CHAPTER-1

INTRODUCTION

1.1 Background of the Research

During the last few decades, geographers have increasingly being paying serious attention to the differential spatial patterns of diseases. One of the commonly accepted generalizations pertaining to the pattern of diseases over the World pertains to relatively higher prevalence of infectious and parasitic diseases in the developing countries and circulatory and degenerative diseases in developed countries. Historically communicable diseases were the main cause of death around the World. With improvement in medical science, health infrastructure and general public awareness, especially after the Wars, the pattern and incidence rates have undergone significant changes. Incidences of communicable diseases have declined in the developed countries, while the developing countries are yet to achieve a satisfactory target in this regard. On the whole, however, the WHO clearly shows that the global pattern of diseases is shifting from infectious diseases to non-infectious diseases with chronic conditions such as heart diseases and stroke contemporarily being the chief cases of death. The shifting trend indicates that leading infectious diseases like, diarrhoea, tuberculosis (TB), neonatal infections and malaria etcetera will become less important causes of death globally in the years to come.

During the last few decades, the health status of the population of India has undergone some improvement. The death rate has gradually declined and life expectancy has gone up. Nevertheless, India's health standards are relatively low as compared to those in the developed countries. India shows wide variation in death rate between rural and urban areas. Morbidity is dominated by communicable diseases. According to an estimate, about 17.2 per cent of all deaths and 20 per cent of all illnesses in India are due to communicable diseases. The major problems continue to be TB, filariasis, leprosy, malaria, diarrhea and malnutrition. According to the National Family Health Survey (NFHS) - India (1992-93), more than 53 per cent of all children under the age of four were underweight. Under nutrition is very high in the states of Uttar Pradesh and Bihar. Non-communicable diseases such as hypertension, diabetes and cancer as well as alcohol and drug abuse are slowly emerging as major health problems.

Spatial variations in the types of diseases and their prevalence within the country are also quite pronounced. Among all the states of the Union, the position of Gujarat state is however, relatively better. It also has a population growth rate that is lesser and a literacy rate that is higher than the respective National averages.

Notwithstanding the achievements of the State in various fields, health problems in its population are not uncommon. According to NFHS-Gujarat (1998-99), the health problems that cause considerable mortality in young children, such as fever, acute respiratory infection (ARI) and diarrhea, are very common in the State. More than one third (37%) of its women segment suffer from undernourishment. Nutritional deficiency is particularly serious for women in rural areas and among women of the underprivileged. Overall 46 per cent of women in Gujarat have some degree of anaemia. Iodine deficiency/disorder is also a serious problem among the rural households, Scheduled Tribe (ST) households and the households with a low standard of living. There is also prevalence of TB, asthma, malaria, and jaundice in the population. Jaundice is higher in rural areas than in the urban areas and more among males than among females.

An attempt is made in the present research to study the relationship of spatial characteristics of the region with the prevalence of major diseases. For the purpose, one of the most representative districts of Gujarat, i. e. Vadodara, has been chosen. The basic intend is to evaluate the role of physical and social characteristics in the prevalence of diseases.

1.2 Objectives

The following objectives were set before the present research at the outset.

1. To identify the spatial patterns of major diseases prevalent in Vadodara district.
2. To identify the temporal variations in the disease pattern.
3. To assess the impact of availability and utilization of health care facilities.
4. To understand people's perception and level of awareness on health.
5. To examine the association of selected diseases with physical and social parameters at micro level.

1.3 Hypotheses

Based on the understanding developed from the available literature pertaining to spatial aspects of diseases, the following hypotheses have been formulated for verification.

1. Distinct physical and social characteristics tend to display different patterns of diseases.
2. With passage of time disease patterns and morbidity rates tend to undergo change/display spatial variations.
3. Level of availability and utilization of health care facilities determine the morbidity rates to a great extent.
4. People's perception and level of their awareness play a definite role in the disease pattern.

1.4 Sources of Data

The study is based on both secondary and primary sources of data. Data gathered from secondary sources, such as, Census of India publications and publications of the Bureau of Economics and Statistics, and different Human Development Reports,National Family Health Survey (NFHS) - 4, India and Gujarat - 2015-16, Rural Health Statistics in India Report,2012 and Sample Registration System, Gazetteer of the Baroda State, Volume II - Administration, 1923 and Integrated Disease Surveillance Project (IDSP) Vadodara (Gujarat) Report have been used to examine the basic demographic, social and economic characteristics of the study area. Relevant published and unpublished literatures and maps including topographical sheets have been utilized to understand the demographic, economic, social and physical characteristics as well as infrastructural facilities of the study area.

