Trans. Inst. Indian Geographers
Vol. 14. No. 2, July 1992.

GEOGRAPHICAL DISTRIBUTION OF TUBERCULOSIS IN KASHMIR DIVISION

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Abstract: The infectious and communicable diseases are more prevalent in under-developed and developing societies as against the high incidence of degenerative diseases in developed countries. The present paper attempts at studying the prevalence rate and the spatial distribution of tuberculosis—a communicable disease in Kashmir

INTRODUCTION

The virtual eradication of many of the communicable and infectious diseases represents one of the few true success stories of modern science and modern medicine. Diseases such as small pox have been wiped out globally and the impact of the poliomylitis, measles, tuberculosis, diptheria, typhoid fever and several other serious communicable diseases have been substantially eradicated from developed nations through the wide spread implementation of mass vaccination programmes. It is also apparent that the accompolishments in the prevention of infectious diseases have been complemented by other significant advances in the basic concept of cell biology, host-pathogen interaction, and immune systems. Development of a wide array of antimicrobial drugs and chemotherapeutic agents and availabilty of techniques for rapid diagnosis of infectious diseases have helped in minimising health problems. Many of these approaches have been successfully applied towards control of effective treatment of life threatening infectious diseases.

Although the global epidemiological patterns of many infectious diseases have been significantly altered to the adventage of the human host, it is apparent that the socio-economic impact of many newly identified infectious diseases continues to overwhelm the meagre professional and economic rresources, particularly in the developing countres.

A developing nation such as India is basically an agrarian society with more than 75 per cent of its population living in rural areas with unhygenic settings and low availability of basic amenities. This had direct impact on the health conditions of its people. The rural settlement pattern and their environment give birth to most of the communicable diseases with higher percentage of morality rates. It is because of these unfavourable settings that few communicable and infectious diseases which were thought to have been eradicated some time back from India are again threatening one or the other area of the country. One such area is Kashmir Division where tuberculosis—a communicable disease, has been arresting attention of medical scientists for the last four or five decades atleast for its prevention if not for eradication.

Kashmir Division is one of the three divisions of Jammu and Kashmir State. The other two divisions are Ladakh and Jammu division situated to its noth and south respectively. Kashmir Division (32°-20' - 34°-50'N and 73°-35' - 75°35'E) is enclosed on all sides by high mountain ranges of mighty Himalayas which give it a rugged and undaulating topography. The altitude varies form 5000 to 14,000 feet where human hanitation is found. Its obvious effect is on drainage pattern which is dendritic on micro level but is strictly centripetal on regional (Divisional) level. The water falling on slopes mixes with the water of the low lying areas thus feeding the main river, The Jahlum. The bulk of settlements are situated on the banks of River Jahlum. During its course the water of Jehlum gets highly contaminated due to dumping of human refuse and other wastes into it thus causes adverse effects on human health. Besides, Kashmir Division being a horticultural area, the pesticides and other fungicides which are being sprayed on fruit trees mingle with the surface and under ground water in large quantities. Spraying season is mainly from the month of March to the month of May which also hapens to be the rainy season in the division. The highly contaminated water is stored for drinking purpose particularly during summer period and in areas which experience shortage of water. In villages spring water is available and thought to be of better quality than any other water source like river or stream, but such under ground water also absorbs various chemicals or pesticides and its use plays an important role in the incidence pattern and diffusion of water borne and other communicable diseases.

PREVALENCE OF TUBERCULOSIS IN INDIA

Over the last 60 years, several surveys have been undertaken to quantify the problem of tuberculosis in the community in terms of prevalence and incidence rates of infection and disease and mortality rates in different regions of India. Between 1930 and 1960 several surveys were conducted using tuberculin test and chest X-rays, mainly in selected groups of population involving relatively small numbers. It was believed that this disease was mainly in the urban population, among the younger persons and among females. Since 1950, well designed and properly conducted surverys in general population both rural and urban were undertaken by individuals and some national organisations.

