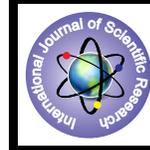


Patterns of Cardiovascular Mortality: A Micro-Level Study of Block Tanda (Hoshiarpur, Punjab)



Geography

KEYWORDS : Cardiovascular deaths, spatial patterns, Punjab

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ABSTRACT

The objective of this paper is to study the micro-level spatial patterns of cardiovascular mortality in Tanda block of Hoshiarpur district (Punjab). The data was collected from both primary and secondary sources. The results showed that cardiovascular mortality is higher along major roads and lower near Beas River and Kali Bein. More males died in economically productive age groups. Areas having more literate and non-agricultural population registered higher cardiovascular death rates. Behavioural risk factors (tobacco, alcohol and rich diet) increased the vulnerability to cardiovascular diseases.

Introduction

The emerging epidemic of cardiovascular diseases in developing countries has been well documented by Reddy (1998, 2002) and Institute of Medicine, Washington D.C. (2010). These studies have concluded that the developing countries are experiencing a sharp rise in burden of cardiovascular diseases because of demographic shifts with altered population age profiles, lifestyle changes due to recent urbanization, altered diets, tobacco use, diminished physical activity, delayed industrialization and overpowering globalization. In India, the state of Punjab has the highest proportion (approximately 50%) of cardiovascular deaths out of the total mortality. The incidence of cardiovascular diseases has been increasing rapidly in the state over the last few decades. In 1985, the total number of outdoor patients suffering from cardiovascular diseases in government medical institutions of Punjab was 2.14 lakhs. The figure rose to approximately 3 lakhs in 1995 and then altogether doubled to 6 lakhs in 2005 (Directorate of Health and Family Welfare, Punjab). The population of the state is being exposed to greater risk of cardiovascular diseases due to the intake of rich diet, high cholesterol level and sedentary lifestyle (The Tribune, 1st May 2006).

The figures on cardiovascular deaths among indoor patients in the state (2007) reveal that the districts with cardiovascular mortality rate more than 15 deaths per lakh of population include Patiala (24), Bathinda (19), Ropar (19), Hoshiarpur (18) and Faridkot (16). The objective of this paper is to study the micro-level spatial patterns of cardiovascular mortality in Tanda block of Hoshiarpur district, which falls in the category of high rate of cardiovascular deaths. Tanda block is situated in the central western part of district Hoshiarpur (Punjab) and extends from 31°33' N to 31°47' N latitude and 75°29' E to 75°42' E longitude. Physiographically, it is a flat alluvial plain, whose western border is formed by river Beas. Most of the choes flowing down the slopes of the Shiwalik hills terminate in the central areas of this block. The block has a total population of 1,08,509, living in its 120 villages.

Data and Methods

The data was collected from both primary as well as secondary sources. Village-wise data on cause of death, month of death, age and sex of the deceased was noted down for all cases of the year 2008 from Death Register of block Tanda available in the Office of Registrar (Births and Deaths). The village-wise data on demographic attributes (population, literacy and occupational structure) for the census year 2001 was obtained from village directory of Hoshiarpur district. For behavioural factors like tobacco use, alcohol consumption and diet, primary data was collected through interview schedules by randomly selecting ten persons from the study area who were suffering from cardiovascular diseases.

Results and Discussion

In 2008, block Tanda registered the highest proportion of deaths (38%) caused due to cardiovascular disease amongst all the de-

velopment blocks of district Hoshiarpur. The total number of deaths from all causes registered in Tanda block was 1,008, out of which 382 deaths occurred due to cardiovascular diseases. As many as 163 persons died below the age of 60 years, which accounted for 43% of the total 382 cardiovascular deaths. The maximum number of deaths (21%) occurred in the age group of 60-70 years. This is cardiovascular diseases have a long period of latency, due to which most of the afflicted persons are likely to die in their sixties. However, the younger age groups are also no less vulnerable to cardiovascular diseases. 27% of the persons who died from cardiovascular disorders were less than 50 years of age. This is due to the high consumption of fats and alcohol, which results in the narrowing of blood vessels, leading to a heart attack or stroke. Moreover, out of the total 382 persons who died in 2008, 60% were males and 40% were females. This shows that the male population is more vulnerable to cardiovascular diseases than females.

The spatial distribution of cardiovascular deaths reveals that most of the deaths occur in the villages lying in close proximity to the National Highway 1A and the main roads connecting the block headquarter Tanda to the adjacent towns. This can be due to the higher level of road connectivity of these villages with the urban areas leading to the greater use of automobiles and increased effect of urbanism. Higher use of automobiles even for travelling shorter distances results in physical inactivity. It has also been observed that most of the villages situated along these main roads of the study area reflect comparatively higher levels of economic development, as compared to the villages situated in the interior far-off areas. In turn, high economic development has increased the effects of urbanism and affluence, leading to higher incidence of cardiovascular diseases in such rural areas.