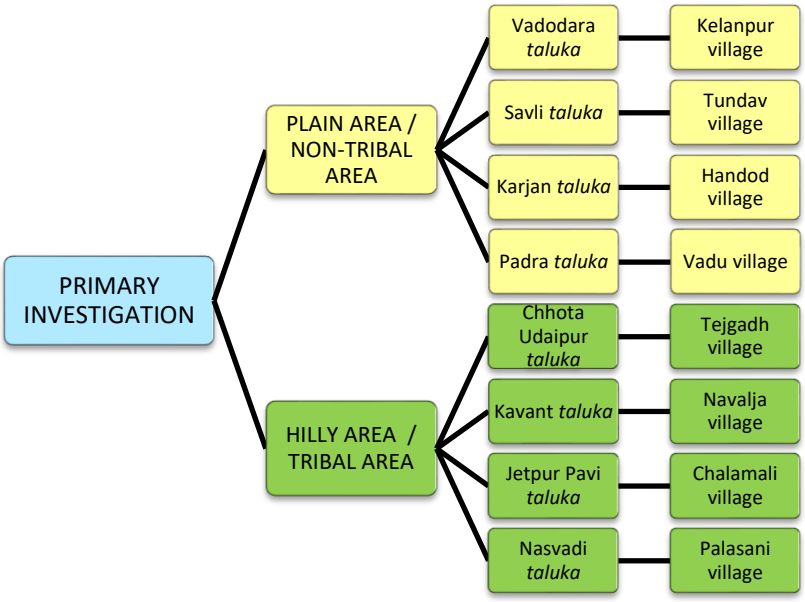
Primary information pertaining to demographic, economic, social, cultural and psychological aspects of the target population are generated through the use of structured household schedules, personal observation, conversation with the village elders and Rapid Rural Appraisal (RRA) techniques. Wherever possible the local doctors and NGO personals have also been consulted.

1.5 Methodology

The study is based both on secondary and primary data. Prevalence of major diseases in Vadodara district has been measured with the help of secondary data pertaining to various indices like number of cases, incidence rate, morbidity rate and mortality rate etcetera. The secondary data have been tabulated and computed using appropriate statistical techniques, like Microsoft Excel Software. Different mapping techniques have been used to analyze the patterns through Arc GIS 10.3. Available data on presumed causal factors collected from secondary sources have been analysed to comprehend the cause-effect relationships.

To compensate the limitations of secondary level data, the study has analyzed data generated at the primary level. For the purpose of primary investigation, random sampling method has been used at all levels, i.e. at the *taluka*, the village and the household levels. The regional frame of the district has been adopted to group the *talukas*. Four *talukas* from each frame is selected for detailed investigation. Analysis of secondary level data for the villages of the selected *talukas* has enabled the study to identify intra-*taluka* variations. Based on the detailed study, the villages have been categorized into two groups and four villages from each group have been selected for detailed investigation at household level. Thus, a total of eight villages have been studied in detail with the help of secondary as well as primary data (Fig. 1.1).

Figure - 1.1 : Structure of the Primary Investigation



Detailed investigation at household level has been undertaken using structured household schedules, personal observation, conversation with the village elders and RRA techniques**.** The field work to collect primary data for the present research was conducted during 2013 and 2014.

To measure the nutritional status, anthropometric data has been collected on height and weight of the population above 15 years of age through primary investigation and Body Mass Index(BMI) is calculated.

Correlation: There is linear relationship between two variables. In order to find out whether there is significant association or not between the two variables (x and y are two variables) the *Co-efficient of Correlation* is calculated, which is represented by the symbol "r" (Park, 2009,755) and is calculated as below.

$$r = \frac{\sum(x-\bar{x})(y-\bar{y})}{\sqrt{\sum(x-\bar{x})^2 \sum(y-\bar{y})^2}}$$

The correlation can be defined as the relation between the variables. The value of which known as the coefficient value, which can range between -1.00 and +1.00.A positive correlation indicates a positive association between the variables (increasing values in one variable in relation to increasing values in the other variable), while a negative correlation indicates a negative association between the variables (increasing values is one variable and decreasing values in the other variable). A correlation value close to 0 indicates no association between the variables.

The formula for Pearson Correlation is as follows:

$$r = \frac{cov(x,y)}{\sigma_x \sigma_y}, \qquad cov(x,y) = \frac{\sum xy}{n} - \bar{x}\bar{y}$$

$$\sigma_x = \sqrt{\frac{\sum x^2}{N} - (\bar{x})^2} \sigma_y = \sqrt{\frac{\sum y^2}{N} - (\bar{y})^2}$$

Regression

The independent variables represented by x and the dependent variable by y. The formula used for the *Regression Coefficient* is as follows.

$\mathbf{y} = \bar{\boldsymbol{y}} + \boldsymbol{b}\,(\boldsymbol{x} - \bar{\boldsymbol{x}})$