Tuberculosis at present is one of the major health problems of India. It is estimated that nearly four hundred thousand people die of this disease annually in India. Plycobacterim tuberculosis (human type) is practically the only causative agent of tuberculosis in India. The mode of infection is by and large air-borne through inhalation of infected sputum droplets. However, the development of active tuberculosis disease following infection is governed by a number of factors both intrinsic and extraneous including the resistance of the host, but these factors are so varied that the ultimate fate of infection in any individual is often unpredictable. The infection is not immediately followed by disease in about 95 per cent individuals. (Directorate Geneeral of Health Services 1987)

Prevalence rate of tuberculosis infection in India is 40 percent in all age groups rising from about 2 percent in the youngest age group to about 70 percent at an age of 35 years. Thereafter it remanins almost constant. Incidence of infection is highest in individuals between the age of 5 and 20 years. The risk of infection is of the order of 2 to 4 percent per year.

The incidence of tuberculosis is higher as the age advances and again higher in males than in females. Male to female ratio varies from 3:1 to 5:1 (Baily, G. V. J 1983).

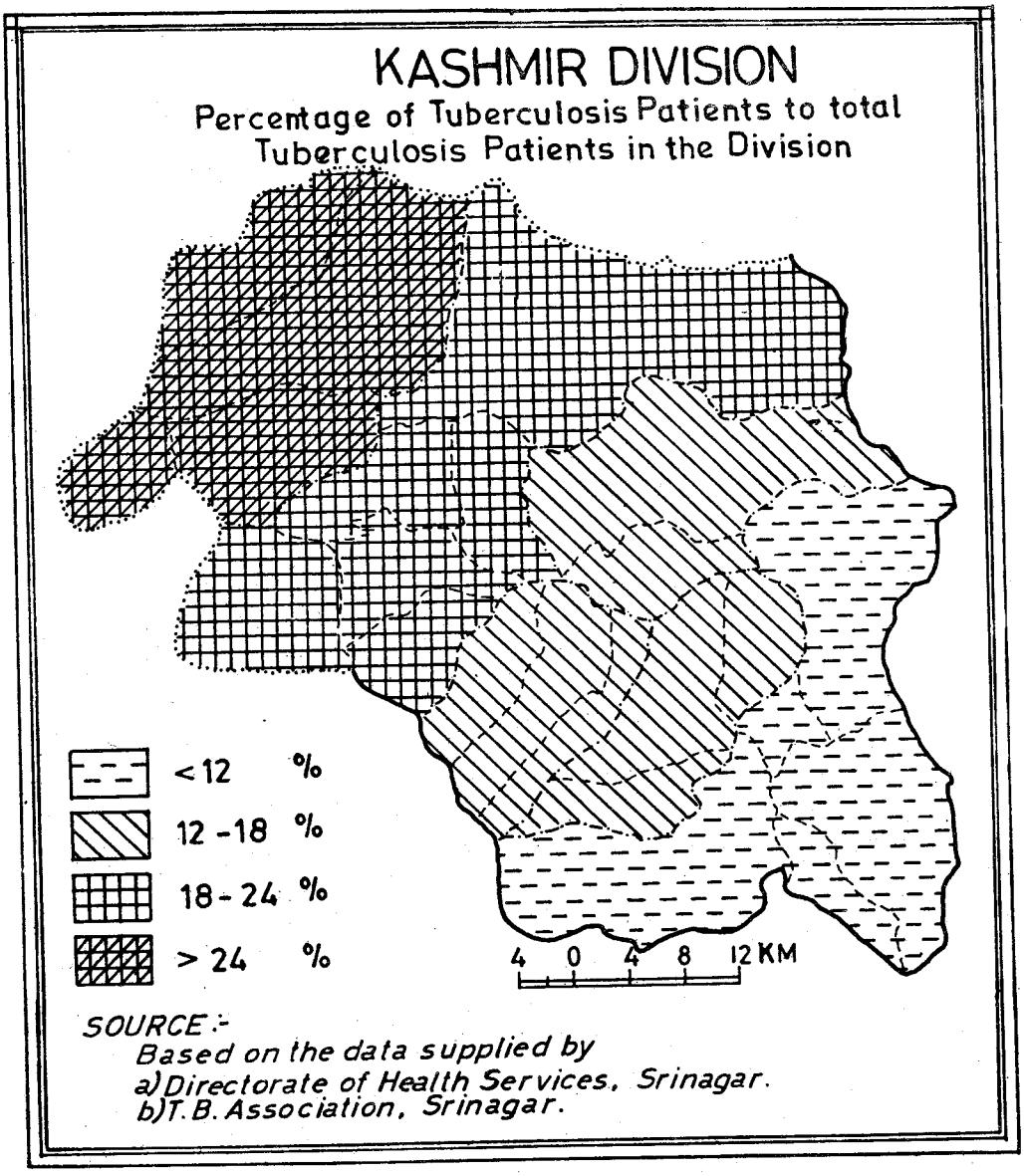

Fig.1

The trend of the disease appears to be almost constant over the years expect in some cities where better services for diagnosis and treatent have been available for some time (Goyal, S. S. *et.al* 1983).

Incidence of tuberculosis is more or less uniformly distributed in urban, semi-urban, and rural areas. Thus the majority of pulmonary tuberculosis patients are to be found in rural and semi-urban areas where about 75

per cent of India's population lives. However, there are certain pockets where the incidence is much higher than in other areas. Non-specific sensivity is highly prevalent in the entire country though there are significant differences between different areas in altitude. It is definitely lower in areas situated at higher altitudes (Raj Narain, er.al 1975).

PREVALENCE OF TUBERCULOSIS IN KASHMIR DIVISION

