CHAPTER - II

THEMATIC PERSPECTIVE
Conceptual Background

The environmental relationships of man have always been of concern to geographers. As appropriate with any evolutionary conceptual process, over the last twenty five years, the spatial study of human health problems has been expanded from approaches taking a borderline position between geography and medicine to several concurrent themes which overlap many disciplinary borderlines [1]. This synthesized approach for studying human health problems with reference to environment within spatial frame is termed as 'geomedical approach' which constitutes the subject matter of recently developed branch of geography i.e. 'medical geography'.

Medical geography, basically a study of relationship between geogens (geographic factors) and pathogens (pathologic factors) is concerned with the distribution and comparison of various indices of disease in human population and the interrelationship with other elements of the physical, biological and cultural environment in space [2]. It contributes significantly to fill the gap by studying spatially man's dynamic interaction with his environment and his adaptability in life. The dominant paradigm of medical geography is the vision of man as a creature of and within an environment which is not only affected by him but also affects him personally and collectively in health-related ways [3].
As a technical term medical geography is often equated with, at least in part with geographic pathology [4], medical ecology [5] and by some with epidemiology [6]. Medical ecology and epidemiology are more locally concerned with body to environmental relationship at a particular site whereas medical geography relates with spatial distribution and interrelation of those environmental elements which have or thought to have an effect upon human health [7]. The concept of 'Medical Landscape' has been developed by Soviet geographers considering the significance of territorial/environmental character in the distribution of diseases. But the basic objective of a medical geographer is neither a territory nor the disease but the area which is affected by particular disease and its distribution within that areal unit. Thus, medical geography may be recognised as a special branch of geography which differs in emphasis from geography and in method from medicine and covers a wide field of study with overlapping interest of geographers and medical scientists.

In 1960, health care emerged as a new study area in the subject matter of medical geography. It was felt that spatial organisation of health institutions plays an important role in the persistent and elimination of diseases and the impact of health care establishments on the morbidity and mortality patterns is a fascinating area for future research particularly in developing and underdeveloped countries. The term medical geography is now somewhat traditional and should be replaced by
the term 'geography of health' [8]. The geography of health may be defined as the orderly description and interpretation of the causes, processes, patterning, interrelations and the spatial organization of human health attributes with varying distribution over the earth surface in the frame of environmental, ecological and behavioral perspective [9]. To define the core concern of geography of health four sets of factor groups i.e. (i) environmental, (ii) biotic, (iii) behavioral and (iv) socio-economic have been considered. (Fig. 2.1A).

Thus, the goal of medical geography should embrace both disease ecology (geographical pathology: spatial variations in disease and their environmental relationships) and health care geography (spatial variations in availability, quality and use of health care facilities) [10].

AN INTERDISCIPLINARY APPROACH

Medical geography, also known as geography of health offers a synthesis by bringing together the work of medical scientists, environmentalists, geographers, social scientists and planners on problems having a bearing on human health from a wider perspective [11]. As an interdisciplinary approach, medical geography opens the possibility of unity developing between the

* In fact, the International geographical Union adopted the terminology 'Geography of Health' in place of Medical Geography. Since a number of scholars have used the term medical geography, both term may be treated as interchangeable.
studies in geographical pathology and the geography of health care.

As the organisms are closely related to environment, various branches of medical sciences such as Parasitology, Epidemiology and Medical Entomology are taken into consideration while dealing with some aspects of relationship between disease and environment. Medical geography has close approach with social sciences. Medical sociology includes a number of well defined explanations of illness determinants. Cultural anthropology can contribute significantly in solving different health problems related with food habits, diets and nutrition. The economists have long been concerned with estimating the demands of health services developing different models of cost effective analysis, rational economic behaviour and optimal locations. The social psychologist is concerned with patient-behaviour. The history of medicine and historical account of diseases and epidemics may be helpful in explaining the trend of epidemics in future. Thus, a geomedical approach does not base exclusively upon the results and statistical data of a single special branch of science but is achieved by interdisciplinary co-operation. Fig. 2.1B illustrates different approaches to be utilized in the study of various problems of health and diseases and highlights the distinction between traditional and contemporary approaches.
Chronological Assessment

