

Evolution of Medical Geography: An Overview

Pashupati Nepal

Associate Professor

Central Department of Geography, Tribhuvan University, Kirtipur

nepalpashupati@yahoo.com

Abstract

Health is not merely absence of disease or infirmity, it is a state of complete physical, mental and social well-being. Infact, health is dynamic equilibrium between man and his environment. A commission on medical geography was made by international Geographical Union (IGU) and its report was discussed at IGU congress in Washington in 1952. Since then the analysis of health and disease through man-environment relationships has attracted the attention of geographers to work in medical geography. In this context, present article seeks to analyse the development, purpose and field of medical geography. It also attempts to analyse environmental control of disease and susceptibility and prospects of medical geography in Nepal. Finally, it concludes that geographers can make major contributions to help reduce suffering of human health and increasing longevity if they are able to establish causal links between specific disease and environment.

Introduction

Health is a state of complete physical, mental and social well-being and not merely absence of disease or infirmity (website: who.int). It is evident from the definition that there is an extension of elements of health as against sickness. In the modern concept, disease is looked as a mal-adjustment in the delicate balance between man and environment and health as a dynamic equilibrium between them (Park 1994). Disease can not arise without the convergence at a certain point in time and space of two orders of factors: environmental stimulus and response of the tissues. They vary with the locational attributes (Husain 1994). In essence, health is a function, not only of medical care but also of the overall integrated development of society, natural, and man-made environment (VHAI 1992).

Diseases are not uniformly distributed over the surface of the earth. When a systematic study is made about the spatial distribution of diseases in which human-being lives in relation to the environment, we approach the field of medical geography. Realizing the importance of medical geography, the International Geographical Union (IGU) constituted a commission on medical geography and its report was discussed at IGU congress in Washington in 1952. The Commission defined medical geography as the study of geographical factors concerned with cause and effect of health and disease. Since then the analysis of health and disease through man-environment

relationships has attracted the attention of geographers to work in medical geography and has emerged as a specialized branch of geography (Bhat and Learmonth 1972). Levels of health and disease vary by places and over time. Medical geography needs to reflect on changing understanding of diseases through time. Like places, diseases (and health) are not fixed realities but are situated and socially produced in particular historical, social, economic, cultural and political contexts (Smith 2005). At present, there is a growing awareness of the importance and understanding of geographical aspects of human health and diseases. This paper aims at tracing out the historical development, purposes and field of medical geography. In addition, this paper also attempts to analyze the environment and health relationships in Nepalese context.

Development of Medical Geography

The primitive men conceived diseases and all human suffering and other calamities as the wrath of Gods due to their limited knowledge. The concept of disease on which the ancient people's trust was dependent is known as the 'Super-natural theory of disease.' It was felt that the anger of these super-natural powers caused diseases or signs of ill health. Mere attention was paid to hygiene and curative aspects of disease.

The greatest physician in Greek medicine was Hippocrates (460-370 BC), who is often called the 'Father of Medicine.' He probably produced the world's first medical geography. He was constantly seeking the causes of disease. He studied such things as climate, water, clothing, diet, habits of eating and drinking and their effects on producing diseases. His book 'Airs, Water and Places' is well known in which the description of the effect of topography and climate on the health and character of man is given. The Hippocratic concept of health and disease stressed the relation between human-being and environment (Park 1994).

There was no perceptible progress in medical geography during the period of 'Middle Ages' (500 - 1500 AD). Therefore, that period was called the 'Dark Ages of Medicine.' The practice of medicine reverted back to primitive medicine dominated by superstition and dogma. At the end of the 15th and the beginning of the 16th centuries, a number of articles, letters and monographs were written describing the relationships between human diseases and environment.

Further development was made when a number of books on medical geography and related topics were written during the 17th-18th centuries. Among these, a German clinician Finke accumulated a large collection of the data of his travels and published three volumes on so called medical geography (Khan 1971).

During the 19th century August Hirsch's contribution enriched the medical geography. Firstly, he published two volumes in German language relating to medical geography between 1860 and 1964. Then, he published its second edition into English version in III volumes entitled 'Handbook of Geographical and Historical Pathology' between 1883 and 1886. In this book, it is highlighted that the distribution of each of the disease was related to the local environment of the place where they occurred (Khan 1971).