Only a few surveys with regard to the incidence of tuberculosis in Kashmir Division have been carried out during 1979-1983. The results show that the prevalence of the disease is more or less similar to national level. In Kashmir Division prevalence of infection varies from 38 per cent to 41 per cent in the gerneral population (Dhar, S. N. *et al* 1984). The study reveals that the disease is encountered in both rural and urban areas with almost similar ratio. Females are more victims of the disease than males. Their percentage is 47 as against 38 for males. There is no difference between different economic groups (Dhar, S. N *et al* 1984). The over all non-specific sensitivity assessed by the tuberculin test was 59 per cent. This figure is less than prevalence of 85 per cent found in Chingleput district of Tamil Nadu State (Baily, G. V. J. 1983).

TUBERCULOSIS ZONATION IN KASHMIR DIVISION

In Kashmir division, district Kupwara registers the highest incidence of tuberculosis followed by Baramulla and Anantag districts. All these districts are located at higher altitudes as compared to other districts of the Division. Data collected from various sources and the analyses of the questionnaires reveal tht the general belief with increase in altitude the percentage or Non-specific sensitivity decreases is proved false in Kashmir Divison. Contrary to this the percentage of non-specific sensitivity increases with increase in altitude. (Fig 1).

During 1984 as many as 639 specific cases of tuberculosis infection were detected from district Kupwara. This makes 21.5 per cent of all the cases found in Kashmir Division. Baramulla district had 576 cases followed by Pulwama district 490 cases, Anantng district 488 cases, Srinagar district 399 cases and Badgam district with 380 cases. These figures represent about 19.3, 16.5, 16.4, 13.4, and 12.7 per cent of all the tuberculosis patients of Kashmir Division during 1984. These figures indicate that the concentration of tuberculosis is high in areas which have mountainous terrian and located at higher altitude.

Although there had been appeciable decrease in the absolute number of tuberculosis patients over last five years from 1984 to 1988, the districts of Kupwara and Baramulla show upward trend form 21.5 and 19.3 to 25.9 and 23.8 per cent respectively. In Badgam district the prevalence rate drops to 6.4 per cent in 1986 as against 12.7 per cent in 1984. This is because of some territorial adjustment of Badgam district. In the remaining three districts of Srinagar, Anantnag and Pulwama the disease is under control and the incidence rate has been declining because of extended B.C.G. vaccination programme. (Fig 2).