Where,

$$\bar{y} = mean\ of\ y1, y2, y3 \ldots\ldots\ldots\ldots yn$$

$$\bar{x} = mean\ of\ x1, x2, x3 \ldots\ldots\ldots\ldots xn$$

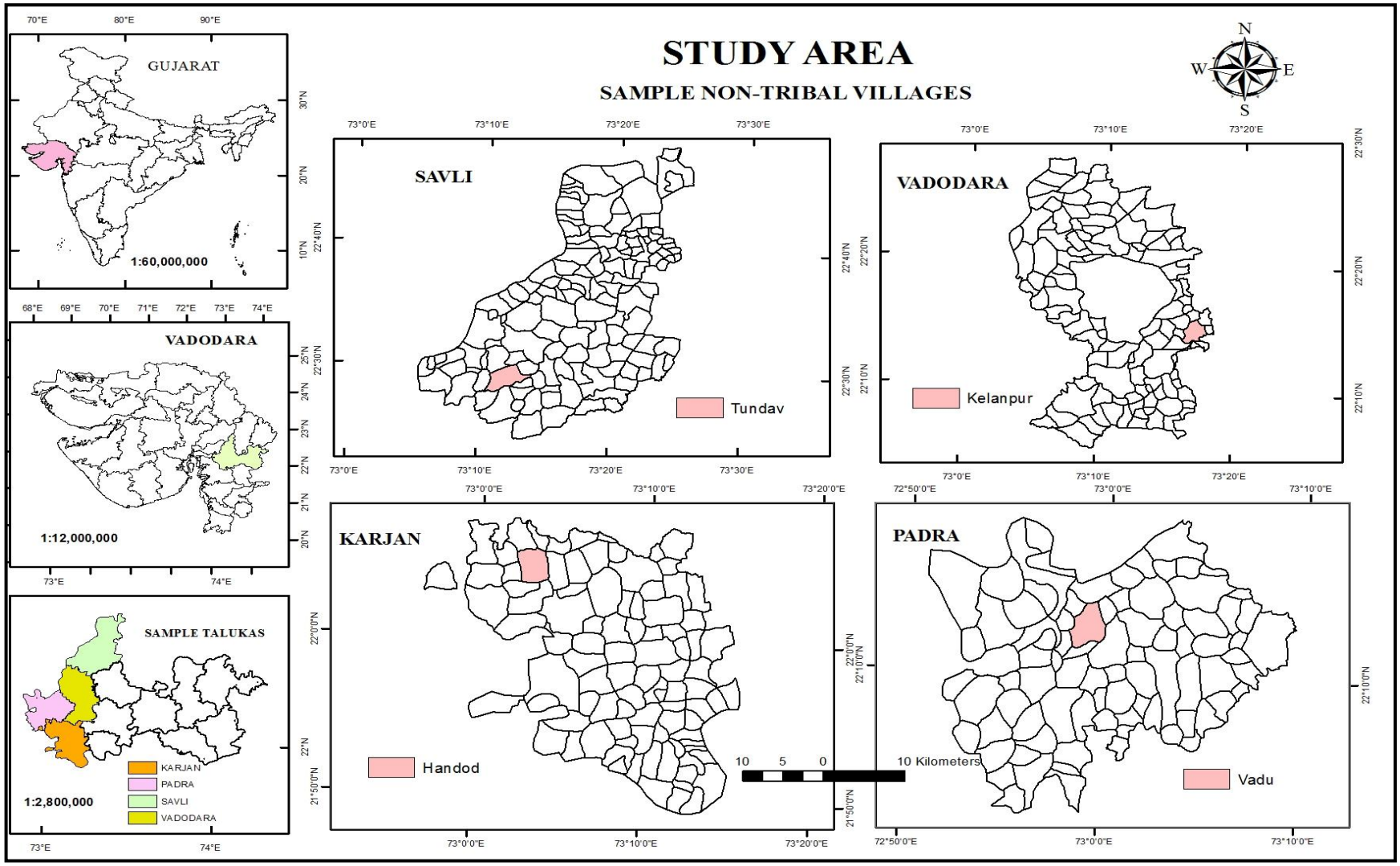
$$\mathbf{b} = \frac{\sum(x-\bar{x})(y-\bar{y})}{\sum(x-\bar{x})^2}$$

The value of 'b' is called the *regression coefficient* of 'y' upon 'x' (Park, 2009,755).

1.6 Study Area

For the purpose of micro study, eight *talukas* in all have been selected from Vadodara district, including four *talukas* each from the non-tribal area/plain area and tribal area/hilly area. From each *taluka,* one village has been chosen randomly for detailed investigation. Household schedules were administered to around fifty randomly selected households of each sample village for the generation of primary data. The four villages of the non-tribal/plain area *talukas* include Tundav (Savli *taluka*), Kelanpur (Vadodara *taluka*), Vadu (Padra *taluka*) and Handod (Karjan *taluka*) villages. The four villages selected from the tribal/hilly area *talukas* of the District are Chalamali (Pavi Jetpur *taluka*), Tejgadh (Chhota Udaipur *taluka*), Palasani (Nasvadi *taluka*) and Navalja (Kavant *taluka*) villages (Map 1.1 & Map 1.2).