Although 'Medical Geography' is fairly recent term, medical geographic studies were quite common even in ancient times. It was known to the Indians and the Chinese in 1000 B.C. and to the Greeks like Hippocrates (5th and 6th B.C.) and Lucretius (1st B.C.) [12]. Ancient Indian scholars of Ayurvedic medicine like Susruta (1500-1000 B.C.), Charak (1000 C.B.C.), Bhel (700 C.A.D.) and others have described the regional patterns of various diseases. Hippocrates amongst ancient Greeks, was probably first medical geographer who analysed the spatial pattern of diseases in a temporal framework taking into account the factors such as climate, locality and human behaviour. He presented a genetic type of classification of diseases into endemic and epidemic types [13]. Both Muslim and Christian scholars have recognised the influence of environmental factors on diseases, during medieval period. In the renaissance and the centuries following, the relationship between health and geography is indicated by the works of Ludwig Finke, Daniel, Drake and August Hirsch [14]. The works done between the Hippocratic era and nineteenth century have been classified by Howe into two timescale - the work done before 1848 A.D. mostly emphasizing the physical aspects in the generalised form and after 1848 which followed the spatial approach along with their representation over the maps [15].
INTERNATIONAL PLATFORM

Medical geography had its modern origin in the late 19th century. The term 'medical geography was first used in Britain by Alfred Haviland in his work 'Geographical Distribution of Disease in Great Britain [16]. Soon after the introduction of Pasteur's germ theory (1881) the relationship between environment and disease got a temporary set back and the progress of medical geography virtually remained standstill till the first world war. By the end of 1949, the subject was recognized by I.G.U., hence a new commission was formed at Lisbon; this was given a permanent status in 1968 at New Delhi. The Commission had given particular emphasis to the environmental and ecological system. Although, the root of medical geography go a long way into the past, a systematic development was not initiated until 1950s with the work of Jacques May [17].

Progress During Fifties

In early 1950s, the contribution of May proved instrumental in establishing the medical geography as a well recognised discipline. American geographers prepared a series of maps on regional and global scale with emphasis on regional heterogeneity of environmental conditions in prevalence and distribution of diseases. The pioneer work of Learmonth [18] based on his regional study of survival, mortality and disease in Indo-Pakistan has been considered as milestone in the field of
medical geography. Learmonth [19] discussed the social and geographical relationship with malnutrition in underdeveloped areas. The 'Geography of Hunger' by De Castro [20] provides an interesting study in geographical terms.

In mid fifties, the Heidelberg Academy of Sciences established a department 'Centre for Geomedical Research' for promoting geomedical researches with the objectives of continuing and advancing the cartographic representation of all border areas between geography and medicine. During most of 1950s, the branch of medical geography, known to most professional geographers within United States, could actually best be described as an outgrowth of many decades of accumulated knowledge about disease risks to humans associated with natural environment [21]. May [22] emphasized the role of natural environment on human health problems and put up medical geography as disease ecology. The publications of Association of Canadian Geographers, since the early 1950s are indispensable for an assessment of the evolution of medical geography in Canada [23]. The work of Learmonth reflecting ecological approach to medical geography is among the first on sets made by geographers into medical problems in tropical Africa [24].

Progress During Sixties

Maps of the mortality and morbidity for areal unit or even country level have been prepared by early 1960s in Britain. Howe
[25] made a remarkable contribution by publishing the maps of mortality distribution based on cause of death. Techniques of demographic mapping have been adopted to present the standard mortality rate in the view to avoid the incorrect visual impression of the regional patterning of mortality [26]. A number of urban surveys conducted in Britain result that socio-economic status can have a close relationship on health differentials and use of health services [27]. The studies of Sowerby [28], Vaughan [29] and Richardson and Dingwall-Fardyce [30] focussed on the access to the health care facilities. Howe traced out possible casual relationship between environmental factors like air pollution, radio-activity and soil etc. and degenerative diseases like cancer, heart disease and chronic bronchitis etc.

In 1961, Jusatz provided impulse to medical geography in Germany by publishing 'World Atlas of Epidemic Diseases [31]. In Belgium, numerous studies made by geographers deal with spatial distribution of mortality [32]. Picheral [33] analysed the occurrence of infectious diseases in developed societies. The study made by Charlier [34] relates the demographic consequences of plague in Brussels during 1667-69. There is strong interest in human bioclimatology both in France and Netherlands. In France, a general manual on the geography of nutrition has been published by Livet [35].

During the year 1964-65, Stamp [36] contributed significantly in the field of medical geography. Stamp insisted on micro level mapping of casual factors in disease association. Ignatyev
pointed out that certain geographic information could be used to stimulate or forecast disease problems [37].