Areas of high mortality (more than 4 deaths per thousand persons) included most of the eastern parts and some villages of the central western parts of the study area (Fig 1). In the eastern parts, the villages with high mortality form an almost continuous belt running from north to south situated to the eastern side of National Highway 1A. Areas of moderate mortality (2 to 4 deaths per thousand persons) form a noticeable belt lying in the mid-western parts of the study area. This belt also runs from north to south almost parallel to the high mortality belt of the eastern parts. On the other hand, the areas of low mortality (less than 2 deaths per thousand persons) include most of the central and extreme western parts of Tanda block.

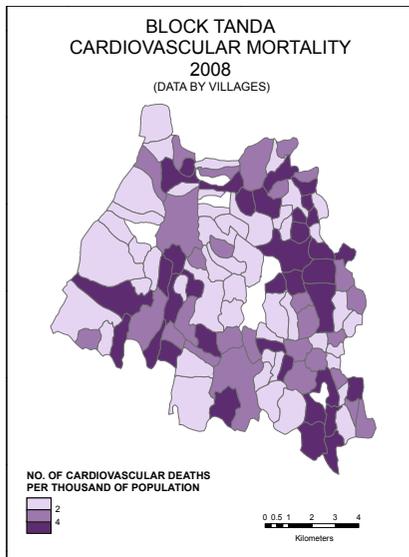


Fig 1

The physical factors that affect the distribution of cardiovascular mortality in the study area are drainage system, spatial variation in winter temperatures and groundwater hardness. The drainage system of block Tanda includes two important water channels. One is the Beas River flowing along the western border. The other is the Kali Bein (a tributary of Satluj) whose course runs through the middle of the study area from north to south direction. The spatial patterns of cardiovascular mortality show that most of the villages lying along these water streams have very low mortality rates. As far as the areas lying along Beas River are concerned, winters are less severe in these areas than the rest of block Tanda. This is primarily due to the moderating effect of Beas River. It has been observed that all the villages situated along the river course experience dense fog during the winter months, while the other villages of block Tanda come under severe frost action. However, the villages along the river channel do not come under the influence of winter frost, due to which their winter temperatures do not fall as low as in other parts of the study area. Therefore, these areas have lower incidence of cardiovascular deaths, which occur mainly during the winter season.

The villages situated along the course of Kali Bein also have lower incidence of cardiovascular mortality. This can be due to the fact that the areas lying along Kali Bein suffer from water logging, which may have increased the hardness of underground water of nearby areas. Hard water is generally associated with lower incidence of cardiovascular diseases. This can be the reason for the lower rates of cardiovascular deaths in the villages situated along Kali Bein.

Among the socio-economic factors, literacy and occupational structure affect the patterns of cardiovascular deaths in the study area. Literacy rate influences the spatial distribution of cardiovascular mortality in Tanda block because it affects the educational level, occupational structure and income of the people. It has been observed that villages having high levels of literacy display high cardiovascular mortality rates, while the villag-

es with low literacy rate have lower incidence of cardiovascular diseases. The coefficient of correlation between the number of literates and the number of cardiovascular deaths in all the 111 inhabited villages of the study area is 0.8, which shows that both these variables have a high degree of correlation between them.

As far as the occupational structure is concerned, visual comparison reveals that the villages having higher proportion of non-agricultural workers out of total workers have higher levels of cardiovascular mortality and vice versa. This may be due to the fact that agricultural activities require a higher degree of physical activity, which in turn leads to lower prevalence of cardiovascular diseases.

Behavioural factors like tobacco and alcohol consumption have a direct bearing on the prevalence of cardiovascular diseases. As far as tobacco consumption is concerned, the data collected from sample survey of ten persons suffering from cardiovascular diseases in the study area reveals that out of the seven male respondents, three persons were smokers. These three persons smoked daily and all of them started smoking when they were 15 to 20 years of age. Smoking of tobacco leads to the hardening of blood vessels, which increases susceptibility to cardiovascular diseases.

In case of alcohol consumption, all the seven male respondents consumed alcohol before the development of cardiovascular disorders. However, only two of them had taken alcohol in the last 12 months. This indicates that most of them had quit drinking after acquiring cardiovascular diseases. None of the three female respondents from the study area consumed tobacco or alcohol. But so far as the intake of milk and milk products is concerned, all the ten respondents consumed milk daily and nine of them consumed milk products (ghee, butter and cheese) on a daily basis. This is a major reason for the development of cardiovascular diseases since milk and milk products contain saturated fats that get deposited on the inner walls of blood vessels making them thick and narrow.

Conclusion

The areas lying along major roads of block Tanda have higher rates of cardiovascular mortality, due to greater reliance on automobiles and increased effect of urbanism and affluence. The villages situated close to Beas River have low cardiovascular mortality rate due to the moderating effect of the river in winters. The areas near Kali Bein have registered less number of deaths from cardiovascular diseases due to the potential role of waterlogging in increasing the groundwater hardness at local level. 27% of the total persons who died from cardiovascular disorders were less than 50 years of age. More males died from these diseases in the economically productive age group of 30 to 60 years. Higher the number of literates and non-agricultural population in an area, more are the cases of cardiovascular deaths. Behavioural risk factors like tobacco and alcohol consumption and intake of diet rich in saturated fats also increased the vulnerability to cardiovascular diseases.

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