CHAPTER I

INTRODUCTION
Preamble

In all the sectors of human life, health is one of the most important factors to improve the functional system and attaining the higher standard of living in the society. India has made considerable progress in all spheres of life including health. A number of diseases like smallpox and plague have been eradicated. The death rate is showing downward trend and life expectancy has increased due to improved health care facilities and augmentation of public health services. Despite this, people are still suffering from a number of communicable and disabling diseases. This situation is thwarting the physical, mental and social well-being of the people and thereby affecting the economic progress of the country [1]. The vicious circle of disease not only creates a problem of health and sanitation but also of social welfare and social justice.

The World Health Organization defined health as a 'state of complete physical, mental and social well-being and not merely the absence of disease and infirmity [2]. Health represents a balanced relationship of body and mind and complete adjustment to the total environment. Thus, health is not merely the medical matter, but a social goal in the attainment of which social and personal behaviour are equally important.

Health which directly affects the well-being and labour productivity of the population is basic considerations in all the planning efforts. A study of all the factors detrimental to human
health and happiness is, therefore, pre-requisite in formulation of an optimal spatial organization of health care activities which in turn, is responsible for bringing up high level of social welfare. Thus, there is an imperative need for conducting such studies that deal with the identification of existing spatio-temporal levels of distribution of human diseases and health care facilities. Such studies reveal not only the existing distribution of resources, health care facilities and diseases but also indicate the actual requirement of those pursuits and ways of planning for them. At present, there is a pronounced awareness of the importance of understanding the geographic aspects of problems of human health. This awareness is a part of an overall attempt within the discipline of geography to strengthen conceptual horizons [3].

The growth and variation of diseases within a spatial unit are primarily governed by socio-economic and behavioural factors. These aspects of cultural geography are mostly neglected by medical scientists. To emphasize these aspects, a new methodology has been advanced which is termed as 'geomedical approach'.

GEOMETRICAL APPROACH

The study of pathological factors (pathogens) in relation to environmental factors (geogens) in the two dimensional frame of space and time is termed as geomedical study. Such studies in micro-regional level constitute an important part of cultural

A regional geomedical study comprises of an analysis of diseases in relation to the physical environment, economic conditions and socio-cultural phenomena in order to demarcate public health and illness. The conclusions of the geomedical studies if supplemented by the studies on geography of health care provide a base for planning strategy so that health of human being can be improved through preventive measures rather than medical treatment up to a considerable extent.

Research Design

OBJECTIVES

The study area, one of the most backward areas of the country is under the grip of health problems of extreme order. Low economic status, poor nutritional level, poor environmental sanitation and personal hygiene are the basic factors contributing to various diseases of nutritional disorder, arthropodal and helminthic infections and communicable nature. Besides, health care facilities are unevenly distributed in terms of population distribution and accessibility. Taking these facts into consideration, the objective of present study have been outlined ut infra.

(i) To submit a thematic frame of the problem revealing its chronological and attributive development.
(ii) To assess the extent of relationship between the ecological factors and incidence of diseases.

(iii) To identify the spatio-temporal distribution pattern of diseases within aetiological perspective.

(iv) To analyse the spatial distribution pattern of health care facilities.

(v) To divide the Bundelkhand into geomedical suitability zones on the basis of distinctive physico-cultural characteristics and health parameters, thereby geomedical regions.

(vi) To assess the present and future health care need of the community concerned.

(vii) To suggest a tahsil level development plan for an adequate distribution of health care facilities and eradication of diseases in the area under study.

DATA BASE

In order to collect the relevant data for the study, the respective sources as discussed below, have been tapped.

(i) The climatic data have been obtained from Indian Meteorological Department, Pune.

(ii) For the population data census publication of the both States (Uttar Pradesh and Madhya Pradesh) have been consulted.

(iii) The data of land use and agricultural productivity (1981-82) are based on revenue records.
(iv) The general statistics and information (1981) have been taken from District Statistical Office of the district concerned.

(v) The health statistics consisting of morbidity of diseases and health care facilities have been collected from Health Directorate of both States, Office of the Chief Medical Officer of concerning districts and in few cases hospital concerned using schedules 'A' and 'B' (Appendixes IA & IB). The morbidity statistics have been obtained for two point of time i.e. 1971 and 1981. The data regarding health care facilities have been collected only for 1981.

(vi) The crude data, thus obtained have been scrutinised in the light of personal observations in the field as well as with the help of health personals and compiled at tahsil level for the purpose of spatial and temporal analysis.