**Progress During Seventies**

In Britain, general distributional features of mortality due to various causes have been discussed by Howe [38]. Some recent cartographic techniques have been used to portray the pattern of mortality at various scales [39], Girt [40] and Giggs [41] concluded that physical conditions of housing may be one of the factors affecting the occupational health. A number of environmental and ecological studies within the field of mental health have been conducted [42]. The general principles of spatial diffusion have been recognised for studying the spread of diseases [43]. A variety of statistical techniques have been used to study the behaviour of diseases in populations. Haggett [44] examined the multiple diffusion of measles within an industrial culture. The ecological approach to the study of spatial distribution of diseases and their possible causes has remained the main trend till early to mid 1970s and a bit attention has been paid to the spatial aspect of health care facilities, their planning and health behaviour. Regarding access and availability of medical care, Hart [45] propounded the 'inverse law of care' and observed that availability of good health care is inversely proportional to the requirement of the population served. The Giggs [46] examined the structural features of health care provisions. There are a few studies which attempt to stimulate
visits to general practitioners and the effects of various spatial location strategies on the usage of community hospitals. Location-allocation models and models based on variants of central place theory have been suggested to assist in the planning of locations for various health and social services [47]. Haynes and Bentham [48], Parkin [49] and Phillips [50] contributed significantly on the usage of medical services in U.K.

In France, Thouvenot and his team studied the relationship between environment and food intake, and the historic and socio-economic evolution of alimentary habits. Similarly, the relationship between food habits and disease or mortality have also been established [51]. Among tropical diseases more attention has been paid on malaria, onchocerciasis, schistosomiasis, meningitis and syphilis. Belgian epidemiologists have significantly contributed in the field of tropical health during 1970s. As regard the studies in geography of health care, spatial approach has been followed. Lebart [52] visualised the regional disparities and inequalities in the distribution of health care facilities. In Netherlands, attempts have been made to provide well balanced health care policy in view of the spatial planning.

During 1970s and onward, the studies on epidemiological geography were also growing in importance in U.S.A. In 1971, Hunter and Young [53] added our knowledge of disease diffusion by comparing the spread of influenza in England and Wales. Meade
[54], Roundy [55], Haddock [56] and Kovacik [57] contributed significantly within the context of disease ecology following both traditional and innovative approaches. During the period cultural-ecological approach has attended popularity. Computer cartography in health studies became quite popular. U.S. Government released national cancer atlases derived from computer tapes and produced by mechanical plotters [58]. Armstrong [59] pioneered the use of printer oriented computer mapping in medical geography. Seasonality in childhood lead-poisoning by Hunter [60], diffusion of acceptance of abortion procedure by Henry [61] and demographic factors and air pollution by Bozzo et al. [62] are new approaches in the field of medical geography.

At the beginning 1970s, Girt, the most active Canadian medical geographer focussed his attention on ecological structure and chronic bronchitis, role of distance on health care use and nonvectored infectious diseases [63]. The relationship between disease and development has been established by Hughes and Hunter [64]. The historical and contemporary material relevant to the study of diffusion of cholera has been brought by Stock [65]. The 'Atlas of Disease Distribution' in Uganda is an important contribution by Hall and Langlands [66] at the national scale. The studies of the availability and use of health services have been carried out at different scales. McGlashan [67] discussed the hospital facilities in Malawi. The provision of mobile medical facilities for the nomadic pastoralists has been made in north east Africa [68].
Progress During Eighties

Shannon [69] and Phillips [70] strengthened the conceptual frame of medical geography. Howe [71] examined the role of maps and cartograms in explaining the spatial pattern of health pursuits. The publication entitled 'The Geography of Famine' by W.A. Dando [72] is a recent contribution to the nutritional aspect. Phillips [73] emphasized the influence of intangible factors on utilizing behavior toward medical services.

In Germany, Hinz [74] has published a synoptic geomedical map for a section of Africa comprising southern Nigeria and western Cameroon. The ecological approach has been popularised in analysing the spatial pattern of disease occurrences in France and Benelux countries. Verhasselt [75] compared the distribution patterns of mortality and morbidity in relation to environmental factors between urban centres. Organizational problems in urgent medical assistance by Backers (1980) and sociological approaches to general health care by Poets and Nuyens (1980) and Nuyens (1980) are pioneer studies in geography of health care in Belgium [76].