GEOGRAPHICAL FACTORS IN THE INCIDENCE OF TUBERCULOSIS IN KASHMIR DIVISION

The incidence of tuberculosis in Kashimr Division ncreases with increase in altitude. There is positive correlation between the two. However, this disease is widely prevalent in the zone between 8000 to 12000 feet. The percentage of tuberculosis patients falls above and below this zone significantly. In Baramulla and Kupwara tehsils nearly 34.5 and 43.6 per cent of population live above 8000 feet. The

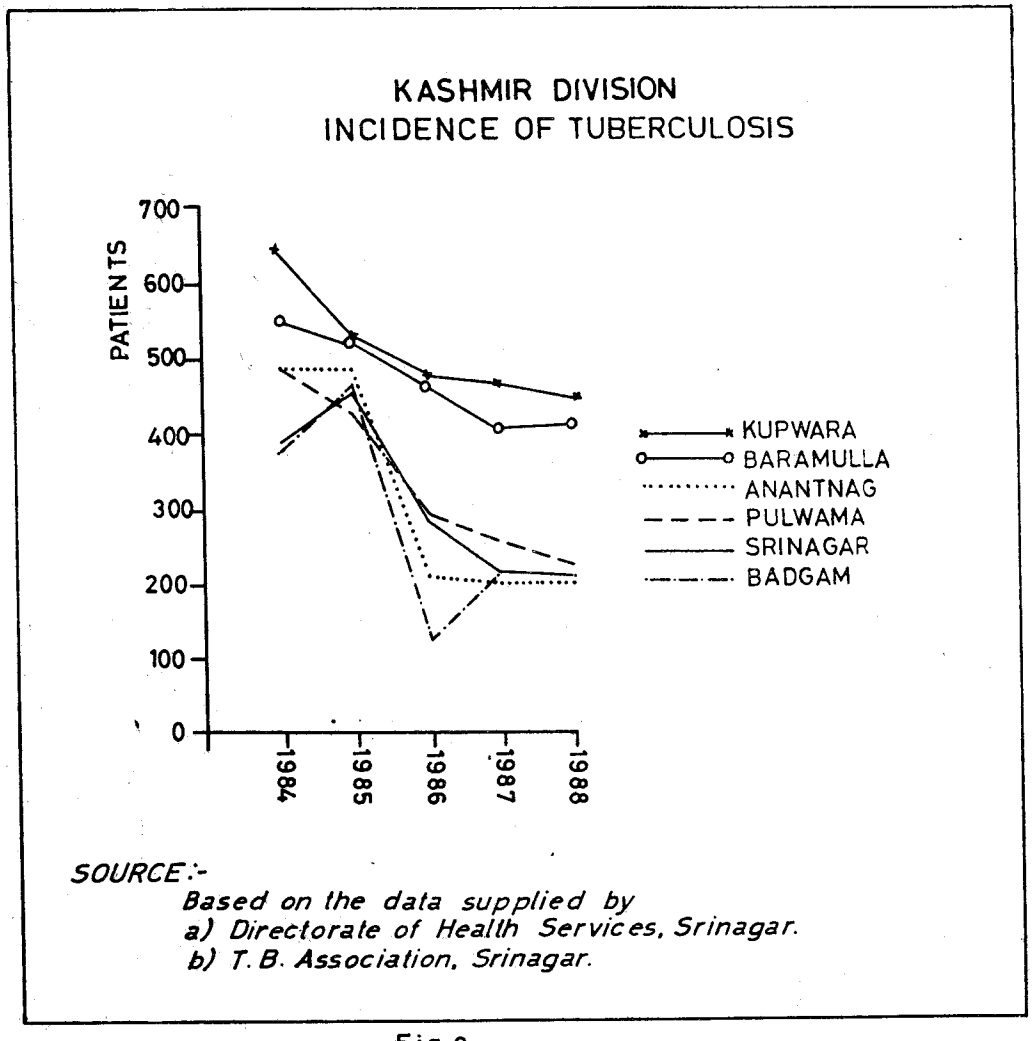

Fig. 2

corresponding percetnage of tuberculosis population in these areas is 16 and 19.5 per cent respectively, out of total of 23.8 per cent and 25.9 per cent. (Fig. 3).

