the survey.

One-third of the participants had hypertension and 15% had diabetes; 36% were smokers. Even in the youngest between 20 and 29 years of age, only a quarter had normal blood pressure, half had normal glucose tolerance, more than half had dyslipidemia and one-fifth had at least two coronary risk factors. Awareness of diabetes and hypertension was poor, and even among the aware, control was suboptimal. The study emphasized the opportunity for preventive interventions among industrial population which will eventually lead to a healthy workforce and reduction in health care expenditure.

Over the past two decades there have been several studies on the prevalence of cardiovascular risk factors from India. In a field survey conducted in Kerala's rural population in 1993, Raman Gupta et al found definite CHD in 1.4% and possible in 7.4%; the prevalence of major risk factors like hypertension, smoking, diabetes and obesity was 17.9%, 21.9%, 4% and 5.5% respectively. Mohan V et al performed a community-based survey of coronary heart disease and its risk factors in Delhi and its adjoining areas. Over 13,134 men and women from Delhi and 1732 from rural areas were participated. The overall prevalence of coronary heart disease among adults based on the clinical and ECG criteria was estimated as 9.7% and 2.7% in the urban and rural populations, respectively. There was highly significantly higher prevalence in the major risk factors in urban versus rural population.

METHODOLOGY AND RESULT

A survey was done in urban , semi urban and rural population of Madhya Pradesh, India, in a sample of 2134 adults (1129 men and 1005 women) using WHO STEPS questionnaire. A very high proportion of all three population reported inadequate intake of fruits and vegetables. Following observations were made:

Hypertension, diabetes, obesity and physical inactivity were significantly more common in the urban areas, while the rate of tobacco smoking was significantly higher in the rural areas ($p < 0.05$).

Rural men reported five time's physical activity as compared with urban and semi urban men and rural women reported seven times physical activity as compared with women in the other two settings. Mean body mass index (BMI) was highest among urban men (22.8 kg m(-2)) and rural men (20.6 kg m(-2)) (P-value < 0.01)(p value = probability value). Similar trend was seen

for women but at a higher level than men. Prevalence of obesity (BMI $>/=$ 30 kg m(-2)) was highest for urban population (male = 5.5%, female = 12.6%) followed by urban slum (male = 1.9%, female = 7.2%) and rural populations (male = 1.6%, female = 3.8%).

The alcohol consumption rates for the urban and rural communities were similar ($p> 0.05$). The quantity of the food items commonly consumed, as well as the frequency with which particular items were consumed, varied across the rural, semi-urban and urban areas ($p< 0.05$). The urban population had significantly higher levels of lipids and serum insulin than did the rural population, but a lower level of plasma glucose ($p< 0.05$).

Among men, alcohol use 40.4% (95% CI: 37.4-43.4) was almost twice higher compared to tobacco use 24.4% (95% CI: 21.7-26.9). Nearly half of the population was physically inactive 45.8% (95% CI: 43.8-47.8) and obese 46.1% (95% CI: 44-48.1). Hypertension and diabetes mellitus were present among one-third 33.6% (95% CI: 31.6-35.5) and one-fourth 26.7% (95% CI: 24.1-29.1) of the population which were significantly higher among men (37.1% vs 30.8% and 31.6% vs 23.2% respectively).

The prevalence of coronary heart disease among males in the ,rural, semi urban and urban was 1.7%, 2.5% and 7.4%, respectively, and among females, 1.5%, 3.4% and 7.1%, respectively. The age- and sex-adjusted prevalence odds ratio of coronary heart disease, in comparison to the rural, was 1.9 (95% CI; 1.1-3.2) in the semi urban and 4.9 (95% CI: 2.9-8.2) in the urban.

CONCLUSION

Urbanization increases the prevalence of the studied non-communicable disease risk factors, with women showing a greater increase as compared with men. Non-communicable disease control strategy needs to address urbanization and warrants gender sensitive strategies specifically targeting women.

Physical inactivity and overweight/obesity increased with increasing education levels. Tobacco and alcohol use was more common among men, whereas physical inactivity with obesity and hypercholesterolemia was higher among women.

The urban way of living is leading to an increase in the prevalence of the well-known risk factors for, as well as the rate of, coronary heart disease. Attempts to preserve the traditional lifestyle are necessary in order to prevent an epidemic of coronary heart disease in the developing countries.

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