Shannon and Crowley [77] have contributed to historical epidemiology with special emphasis on diffusion of diseases within spatial frame. Andrew Learmonth [78] edited the 'Geography of Health Care' containing the selected papers from the 24th International Geographical Congress, Tokyo. Pierce [79] studied
the socio-economic status of women having abortions in Manhattan using factor analysis as statistical device. Field analysed mortality over a 50 years period in Canada. Seasonal variations of diseases have been studied by Kevan [80]. French speaking Canadian geographers conducted studies on spatial organization of health services and analysis of variations in disease and mortality. The works of Thouez [81] may be cited in this regard. Slocik [82] has contributed significantly in geography of health care in tropical Africa. In Japan, the contributions in the field of medical geography by Tsuneo Tanaka et al. (1981), Norihiko Miyawaki and Sheng-Chin Chen, N. Nihel et al., Eiji Takahashi, H. Tamashiro et al., M. Minowa et al., N. Hayakawa and M. Kurihara and Yoshiyuki and Kunio Aoki are noteworthy [83].

**INDIAN PLATFORM**

The progress of traditional medical geography has been considerably delayed in India though it is deep rooted into our past history. The earliest works in the field of medical geography seek their history into latter half of the nineteenth and early twentieth centuries and are merely concerned with distribution of diseases based on descriptive approach. The work of McClelland [84] based on identification of regional factors associated with prevalence of diseases may be considered as first attempt in the field of medical geography in India. The contributions made by McNamara [85], Moore [86], Fayrer [87], Chevers
[88], Adams [89] and Hamoston [90] are significant studies at initial stage. Kendrick's study of malaria in relation to rice cultivation and Iyengar's in relation to forest are the outstanding contributions by non-geographers in the field of disease ecology [91].

Learmonth [92] provided a scientific base to the medical geography in India by contributing a number of studies during 1950s. His worthwhile contribution gave a well defined direction for Indian scholars to conduct the studies based on geomedical approach. During 1950s the works of Chakrabarti [93], Covell [94] and Sen [95] on cholera and malaria deserve special mention. Till 1950s, the researches conducted in medical geography in India generally belong to foreign scholars. Among the relatively newer field of geography, the subject is gaining momentum since last two decades.

Progress During Sixties

Incidence and distribution of diseases remained the focus of all studies conducted during 1960s. Basu [96] and Nair and Samnotra [97] presented the micro level studies on cholera and malaria. The researches conducted on different aspects of nutrition and deficiency diseases are greatly influenced by Aligarh school of medical geography. The works of Shafi [98], Khan [99] and Husain [100] may be cited in this regard.
The cultural environment of rural India has been studied as an aspect of community and social medicine [101]. Nigam [102] attempted to analyse the problems of housing in relation to human health.

Progress During Seventies

As regard the work done on incidence and distribution of diseases during 1970s, the studies on trachoma and cancer by Indrapal (1970, 72), on cholera by Hyma and Ramesh (1976, 77), on goitre by Akhtar (1979) and Krishnamachari (1974), on malaria by Akhtar (1979) and Hyma and Ramesh (1980), on dengue fever by Joshi and Deshpande (1972) and Jusatz deserve special mention [103]. Mathur [104], Sharma [105] and Pandurkar [106] contributed on incidence and distribution of diseases. Jyssawalla [107] studied the epidemiology of cancer.

In 1970, Misra [108] aroused interest in the subject by correlating general health conditions with geo-economic environment. The researches on nutrition and deficiency diseases in relation to environment in Uttar Pradesh by Siddiqui [109], in Sagar city by Choubey [110] and in Bagh basin by Chouridule [111] are of considerable importance. An analysis of diet and deficiency diseases has been conducted for upper Ganga-Gomati doab by Husain [112], for Agra-Mathura region by Qureshi [113] and for trans-Rapti plain by Farooqi [114]. Benerjee and Hazra [115] discussed the problems of malnutrition in India following
geo-ecological approach. Models and medical geography by Learmonth [116] and medical Geography of West Bengal by Hazra and Banerjee [117] are important contribution in the conceptual and methodological aspects of medical geography during seventies. Akhtar examined the growth and distributional pattern of health facilities in Rajasthan and analysed environmental factors in relation to health [118]. The scholars related with sister discipline significantly contributed in the field of community and social medicine. The works of Kochar on human factors in hookworm transmission [119] and Mathur and John on role of beliefs as a factor in small pox and other infectious diseases in south India [120] may be considered of prime importance. Family planning, a part of nation wide health campaign has been analysed following spatial approach by Blunden and Karan [121] and Blunden [122].