As regard the data concerning with different aspects of health, some limitations require proper discussion. The data used in the present study are concerned with government and government aided institutions. In addition to these government run health institutions, there are number of charitable hospitals and private physicians treating quite large number of patients but these are generally concentrated in urban areas. Data of private institutions are neither properly maintained nor easily approachable. Besides, there are number of cases which remain unreported and untreated. These facts mark a question of validity of the
data maintained by government health agencies. The author is fully aware of the limitations entangled in the use of such data. Here, it is to be pointed out that the morbidity data obtained from primary survey on the basis of sampling are not absolutely exact.

In the light of data limitations ut supra, it may be remarked that the study aims not to present the absolute number of cases of particular disease rather than the pattern of disease over the span of space and time.

**METHODOLOGY**

The methodological considerations in geographical studies have changed from simple cartographic to scientific or more quantitative approaches during the last two decades [5]. More precise and accurate conclusions from the studies on the problems related with human health justify the use of such techniques, therefore, more attention has been paid on recent statistical techniques in the present study. The methodology dealing with the objectives of the study has been designed as follows:

(i) To workout the thematic frame of the problem, a descriptive approach has been followed. All the available literature in the forms of published work, government reports, research bulletins and journals have been sifted to reveal the chronological development of the theme and review of literature so far. Apart from geographic literature available on the problem, the judicious use of the
literature of medical science has been made. Geomedical models and diagrams have been used to project the thematic complex for common interest.

(ii) To assess the extent of relationship between ecological factors and diseases of the region, coefficient of correlation and multiple regression techniques have been followed. The distribution of ecological factors has been shown at tahsil level areal units converting physical values of each ecological factors into numerical values.

(iii) The spatial distribution of most common 18 diseases has been presented using disease morbidity index. The disease combinations have been decided using maximum positive deviation method.

(iv) Ranking co-efficient method has been used to measure the distribution - levels of diseases and health care facilities.

(v) Factor analysis (principal component method) has been applied to study the spatial variations of geomedical well-being and geomedical regionalization. For the purpose a set of 20 variables grouped into physical, cultural and health parameters has been analysed with the help of electronic computer.

(vi) In planning perspective, following the normative approach approved by Planning Commission of the Government of India with due consideration of results derived from the study,
number of new health care establishments have been proposed for each tahsil in order to fulfil existing and projected (2001) health requirement and achieve a rational spatial organization of health care facilities in Bundelkhand region.

(vii) Pearson's product moment correlation coefficient and regression equation have been obtained to measure the degree of relationship between different variables.

(viii) The techniques of standard deviation and quartiling have been used for dividing the parameters in different ranges to obtain the levels of distribution.

(ix) The models and hypotheses developed on geomedical approach have been given due weightage.

(x) Personal observations of the field have been made the base while describing the facts and figures.

Areal Units

In order to analyse the physical personality of the region, the physical features viz. geology, relief, drainage, underground water table, climate and soils, the region as a whole has been considered as a unit. The same criteria have been followed while presenting the locational aspects of urban centres, tourist centres, industrial centres, transport network etc. Thirty three tahsils of the region have been considered as units for comparative appraisal and cartographic representation, however, in the
case of such variables for which tahsil level data are not feasible or not properly maintained, district level units have been accepted for cartographic and statistical analysis.

Cartographic Techniques

Maps have been used as a tool in simplification of collected data, spatial variations, locational problems and testifying various hypotheses. Quarter inch topographical sheets (54J,K,L,-N,O,P; 55M; 63C,D,G,H, and 64A) have been made the base for outline maps and maps of physical features. The maps of cultural phenomena have been obtained from their respective sources or developed on the basis of data collected during field survey. To present the spatial variations of different characteristics, isopleth, choropleth and choro-schematic techniques of mapping are frequently used. The comparative and correlative features and their trends have been depicted cartographically with the help of diagrams and models. Large number of tables have been discarded by applying suitable cartographic techniques.

Statement of the Problem

To facilitate the analysis, the study has been divided into eight chapters. The chapter first, devoted to introductory part comprises preamble, research design and study area profile.

The chapter second of the present study offers the conceptual background of the theme of the problem. It also discusses
the chronological assessment and attributive appraisal of the theme.

The chapter third has been designed to discuss the physical features as geomedical pursuits of the area. The chapter includes the assessment of the role of inorganic and organic factors in the distribution of diseases and health. It also examines the part played by climatic hazards in regional medical landscape.