Map-1.1


STUDY AREA
SAMPLE NON-TRIBAL VILLAGES
GUJARAT
1:60,000,000
VADODARA
1:12,000,000
SAMPLE TALUKAS
KARJAN
PADRA
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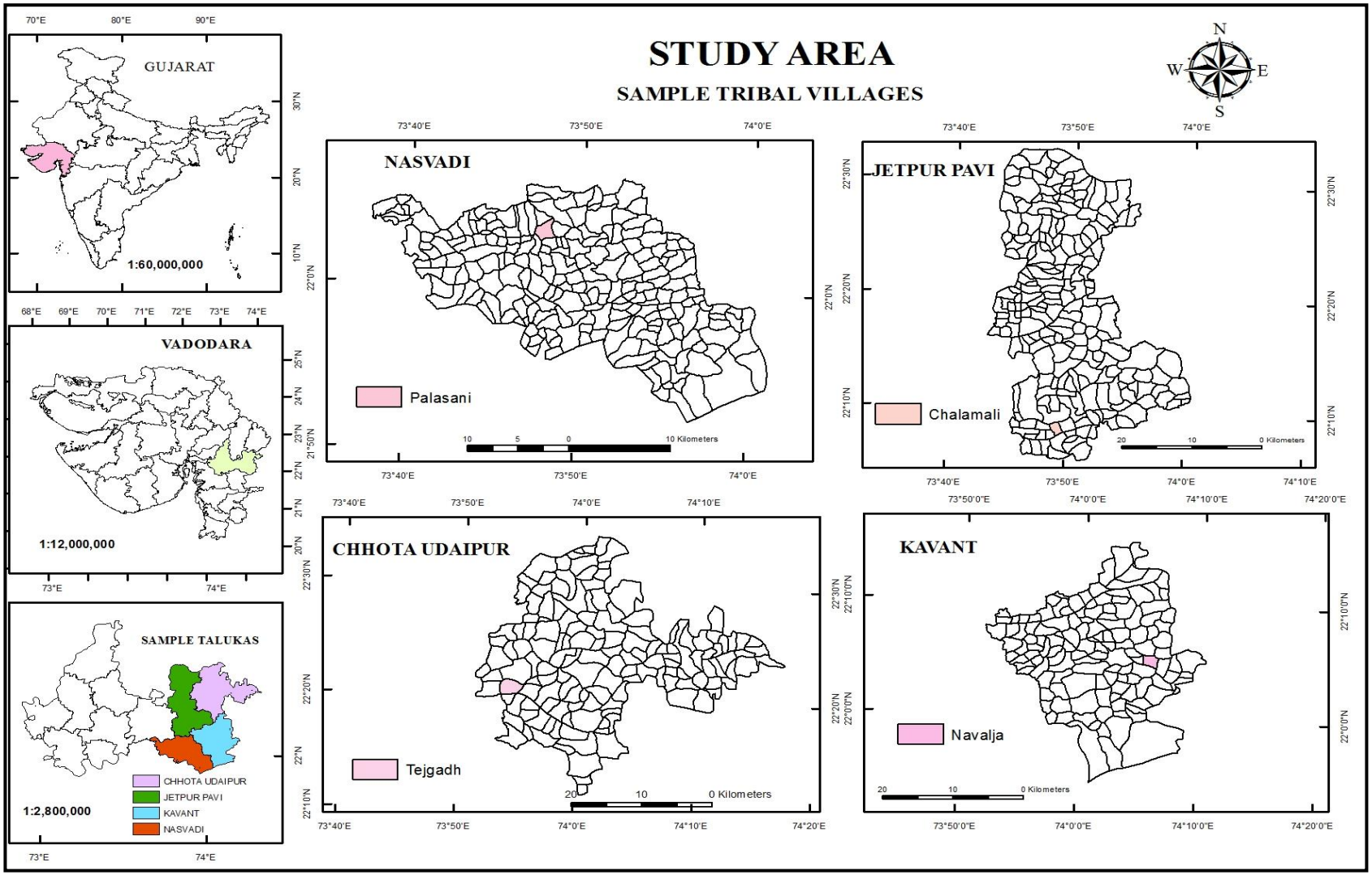
Map-1.2


STUDY AREA
SAMPLE TRIBAL VILLAGES
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1:60,000,000
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1.7 Conceptual Clarifications

The theme of the present research is closely associated with a few concepts, which require to be clarified at the outset. An attempt has been made in that direction in the following paragraphs.

1.7.1 Definition of Health:

Health has been seen as the "absence of disease" and when a person is librated from disease, he/she is considered a healthy person (Park, 2009, 12).An attempt has been made in this section to discuss some of the most important definitions of health.

World Health Organisation (WHO) (1948)defines health in the preamble to its Constitution as "a state of complete physical, mental and social wellbeing and not merely an absence of disease or infirmity" (Park, 2009, 13).

Oxford English Dictionary defines health as "soundness of body or mind; that condition in which its functions are duly and efficiently discharged".

According to Webster, health is "the condition of being sound in body, mind or spirit, especially freedom from physical disease or pain".

Perkins says, health is "a state of relative equilibrium or body form and function which result from its successful dynamic adjustment to forces tending to disturb it. It is not passive interplay between body substance and forces imparting upon it, but an active response of body forces working toward readjustment" (Park, 2009,12).

According to Rene Dubos(1965), "health implies the relative absence of pain and discomfort and a continuous adaptation and adjustment to the environment to ensure optimal function"(cited in Park, 2009, 12).