Medical geographers in the Soviet Union were working with a theory of the natural tendency of zoonotic diseases to become localized in a specific habitat as early as the 1950's. Pavlovsky wrote of a 'Landscape Epidemiology' which delimited the foci of infectious, zoonotic diseases by analyzing the associations of vegetation, animal and insect, soil and precipitation regime and other elements of the natural landscape (Meade 1977).

May, the Director of the Medical Geography at the Department of American Geographical Society of New York, introduced the ecology of disease into American Geography in the 1950's in his voluminous writings (The Ecology of Human Diseases 1958; Studies in disease Ecology 1961). He described the epidemiological constraints of various diseases requiring the coincidence of two, three or four factors. For example, African sleeping sickness required a large population of tsetse flies, infected game animals or humans, and susceptible people. He then tried to identify the geographical elements, or *geogens* that determined their existence and distribution (Meade 1977).

Stamp's books on 'Some Aspects of Medical Geography' published in 1964 and 'Geography of Life and Death' published in 1965 have contributed, among other important studies of the recent past into the proliferation of scope of medical geography. In these books, he pointed out that the mortality and the health of the living people should be considered simultaneously in the study of medical geography.

In India, some scholars have emerged as medical geographers to contribute to the evolution of medical geography through publications. For example, Misra published 'Medical Geography of India' in 1970. In this book, he provided a broad survey of the distribution of diseases in India and also discussed on the geographic problems related to nutrition and health. Likewise, Hussain published an edited volume entitled 'Medical Geography' in 1994 in which he has focused on concept, planning for health care, diseases diffusion, diseases-mapping, and so on. Efforts have been continued through contributing papers related to different issues and problems of medical geography through 'Geographical Journal' and 'Indian Geographical Journal'.

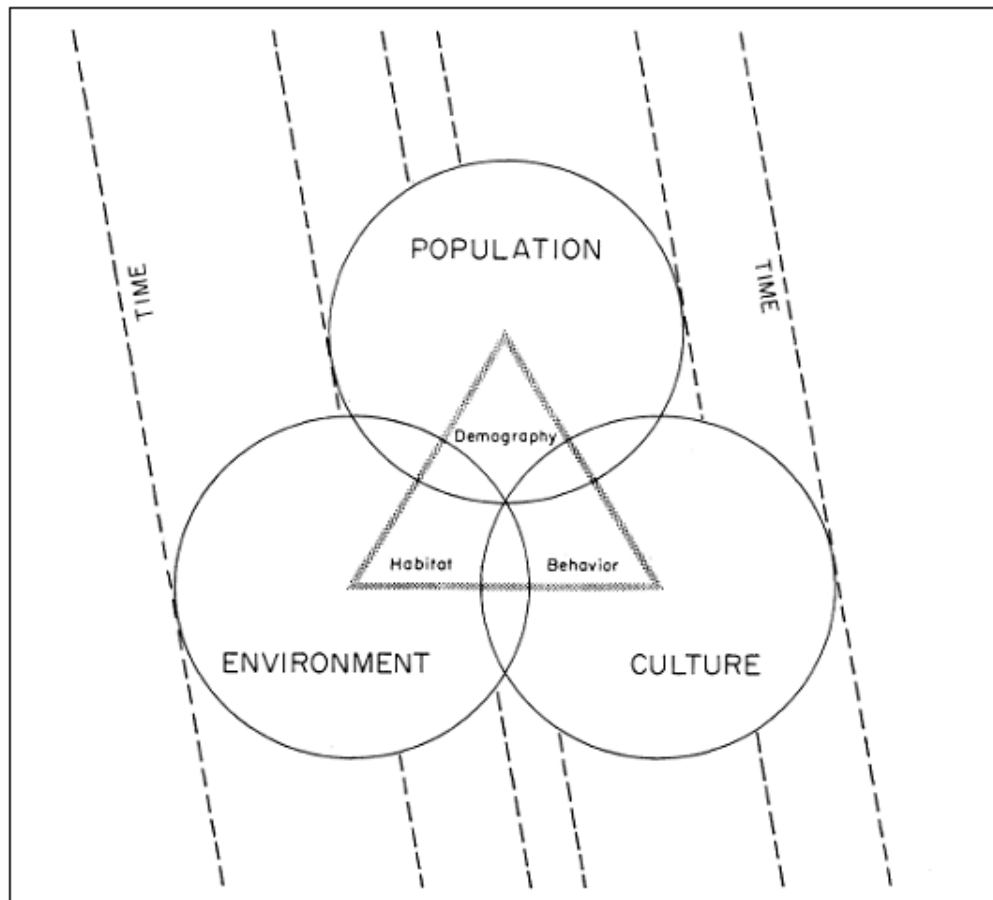
In Nepal, few scholars have emerged and contributed some complements to medical geography through research works and publishing health related papers. For example, Sharma (no date) conducted a study on 'Medical Geography of Infant Mortality in Deokhuri Valley, Western Nepal' and likewise Gurung (1988) carried out a study on 'Human Geography and Child Mortality in Nepal.' In addition, Dhungel and Dias (1988) conducted a study on 'Planning for Rural Health Services in Nepal'. These studies can be cited as major contributions in this direction. The current author has also made efforts on medical geography through publishing papers and a book related to medical geography. However, efforts require to be continued to conduct more studies on medical geography in Nepal.