Table I shows the percentage of population of districts living in respective districts together with the concentration of tuberculosis patients to total tuberculosis patients in each district.

Such a distributional pattern and concentration of tuberculosis in the belt of 8000 to 12,000 feet is analysed in the context of geographical environment.

One of the physical factors for the high incidence of tuberculosis is the wind pattern that blows over the "Tuberculosis Belt of 8000 to 12,000 feet in the Division.

Since the Kashmir Division is surrounded on all the sides by moundatin ranges these work as barrier in the path of summer monsoons and the air masses that have their origin in the

Indian Ocean. The Greater Himalayas however, have little obstructive influence on the influx of Westerly winds as they move at a higher altitude and enter the Division from west and north-west. Secondly there are certain cuts in these mountain ranges which act as funnels through which the gushing winds enter into the Division. On entering the division these winds descend in the belt of 8000 to 12000 feet altitude, creating here a comparatively permanent high pressure zone. These winds are responsible for carrying bacilli in the sputum droplets which get transmitted into other non-infected population. As in India, plycobacterim tuberculosisis only causitive of the disease in the Kashmir Division.

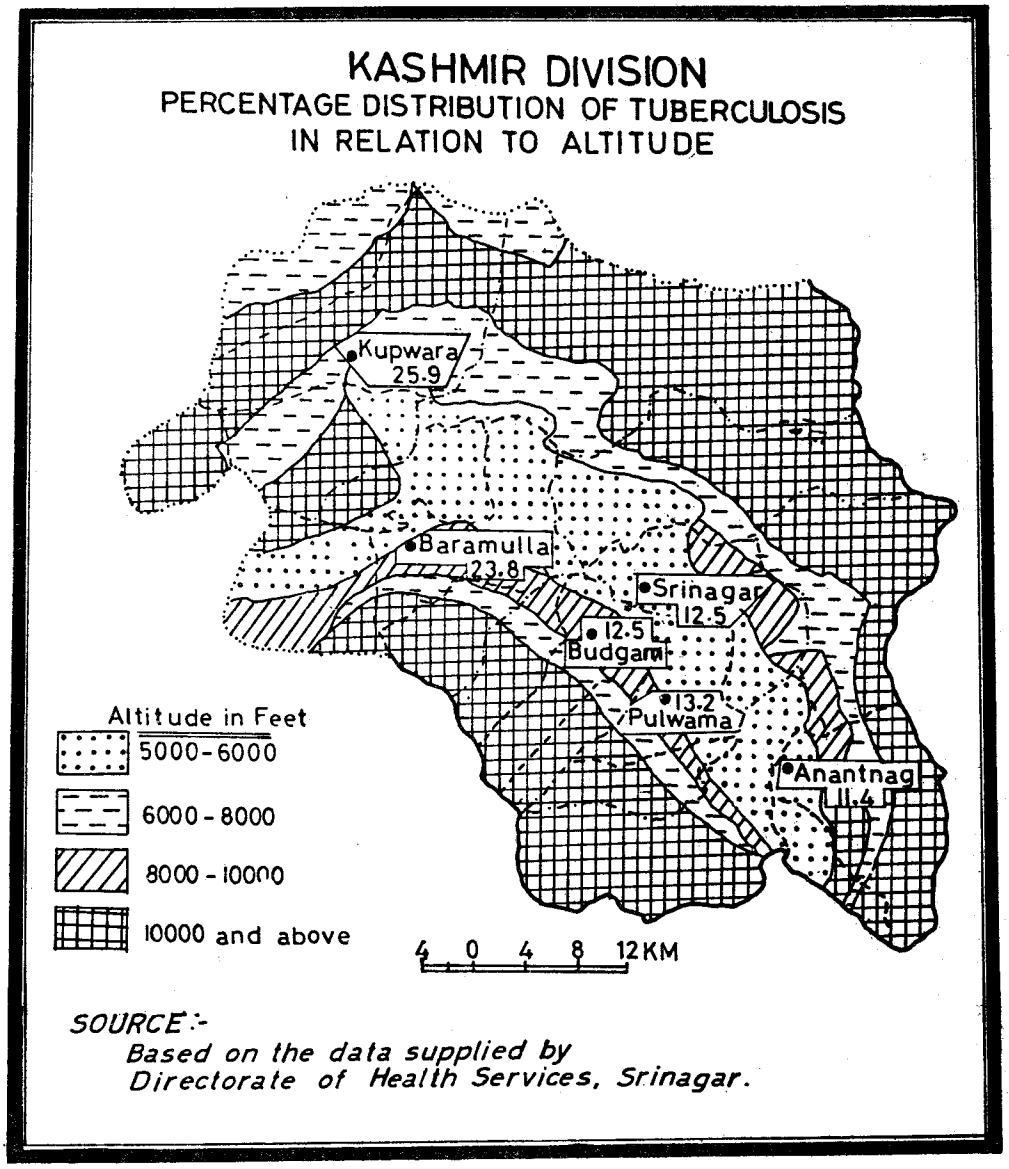

Fig. 3

TABLE I

PERCENTAGE OF POPULATION IN VARIOUS ALTITUDINAL ZONES IN RELATION TO TOTAL POPULATION IN EACH DISTRICT IN KASHMIR DIVISION

District	Percentage of population in zone 5000 to 8000ft. altitude	Percentage of population in zone 8000 to 12000ft. altitude	Percentage of population in zone above 12000ft. altitude	Total and percentage of T. B. pop. in zone 8000 to 12000ft altitude	Total tuberculosis population in district as% of the division
Baramulla	60.4	34.5	5.0	16.0 (67.2)	23.8
Kupware	56.2	40.3	3.3	19.5 (75.2)	25.9