According to Jacques May, "health is a harmonious equilibrium between man and his environment and disease is maladjustment of human organism to his environment" (cited in Mishra, 2007, 11). May further adds that, disease is the result of interaction among the agent, host and environment. Agent and host interact and both interact with environment. The agents are pathogens (organisms) and geogenes (physical and cultural environments).

1.7.2 Factors Affecting Health

Health is not unidirectional, rather is multidirectional and is influenced and effected by the physical and cultural factors.

1) Biological determinants-the genetic make-up of a person which does not change after conception.
2) Behavioural and socio-cultural conditions -the way of living by a person is the main determinant of health and diseases. The daily personal habit including smoking and alcoholism, which leads to diseases like coronary heart disease, obesity and lung cancer commonly observed in the developed countries. Some of the habits like poor nutrition, poor personal hygiene and lack of sanitation specifically in the developing countries lead to diseases. Good habits such as adequate nutrition, physical activity and proper sleep lead to healthy life" (Park, 2009,19).
3) Environment - there are two types of environment, i.e. internal and external environment. Internal environment includes inside body and external environment includes outside of body such as physical, biological and psychosocial components and other factors (Park, 2009, 20).
4) Socio-economic conditions - it includes the economic status of a person for purchasing food and his/her living standard etcetera, which has positive influence on health. Education is another socio-economic condition which has strong impact on health and diseases. Occupation is also considered as a major factor for good health compared to unemployment, which leads to psychological and social damages. Pattern of health can also be influenced by the political system of the country, in terms of spending on health system, formation of health policies, provision of health care facilities etcetera(Park, 2009,21).
5) Health services- Access to health care services is equally important. Incidence and prevalence diseases can be monitored as well as controlled with proper location of health care facilities (Park, 2009,21)
6) Aging of the population - By the year 2020, more than one billion populations are expected to be in the 60+ age group in the developing countries, which will lead to chronic diseases (Park, 2009, 21).
7) Gender- The Global Commission on Women Health formulated in 1993, considered issues like nutrition, reproductive health, violence, aging etcetera important with respect to women (Park, 2009, 21).

1.7.3 Demographic Cycle

Demographic characteristics of the population, such as growth rate, density, birth and death rates, age sex structure, occupational structure, and rural-urban share in addition to religious and ethnic composition of the population, also influence health, diseases and the health care system of a region. History of the World population suggests that there are five stages of the demographic cycle and all countries or societies have been passing through these stages. The five stages are: (1) High Stationary, (2) Early Expansion, (3) Late Expansion, (4) Low Stationary, and (5) Declining.

1) First stage (High Stationary) - This stage is characterised by the high birth rate and high death rate and overall population remain stationary. The death rate remains high due to high infant and child mortality. Growth rate naturally remains low. Till 1920 India was at this stage.
2) Second stage (Early Expansion) - This stage is characterised by declining death rate due to improvement in the health facilities and control over the epidemic diseases. Birth rate remains stationary. Most of the South Asian and African countries are experiencing this stage at present.
3) Third Stage (Late Expansion) - This stage is characterised by the declining in the death rate and birth rate also fall. India is in this stage since 1995. Other major countries in the stage are China and Singapore.
4) Fourth stage (Low Stationary) - This stage is characterised by the low birth rate and low death rate, when the population remains stationary. The population growth rate reduces and remains close to 0 to 0.5 per cent. The developed and highly industrialized countries like, UK, Denmark, Sweden and Belgium are experiencing this stage of the population cycle.
5) Fifth stage (Declining) - This stage is characterised by declining birth rate and consequential decline of population. Germany, France and the Scandinavian countries are passing through this stage (Park, 2009, 411 & Mishra, 2007, 139-140).

Majority of the African, West Asian and Latin American countries are in the first stage of demographic cycle. The Asian countries are lying in the third stage. The urban industrial countries of Europe and North America are at the fourth and the fifth stages. Over all the World population is transiting the second and the third stages (Mishra, 2007, 141).

1.7.4 Medical Geography

Medical Geography is one of the branches of Human Geography focused on the geographic aspects of health and health care system. Medical Geography focuses on the concepts, and with the help techniques of different disciplines brings out the spatial and ecological perspectives of human health (cited in Akhtar & Izhar, 2010,12). The Greek physician Hippocrates is considered the father of modern medicine. Hippocrates was a strong advocate of the physical environmental factors and was critical of those who believed in the influence of unnatural factors on human health.

The late 19th century Medical Geography mostly focused on mapping of diseases and providing ecological explanations. The pioneering study of Dr. John Snow, a late 19th century (1854) physician, on the outbreak and distribution of cholera epidemic in Soho (London) revealed that the maximum number of cases occurred among the households that used water from the public pumps. Similar contribution is seen in the 1881 'Germ Theory of Disease' of Louis Pasteur. According to Germ Theory, diseases spread through the diffusion of the germs. Leon Poincare, in his paper titled 'Prophylaxis and Medical Geography' in 1884 said that for Prophylaxis, data on location and site are important (cited in Akhtar & Izhar, 2010, 14).