A few works, completed during 1970s, may be cited as good examples of the use of suitable statistical and cartographic techniques viz. mortality study of Rajasthan by Tewari [123], mortality registration in Orissa by Ahmad [124], health hazard index for planning purposes by Mukherjee [125], map of malaria in India by Christopher and Sinton [126] and malaria parasite index by Learmonth and Akhtar [127].
Progress During Eighties

Choubey [128] studied the intensity of diseases in eastern Malwa region. The studies on malaria by Hyma [129] and Akhtar [130], on cancer by Akhtar [131] and Hazra [132], on infectious hepatitis by De and Gollerkeri [133], on cholera by Kumarswami [134] and on smallpox by Singh and Dutta [135] may be taken as examples of the works conducted during 1980s on incidence and distribution of diseases. Hazra [136] attempted to demarcate the disease regions of West Bengal. Dutta and Dutta [137] focussed on the disease dynamics in south and south-east Asia. During the decade, the studies on disease ecology have been conducted by Singh and Singh [138], Banerjee and Hazra [139], Joshi and Deshpande [140] and Sinha [141]. Misra [142] analysed the nutritional and health status of India following the spatio-temporal approach. Tewari [143] studied the food intake system and deficiency diseases in rural areas of Madhya Pradesh. Akhtar [144] produced a notable work on environment agriculture and nutrition in Kumaon region.

The health care delivery system has been analysed both spatially and temporally by ghinde [145], Sharma [146], Kayastha and Singh [147], Akhtar and Izhar [148], Banerjee-Guha and Joshi [149], Chib [150] and Choubey [151]. Attention has been paid on locational aspect of health care facilities by Massam et al. [152] and Mahadev and Thangamani [153]. The efficiency of health care system has been measured by Hodgson and Valadares [154] in
Salcette Goa and Vasanthakumaran and Jeyapal [155] in Madras. The role of indigenous health care system has been brought into limelight by Ramesh and Hyma [156]. The attempts have been made for assessment of health care needs and resources by Chandrasekhar Rao [157] and planning of health care facilities by Jayachandran [158]. De and Gollerkeri [159] paid their attention on socio-cultural aspects of infectious hepatitis in Vadodara city. The public awareness in the health problems of Calcutta metropolis was the subject matter of the study conducted by Karan [160]. The residential conditions and health problems in urban community have been evaluated by Sivagnanam et al. [161]. Roy [162] presented his monumental work on medical cartography. Historical development of medical geography has been traced out by Ramesh [163]. Akhtar discussed the scope of geography of health and geomedical researches in India and outlined the course of medical geography for teaching in Indian Universities [164]. McGlashan [165] presented the opportunities and needs in the field of geography of health in India.

Attributive Appraisal

After sifting the available literature following major trends have been observed in the thematic frame:

(i) Incidence and distribution of diseases.

(ii) Disease ecology.

(iii) Diet and Nutrition.
(iv) Community and Social medicine.
(v) Health care delivery.
(vi) Cartographic and statistical techniques.

INCIDENCE AND DISTRIBUTION OF DISEASES

The most widely studied aspect of medical geography in India has been incidence and distribution of diseases. Spatial variations in the distribution of various diseases, specially chronic diseases, have remained the matter of concerned to medical geography during post war period in United Kingdom. In France and Benelux countries attention has been focussed on chronic as well as infectious diseases and distribution of diseases is considered as zonal pathology. Approaches to the spatial diffusion of diseases had been part of International medical geography since nineteenth century. The studies of disease diffusion may be considered as conceptual expansion of the subject during late 1960s and early 1970s. During the 1970s and 1980s, traditions in epidemiological geography were also growing in importance with due emphasis an historical epidemiology.

The role of seasons, as affecting favourable conditions for development of diseases and its transmission has been examined not only in tropical world but also in Canada. Several methods have been used for linking diseases and spatial behaviour.
DISEASE ECOLOGY

The Indian geographers have examined the geo-ecology of various diseases in different regional context. In Britain till mid 1970s, the ecological approach to the spatial distribution of diseases and their possible causes was the main theme of the medical geography. The environmental relationship of human diseases in association with ecological conditions varying both spatially as well as temporally has been recognised in Germany. It was concluded that any change in human environment due to economic activities may impair the health status and give rise to epidemics. The study of disease ecology and the impact of changing environment have widely recognised as a solution of major health problems in U.S.A. Both traditional and innovative approaches have been followed in studying the problems of disease ecology.