Purpose and Field of Medical Geography

Medical Geography is defined as the study of spatial distribution of health, ill health and diseases as determined by the natural and cultural milieu of human-beings (Khan 1971). It is impossible to ignore the intrinsic interrelationships between distribution and influence of geographic factors, such as landforms, soil, climate, vegetation, flora and fauna, micro-organism, etc and life of human being. The occurrence of these in single or in collusion with others and the reasons of human's physiology and mind to them, forms the core of medical geographic research.

When health is conceived as adaptability, the disease is transformed from that of a biological entity to human beings. It is a measure of the maladaptive interactions among the familiar triad of population, environment and culture (Fig. 1).

Figure 1: Purpose of Medical Geography



Source: Meade (1977), p.383.

The population dimension includes a host of variables like genetic, nutritional status and demographic composition and structure. Environment involves infectious, physical, chemical and psychosocial insults to health, as well as the available health services and facilities. Culture as a dimension includes taboos and dietary practices, house types, clothing, and attitudes.

Behavior usually has spatial expression. Human behavior is responsible to create necessary conditions for health and disease. Behavioral patterns conditioned by age, sex and ethnic role determine which people will be exposed for what duration to which insults. Behavior determines the utilization of physical and cultural resources of the environment. In fact, human behavior is responsible for diffusing elements of the environment such as irrigation, water, infectious agents or radioactive materials over different places.

People relate their daily lives with the specific habitat conditions. Geographers are much interested in the quality of population that finds expression in demographic composition, structure and dynamics or in susceptibility to disease.

From such a perspective, it is easy to add a time dimension. For example, one may be concerned with past health environments studying: how the introduction of agriculture transformed the habitat conditions of mosquitoes and malaria; how the growth of cities and integrated settlement systems created conditions that brought measles and other infectious diseases into existence, etc (Meade 1977).

Due to younger discipline, there appears diversity in views regarding the objectives and areas covered by medical geography. Those various views can be grouped into three basic stands which demonstrate the geographer's overriding concern with spatial relationships, patterns, processes and movements, their causes and influences, and so on (Woods 1982 cited in Husain 1994).

Environmental Control of Diseases and Susceptibility

Population movement is a geographical phenomenon that seems to be a human necessity in every age. People have a tendency to leave those places where life is difficult and move to new places where perceived life may be easier and better. In this situation, migrants may suffer from new infection agents with them from their origin place and introduce them at their places of destination. Thus, with the movement of people, diseases of various types also move faster from place to place. The spread of diseases needs certain specific environments. The movement therefore is the first to link the existence and occurrence of diseases to a particular climate and environment i.e. natural environment and cultural environment (Khan 1971). For most of the diseases, geography is destiny; it is not just what you do, but where you do it (Shannon et al 1991). The contribution of medical geography therefore has not simply been to identify and develop understanding of particular places and their relationship to health but to demonstrate the complexity of such relationships produced by population movement.