Modern medical geography is considered to have started around 1950 and all geographers followed the concept of "geogens and pathogens" propagated by J.M. May. The conceptual and methodological framework of modern medical geography has been contributed by M. Sorre (1950) who propounded the concept of "Pathogenic Complexes" (1933).These pathogenic complexes are related to physical, biological and anthropogenic factors. During the decades of 1980 and 1990, medical geographers paid greater attention to the simple health system model proposed by John Giggs (1979) which has three components.

1. The spatial patterning of ill health.
2. The spatial patterning of spatial characteristics which affect health.
3. The spatial patterning of health care system.

According to Hunter (1988),the focus of medical geography during this phase was preventive medicine and health care services. As time passed, conceptual and methodological advancements were achieved in medical geography. Currently medical geography focuses more on the rational development and testing of models,

which enables to identify the spatial distribution of different diseases and how they are linked with the physical and cultural environment/factors (Akhtar & Izhar, 2010,14-15).

1.8 Medicine Systems

The primitive knowledge about disease is difficult to trace out, because it is lost in antiquity. There are no as such well-defined documents and evidences found to throw light on this aspect. Some of the main sources of evidences lie in the naturally protected buried dead bodies in caves. Such sources of evidence are also found in the mummy preserves of Egypt and Peru. The fossil bones of early vertebrates in North America are also the sources of evidence(Mishra,2007,48). However, the sources on the medicine systems in the different parts of the world are sufficiently rich, as they are still in practice at least in their area of origin. They are: Egyptian medicine system of Egypt, Mesopotamian medicine system practiced on the land between Euphrates and Tigris Rivers, Greek medicine system and Unani medicine system of Greece, Chinese medicine system, Ayurveda and Siddha medicine system of India.

1) Egyptian Medicine: Egyptian medicine system, which dates back to around 2800 BC, was a type of magical-cum-religious medicine. Egyptian medicine believed disease is outcome of absorption of harmful substances from intestine which will impure the blood and leads to pus formation. This system considers heart as the major organ of the body. Egyptian physicians used castor oil, tannic acid, opium, turpentine, minerals, roots and drugs etcetera to cure diseases (Park, 2009, 2 & Mishra, 2007, 26).
2) Mesopotamian Medicine: This system was in practice in the present day Iraq area, lying between Euphrates and Tigris Rivers. It was based mostly on magic and witchcraft (Park, 2009, 2 & Mishra, 2007, 26).
3) Greek Medicine: Greek medicine system (460-136 BC) was highly influenced by the contributions of Hippocrates, who is referred to as the father of medicine. He changed the approach to study diseases from supernatural cause and stressed on the natural or physical causes for disease occurrences. Greeks believed that the four elements of earth, air, fire and water are important; all four are associated in body with four humors- phlegm, yellow bile, blood and black bile. Most of the information on Greek medicine comes from the *Corpus Hippocraticum* of Hippocrates (Park, 2009, 2 & Mishra, 2007, 27).

4) Unani Medicine: Unani medicine system was practised in Greece. Unani medicine is the combination of Greek, Arab, Persian, Indian systems of medicine. The practitioners of Unani system of medicine believed in animal sacrifice and did not bury dead bodies. They have three types of healers; healed with knife, healed with herbs and healed with holy water. Unani system was also based on humoral theory (Mishra,2007,29).
5) Chinese Medicine: Chinese medicine system (2700 BC) is based on the principles of the *Yang* (active masculine principle) and *Yin* (negative feminine principle). Disease occurs when the balance between the two forces is disturbed (Park, 2009, 2). The belief in this system is, blood vessels consist of blood and air with varying proportions. The system also incorporates the use of herbal medicine, massage, exercise and acupuncture (Mishra,2007,34).
6) Ayurveda Medicine: Ayurveda medicine system has its roots in India and is considered to be around 5000 years old. The term "Ayurveda" is a Sanskrit word. *Ayur* means life and *Veda* means Science or Knowledge. This science developed through the contributions of different ancient Indian saints namely, Charaka, Atreya, Susruta and Vaghbhat. Atreya was the first Indian physician and surgeon. Charaka and Susruta collected and compiled most of the information on medicine and surgery in two *Samhitas*. Charaka *Samhita* focuses on medicine and Susruta *Samhita* focuses on surgery and Ashtanga Haridaya *Samhita* compiled by Vegabhata on both the fields (Park, 2009, 2 & Mishra, 2007, 30-31). Charaka is considered the father of Indian medicine. Susruta is known as the father of Indian surgery. Ayurveda believes that human is result of five vital elements, includes seven body tissues (*Saptdhatus*), five senses (*Panchendriyas*), mind (*Manas*), intellect (*Budhhi*) and soul (*Atma*). The *panchabhootas* are lithosphere (earth), hydrosphere (water), atmosphere (air), sunlight (fire) and aether (space). When all these *panchbhootas* combine together, they generate three humors in human body. Ayurveda medicine is based on "*tridosha* theory of disease", the *dosha* or humors are *vata* (wind), *pitta* (gall) and *kaph* (mucus). Whenever there is misbalance in all three *doshas* or humors, then diseases occur. Homeopathy is another medicine system practiced in India. It was introduced by Samuel Hahnemann (1755-1843), which uses small amount of drugs to treat diseases (Park, 2009, 2 & Mishra, 2007, 30).