The fourth chapter describes the factors of cultural environment as geomedical pursuits. While dealing with population, growth, distribution, density, sex ratio, age, ethnic and occupational structure and vital characteristics have been taken into consideration. The analysis of rural settlements includes size, density and spacing of rural settlements while discussion on urban settlements comprises growth and distribution of urban centres and levels of urbanization. To portray the spatial structure of regional economy, agriculture and industry have been considered and analysed spatially. In agriculture, land use, irrigation, cropping pattern and productivity have been discussed. The industrial structure and related health hazards have been presented in order to assess the impact of industrialization on regional economy and human health. Structure of transport network and density and accessibility by road have been described in regional perspective. The parameters for the assessment of living conditions such as environmental sanitation, pollution, food habits and nutrition have been discussed as the factors affecting
human health and happiness.

The fifth chapter is concerned with ecology and distribution of diseases. The diseases classified into four groups i.e. deficiency diseases, arthropodal and helminthic diseases, communicable diseases and non-communicable diseases have been discussed within ecological perspective. Distribution of diseases has been analysed both spatially and temporally. To present the regional association of diseases, disease ranking, combination and disease zonation have been determined.

The chapter six focusses the spatial distribution of health care facilities. The distribution of health facilities has been analysed with respect to population distribution and functional and physical nature of the facilities. To assess the population pressure on health facilities, work-load and distributional anomalies between rural and urban work-loads have been measured. The levels of distribution of health care facilities have been determined to highlight the regional disparities in availability of health care facilities. A comparative appraisal of distribution of health care facilities and disease intensity rate has been made to point out the areas of similarity and dissimilarity. Finally, deficiency zones of health care facilities have been demarcated.

The chapter seventh is devoted to geomedical regionalization. Spatial variations in geomedical well-being have been
analysed considering 20 selected variables. Geomedical suitability zones have been delineated with the help of principal components of selected variables. Finally, geomedical regions with different geomedical associations have been demarcated.

The chapter eighth highlights the planning aspects of the present study. The existing and projected requirements of health care facilities have been assessed following the normative approach. For the development of suitable health care infrastructure for existing and future population, number of health care facilities, specialized treatment facilities and facilities for eradication and control of epidemics have been proposed at optimal locations. Finally, proposals for health education and integration of different medicine systems have been made.

The Study Area Profile

Linguistically the word 'Bundela' is the corrupt form of Vindhela [6] with the suffix of illa-Vindhya-Vindhyela and the latter on Bundela. The geographical set up of the region does support it as the Vindhyan ranges are stretched throughout the region from south-west to north to north-east. Bundelkhand [7] region extended between 23°49' to 26°30'N latitudes and 78°10' to 81°31'E longitudes, bounded in north by upper Ganga plain, in south and east by Vindhyachal - Baghelkhand region and in the west by Malwa and Udaipur-Gwalior region. The river Yamuna in the north forms the boundary of the region and separates it from the
BUNDHUKHAND
ADMINISTRATIVE SET-UP

DISTRICT HEADQUARTER
TAHSIL HEADQUARTER
STATE BOUNDARY
DISTRICT BOUNDARY
TAHSIL BOUNDARY

KILOMETRES

10 0 10 20 30 40 50 60 70

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10 0 10 20 30 40 50 60 70

BASED ON QUARTER INCH TOPOGRAPHICAL SHEETS

FIG. 1.1
Ganga plain while water divide of the Narmada and tributaries of the Ken and the Betwa demarcate the southern boundary. In the east Vindhyan hills and in the west the Sindh and the Chambal rivers demarcate the regional limits. Bundelkhand region may be defined as the trans-Yamuna plain together with adjoining uplands [8].

The region comprising Jalaun, Jhansi, Lalitpur, Hamirpur and Banda districts of Uttar Pradesh and Datia, Tikamgarh, Chhatarpur and Panna districts of Madhya Pradesh covers an area of 52,325 km². Inhabited by 7904587 persons (1981), the region is administratively divided into 33 tahsils (Fig. 1.1).

The region is facing the problems of poor environmental sanitation and low standard of nutrition resulting the substandard health of masses. There are several areas in the region where endemics are undermining the health of population. Various diseases like malaria, filariasis, gastroenteritis, infectious hepatitis, measles etc. are posing the problems of health specially in rural areas where majority of population dwells without proper drinking water and medical treatment facilities. The villagers have very limited knowledge about personal hygiene, proper infant-feeding and family planning practices due to lack of education.

Under such circumstances, the region is said to be the best suitable study area to evaluate the factors of geomedical studies at length.
REFERENCES


7. The inclusion of Pawai tahsil (Panna district) and exclusion of Lahar (Bhind District) and Bhandar (Gwalior district) have been made in traditionally accepted Bundelkhand (vide Singh, R.L. 1971. India: A Regional Geography. Varanasi, p. 597) from geomedical point of view.