For identification conveniently, population movement can be described at different scales and in different forms such as micro level (within village) in the form of circulation, meso level (central places) as mobility and macro level (changes in residential location) as migration. The movement of people and their exposure to new environment from indoor to outdoor, from

one place to another even within their own locality are susceptible to diseases. *Circulation* is utmost important for health in several respects. Relatively, people spend most of their time in few micro-environments. Chiefs of these are home, school, forest, field, temple, clinic, restaurant, etc. Home as a micro environment has its distinctive regime of temperature, humidity and ventilation, food storage and associated insect and rodent pest and sanitation. For example, dark and poorly ventilated iron roofed houses offer considerable harborage to bed bugs, cockroaches and house rats but less than thatched roof houses. They also provide easy entry for mosquitoes and flies. *Mobility* is highly significant for health in several respects. First, people from one place may be susceptible to the health hazards of another place, which they have not previously experienced. People may introduce disease agents from other places into their own settlement on return (Khan 1971). The degree of difference in infectious agents between places and the frequency of contacts determines the hazards of susceptibility and introduction of new infections. Two settlements even near each other and of the same livelihood may have different interactions with the border environment, and consequently, invite different exposure to health hazards. *Migration* involves essentially the same hazards as mobility but the dangers of exposure of susceptible people and introduction of exotic organisms are intensified by the increased variety of disease habitat (Khan 1971). For example, the people who migrate from the rural areas to the urban industrial areas suffer from the lack of open space, good housing and fresh air. The highly polluted atmosphere of the new place (urban centers), the toxic fumes and dust affects their health adversely. They also have to adapt to the new dietary habits and timings of food. The incidence of respiratory diseases, cardiac problems and cancer among the people who migrate from rural areas to industrial town is found very high.

Prospects of Medical Geography in Nepal

The health status of an individual, a community or a nation is determined by the interplay and integration of two ecological universes – the internal environment of human beings themselves and the external environment, which surround them (Park 1994). Environmental problems and their corresponding impacts on health vary between urban and rural areas. In rural areas unsafe drinking water and inadequate excreta disposal combined with contaminated food are responsible for a majority of illnesses. On the other hand, environmental problems in urban areas are the results of rapid and massive urban bound population migration and of uncontrolled industrialization and urbanization. Municipal services are unable to keep pace with the urban growth like providing adequate water supply, sewerage and sanitation (WHO 1997).

Many people in Nepal are settled in diverse areas. Thousands of people are on the move to new areas in search of better opportunities and facilities. The regional migration especially from Hill to Tarai and vice versa invites exposure to a variety of physical, biotic and aquatic habitats, which may serve as foci for the transmission of human diseases. These foci provide the physical habitat necessary for the survival and reproduction of human disease agents, vectors and hosts.

Nepal has diverse geographical variations within a short horizontal span, as well as cultural differences in terms of customs, traditions, diets and food taboos. In view of the fact that man and environment are closely linked in complex relationships, the range of diseases in Nepal is particularly wide. The physical and cultural variations have been producing a number of diseases and also influencing the behavior of people toward particular perception of health problems.

Communicable diseases are very much predominant in Nepal, which are caused by microbes in water, food and air. Gastrointestinal disorders, respiratory tract infections, infections of eye, ear and nose etc are common in Nepal. Worms are endemic in children and adults. Diarrhoea and dysentery have been the main cause of deaths in children. Typhoid and cholera are almost endemic in urban areas in Nepal. Over three-fourths of the communicable diseases are caused by polluted drinking water. Infant mortality rate is still utmost high in Nepal. Diarrhoea diseases still top the list of major diseases in the country. Per capital water available is extremely inadequate and also poor in quality. Rivers and ponds in most of the rural areas are the major sources of water for domestic purposes. Access of pipe water particularly in the rural area is very low. The state of sanitation all over the country is generally in poor condition.