7) Siddha Medicine: Siddha medicine system is the oldest system practised in the peninsular parts of India. This system of medicine is based on the concept of free flow of *pranic* energy (life) in the body. If this flow of energy is blocked, it will lead to diseases. Medicine is not used in this system instead meditation and Yoga are prescribed for the cure of the disease. The system is based on the understanding of the seven chakras on central chord from lowest point to head in the human body. If chakras are clogged, diseases occur. Such blockages are generally caused due to heredity and environmental causes. The blockage can be removed by meditation (Mishra, 2007, 32-33).

1.9 Diseases in the Past

Diseases are caused by the interaction of pathogens and geogenes. Pathogens are responsible for diseases. These pathogens are found everywhere. Some of the diseases spread fast and some very slowly. Most of the communicable type of diseases spread very fast and kill more number of people in comparison to non-communicable diseases. Historical evidences also prove this fact. For example, the plague that occurred in 1920 killed more than a million people. Other such communicable diseases which lead to large scale deaths in the past include small pox, cholera, trachoma, guinea worm and anthrax. Historical records of their occurrence and large scale deaths caused by them are also not rare (Mishra, 2007, 177).

1) Plague - Plague is one of the most ancient diseases. Evidences of its occurrence are found in Bhagavat Purana (800 BC). The plague of fourteenth century is known as ‘black death’ in Europe, Chuma in Russian, Yeki in Japanese, Shu-Yi in Chinese and Mahamari in India. Plague is a medical condition in which infectious fever is caused by *Pasteurellapestis.* There are three types of plague. They are;

1. Bubonic plague - affects lymph nodes.
2. Pneumonic plague- affects lungs.
3. Septic plague- affects blood stream.

The foci of the disease were located in Asia (Arabia &Iranian Kurdistan), Central and South Africa, South and South-East Asia (Myanmar, Vietnam, Indonesia and India), South America and Western United States of America. During the last 2000years, three pandemics have occurred. The first one occurred in 542 AD and killed 100 million people. The second one occurred in 1346, continued for three years

and killed 25 million lives. The third began in 1894 and continued for more than three decades. Over time however, deaths due to plague have reduced drastically. The last cases were recorded from Srilanka (1938), Thailand (1952), Nepal (1968) and India and Myanmar (1994) (Mishra, 2007, 179).

Plague is transmitted by fleas, which attacks rodents (rat) and then flea attacks human being by physical contact. The bacilli multiply in the stomach of flea. Plague entered India from Europe through the trade routes in 19th century. It remained dormant for one hundred years and then reappeared in 1812 in Gujarat, then Rajasthan in 1836 and again in 1896 in Bombay through the trade route from China. Soon it got spread over the whole country in 1904, killing more than millions of people. Since the mid-twentieth century, the occurrence of plague and deaths caused by it has been significantly controlled (Mishra, 2007, 186).

2) Small pox - Small pox is an acute respiratory infection caused by variola virus. It causes very high fever. Red rashes occur on all parts of the body and the tongue of the patient becomes coated. Within a few days papules appear on the face followed by the arms and then the entire body. Virus of small pox enters the body via nisiss membrane of upper respiratory tract by direct contact (Mishra, 2007, 187).Small pox occurs in all climates but attacks severely in hot climates. Small pox is a seasonal disease, the epidemic increases in spring months. Virus can survive for 12 to 18 months outside the body in low temperature and humidity. Incidence of small pox increases with humidity. Sunlight is harmful to the virus. Diffusion of the disease becomes the maximum in crowded areas. Prevention and control can be done by taking care of the patient and maintaining cleanliness. Virus of small pox is highly contagious. This disease was pandemic in Europe in 1614, endemic in England between 1666and 1675 and in 1967 it was endemic in 33 counties. Small pox was present from very ancient times in India. This was prevalent in all parts of India, with maximum prevalence in the north western states of Rajasthan, Punjab, Haryana, Gujarat, Uttar Pradesh and Madhya Pradesh. Incidence rate of small pox in India was the highest in the World. However, it started declining after India achieved Independence and now it has been completely eradicated (Mishra, 2007, 189).

3) Trachoma - Trachoma is a surface infectious disease that causes blindness. It mostly affects children. According to May, it is a chronic disease of conjunctiva and cornea, and is characterised by a sub-epithelial cellular infiltration with a follicular distribution. Trachoma is caused by the virus *chlamydozoa trachomatis* and

C.oculogenitale. The virus dies in 15 minutes under 45°c but can resist cold temperature. It gets transferred from person to person through the use of common cloths, towels etcetera. This disease is associated with poverty, poor environment, lack of diet, improper sanitation and health care. It is believed that the disease originated in Mongolia in ancient times. But as mongoloid people followed the trade route to western Asia region through Isthmus which connects America and European countries, the disease could spread to these areas along with them. Others believe that it had originated in western Asia. In this way it spread all over the globe (cited in Mishra, 2007, 193).