DIET AND NUTRITION

The importance of nutritional status of population is fundamental in medical geography. The works conducted in India may be categorised as regional aspects of deficiency diseases, analysis of caloric value of food in rural community and nutritional problems in relation to food production. The geography of nutrition constitutes very useful elements to a most interesting field of social geography. Canadian scientists have devoted slight attention to nutritional aspect whether in the field of medical or cultural geography.
COMMUNITY AND SOCIAL MEDICINE

Cultural factors and social customs influence, not only the occurrence of diseases, as indicated by studies of the incidence of deficiency diseases but also the acceptance of innovations like family planning methods. During 1970s, the cultural ecological approach of medical geography has gained popularity in India. Environmental pollution and health, health problems related to water supply and occupation health hazard are the topic of great interest in community and social medicine. In Germany, studies concluded that the socio-economic environment in relation to health conditions has quite close approach to medical sociology, social medicine, social hygiene and health care planning. To analyse the spatial aspects of urban health problems, social area analysis and factorial ecology (ie. socio-economic status, life cycle shifts and minority segregation) have been developed as utilization measures.

HEALTH CARE DELIVERY

It includes spatial and locational aspects of health care facilities, patient travel and accessibility, patient behaviour and health education. The spatial and temporal analysis of health care facilities and efficiency of health care system are the important topic of research in India. The attention has been focussed on traditional health facilities and adoption of family planning methods. The study of planning of health facilities is recently developed field of geography of health care in India.
The studies conducted in Britain during 1970s were related with structural features of health care provisions. Regional disparities in health sector and changing organisation and location of specific factors of health services have also been examined. The locational disparities and locational preferences have been considered in planning of medical man power. A number of studies on use of medical facilities has been conducted in U.K. with due emphasis on distance factor and utilization behaviour. The regional disparities and inequalities in distribution of health care facilities in France while organizational problems in urgent medical assistance and sociological approaches to general health care in Belgium are the topics of utmost significance.

The following aspects of geography of health care in U.S.A. have been considered significantly during last 20 years:— (i) distributional pattern of health care resources; (ii) man-power shortages; (iii) methods of payment for health services; (iv) distance travelled to hospitals; (v) methods for planning of new facilities; (vi) hierarchical arrangement of health care delivery facilities. In Canada, the locational aspects of health care facilities on individual health appeared to be significant. The studies on availability and use of health services has been carried out in tropical Africa. Health care behaviour and use of traditional health care services have also been given due consideration.
CARTOGRAPHIC AND STATISTICAL TECHNIQUES

The need of cartographic representation of medical data for the purpose of description, analysis and aetiological study has long been recognised. However, in recent years, cartographic techniques have been used to illustrate diffusion of diseases, probabilities of contracting ailments and varying availability and usage of services. In Germany, Jusatz's work constituted an important step forwarded to the field of disease mapping. Disease mapping has developed as an important linkage in medical geography. During 1970s, computer cartography has became quite popular in the study of health problems. Even before the widespread application of computer mapping programmes, the general awareness of the data handling and general disease mapping was well established. Most of the geographers of India have used similar mapping techniques to present the incidence and mortality rates of a disease. Computer mapping is still uncommon among Indian medical geographers.

Statistical techniques of increasing sophistication have been used to analyse human health problems. To establish physico-cultural environmental association multivariate techniques have been used. Different statistical techniques have been followed to investigate the behaviour of diseases in the groups of population. The techniques of progression have been used to understand the history of disease progression and to predict the outbreak. Diffusion models have been developed to study the disease diffusion. The models like, location-allocation
models and models based on variants of central place theory have received general attention in U.K. and also in India to assist in the planning of locations of various health and social facilities. Bio-statistical and public health researches had perfect mathematical methods of testing hypothetical health environmental associations in U.S.A. decade before the advent of computer based associative analysis. The non-availability, lack of standardization and unreliability of data is the major drawback in use of sophisticated computer analysis in India.

Though number of research works in the field of medical geography has been produced by Indian scholars, the examples of systematic studies based on geomedical approach are still lacking. Present study is, therefore, designed to fill-up the research need in order to highlight the regional health problems within ecological perspective.
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