The ecological destruction that has taken place in the Himalayas over the last half century has led to unprecedented poverty and deterioration of the quality of health of the inhabitants. Soil erosion, deforestation, landslides, etc have threatened the people in the hills and are hardly able to survive on the local resource base. These hardships have impacted upon their health. Many of the poor are engaged in subsistence farming. Poor hill farming families are compelled to borrow loan from the landlord to meet catastrophic circumstances. As such, malnutrition and illness among such vulnerable communities are continuing. For women particularly the excessive labor required in cultivating food crops and collecting bio-mass, fodder and fuel has weakened their health considerably. In addition, high incidence of worm infestation from contaminated water occurs often among them. Due to this, the people in this area are highly susceptible to tuberculosis. Women suffer from anemia and other gynecological diseases like leucorrhoea due to inadequate time to maintain their personal hygiene or have rest adequately during their menstrual cycle and pregnancy.

On the other hand, floods have become a hazard primarily in the Tarai districts. The pressure on the resource base in the Hills with consequent deforestation and soil erosion prevents water from being leached in to the soil. There is increasing run-off and hence an increased amount of water that flows into the plains. The water with large amount of silt raises the river bed and reservoirs which ultimately create flood hazards in the Tarai plain. The tropical and subtropical types of climate together with depleted forest and water resource have caused to occur varieties of diseases in the Tarai. Malnutrition manifested in gastro-enteritis leads to higher mortality among the children. Increased humidity and water pools during rainy monsoon cause vector borne diseases such as malaria, Japanese encephalitis, dengue, etc. Increasing infrastructure development programs, forest depletion, excessive use of marginal land etc. have created adverse environments and affected the harmonic relationship between people and land. As a result, the means of survival especially of subsistence households has been threatened.

Thus, the above mentioned processes of human interventions, declining natural resources based means of survival, and weakening of harmonic relationship between habitats and environment have resulted into a high prevalence of different diseases in different ecological regions. So, different diseases have created varying health impacts on the health of the people, which vary considerably from one place to another because of spatial variation in population density, local climatic conditions, agro-ecological conditions, degree of industrialization and urbanization, availability of human health related services and facilities and their quality, etc.

Conclusion

The study of medical geography or geography of health is essential to portray an understanding and prevailing of the patterns of diseases over locations and time. The factors and processes of the growth and variation of diseases related to environment and dietary status of the people within a spatial unit can best be understood by geographers because the key to the nature, occurrence, prevention and control of diseases lies in the environment. Analysis of the links between the migration of people and spread of diseases, and environment and health is by its very nature a spatial problem. Levels of risk and vulnerable vary spatially in response to variation in environmental conditions, and as a consequence, the health outcome and associated levels of need and health support vary. Obviously, geographers can make major contributions to help reduce suffering of human health and increasing longevity if they are able to establish causal links between specific disease and environment. The curative aspect of disease may well handle by the people by using medicine but when they need to preventive aspect, they have to go beyond it.

References

- Bhat, L S and Learmonth, A T A (1972), Medical geography: a trend report. *A Survey of Research in Geography*, 244 - 251.
- Husain, M (1994), *Human Geography*. New Delhi: Rawat Publications.
- Husain, M, ed. (1994), *Medical Geography*. New Delhi: Anmol Publications Pvt. Ltd.
- Khan, R (1971), Purpose, scope and progress of medical geography. *The Indian Geographical Journal*. Vol. 66 (1, 2): 1-9.
- Meade, M S (1977), Medical geography as human ecology: the dimension of population movement. *The Geographical Review*, 67 (4): 379-393.
- Park, K (1994), *Textbook of Preventive and Social Medicine*. Jawalpur: M/S Banarasidas Bhanot.
- Shannon, G.W. (1991), The origin and diffusion of AIDs: a view from medical geography. *Geography*: 35-52.
- Smith, F (2005), Medical geography: therapeutic places, spaces and networks. *Progress in Human Geography*. 29 (4): 488-495.
- VHAI (1992), *State of India's Health*. Voluntary Health Association of India (VHAI).
- WHO (1997), *Declaration on Health Development in the South- East Asia Region in the 21st Century*. New Delhi: World Health Organization (WHO), Regional Office of South East Asia.
- Web sites - <http://www.who.int/>