Badgam	89.6	7.9	2.3	7.3 (58.4)	12.5
Pulwama	85.8	12.3	1.6	8.5 (64.3)	13.2
Srinagar	80.0	17.0	3.0	70.5 (56.4)	12.5
Anantanag	84.1	13.2	2.7	6.8 (59.6)	11.4
Kashmir Division	76.0	20.0	2.9	63.5%	100%

Source: Based on field survey.

Figures in brackets represent percentage to total tuberculosis patients in each district.

Also, this belt is truely rural in nature where most unhygienic environment prevails and the people are socially less aware. They are observed chewing tobacoo, using snuff on teeth and in nostrils and sneezing frequently and spitting anywhere any time. This is the chief factor in transmitting tuberculosis among fellow people.

The second physical factor in diffusing tuberculosis in the Kashmir Division is the lack of infrastructural facilities including the supply of clean drinking water because of its rugged toporgaphy. The difficult terrain restricts the expansion of welfare measures in higher altitudes. The settlements in the tuberculosis belt (8000-12,000 feet) in most cases lack pro-

tected drinking water supply and use streams and other riverulets as alternative means, which are contaminated and polluted by all dirt and the refuse of the area. The clothes and the utensils are washed with the same water and in same streams where from water is drawn for drinking purposes. This way sputum of infected people contaminates the water and the general population of the area is affected by the bacilli. However, there seems to be no relation between tuberculosis and bed rock material as has been observed with other diseases like goitre and anaemia. Petrology of some of the highly infected areas is similar to that of the areas low in prevalence. Both Kupwara and Srinagar tehsils have limestones as bed rock material but the prevalence of the tuberculosis is markedly different.

ACKNOWLEDGEMENT

Author is thankful to Prof. Rai Akhtar for his supervision and suggestions in writing this paper.

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