The occurrence of this disease is the highest in Rajasthan, Uttar Pradesh, Madhya Pradesh, Bihar, Punjab and Gujarat among all the states of India, with prevalence rate varying between 38 to 70 per cent. It is not yet fully eradicated in India. It is associated with bacterial infections. It normally occurs during the months of April-May and July-Sept. This disease is associated with solid wastes, poverty and poor personal hygiene etcetera. According to WHO, trachoma is targeted to be eradicated by 2020(Mishra, 2007, 194).

4) Guinea Worm Disease(Dracontiasis) - It is a vector borne parasitic disease. Guinea worm is related with rainy seasons. World recorded 8,92,005 cases of this disease In 1989, which is on the decline over time. The disease is endemic in India, West-Asia and tropical Africa. Although it is under control, complete eradication is still due in India. By a 1991 count, the maximum number of cases of Guinea worm was in India was reported from the states of Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra and Rajasthan (Mishra, 2007, 197).

5) Anthrax - Anthrax disease is caused by spore forming *bacterium Bacillus Anthracis*, an organism that becomes resistive spore and remains in contaminated soil for many years under specific conditions. Anthrax attacks in three ways- through skin infection, inhalation and intestinal infection. Human beings get infected when they eat undercooked meat. Anthrax disease is found in all parts of World. Between 1990 and 2000,35 cases of anthrax were reported from Pondicherry in India. The vaccine of anthrax is penicillin for human and prophylactic for animals(Mishra, 2007, 199).

6) Yaws - Yaws is a chronic contagious non-venereal disease, caused by *T.Pertenues*, which is very small in size. Yaw is transferred from person to person. This disease comes in the childhood starting with primary skin lesion and then leads

to many eruptions on skin and bones. Yaw is generally associated with areas closer to the tropics of Cancer and Capricorn. It is a disease of the hot and humid tropics where the amount of rainfall is around of 1000 cm. The states of Andhra Pradesh, Madhya Pradesh, Maharashtra and Odisha are the most affected states in India by this disease (Mishra, 2007,199).

7) Poliomyelitis - Poliomyelitis is caused by the *Poliovirus hominis.* Released through tonsils or feces, get lodged in the intestine with such symptoms like sore throat, fever and headache. Poliomyelitis virus enters the human body through nasal and pharyngeal portals, through digestive tracts and intestine. It attacks the interior horn of the spinal cord, motor and premotor. Too much of stress, fatigue, pregnancy and high fever favours the severe attack. Polio is found everywhere. But due to the development of polio anti-polio vaccine in1954, the situation is improving. In some countries polio is completely eradicated, e.g. in America (1994), in Europe and West Pacific (1999). But, South East Asian region remains the major reservoir of polio today. Polio is gradually getting eradicated in India. Incidence of polio reduced from 25,711 cases in 1988 to 1,934 in 1998, 1,126 in 1999 and 300 in 2000.Target was fixed to eradicate the disease from the country in due course and success has been achieved in 2005 (Mishra, 2007, 201-202).

8) Leprosy - Leprosy is also one of the oldest diseases. There is not much of clarity with regard to its place of origin. It affects mucous membrane and peripheral nerves of face, hand, feet and leads to deformity. Leprosy is caused by Mycobacterium Leprae. Leprosy is found in humans but not in the animals. Leprosy mostly occurs among the children rather than the adults. There is a close relationship between the incidences of leprosy and tuberculosis. Humid climatic conditions are highly favourable for the disease. Leprae can survive in moist soil for 46 days. Overcrowding is another factor for transmission of the disease. Laprae enters the body through cuts and injuries. It is a communicable disease. Leprosy concentration is highest in Asia and Africa (Mishra, 2007, 207).

With the use of Multiple Drug Therapy (MDT), 10.70 million patients were cured in India by the year 2000. Leprosy eradication program targeted to treat 12.19 million cases and could cover 8.33 million cases. The disease has its presence all over India with greater prevalence in West Bengal, Odisha, Bihar, Uttar Pradesh (Mishra, 2007, 207) .By and large, the eastern coastal states report higher incidence. The Himalayan foothills and the central part of the country register moderate and low

incidence of leprosy cases indicating the role of humidity on the disease. Indian Government has launched a National Leprosy Control Program in 1955, under which around 80,000 cases were covered (Mishra, 2007, 213).

1.10 Organization of the Study

The introductory **first** chapter deals with the research question, objectives and hypotheses, methodology and sample size of the study area.

The **second** chapter deals with the literature review. The review includes contributions of scholars belonging to diverse disciplinary backgrounds from all over the World.

The **third** chapter focuses on the study area of the research. Vadodara district extends over the eastern part of the Gujarat state. Vadodara district is a part of the Gujarat plain. The terrain of the district is flat level plain in the west while the eastern part is a hilly tract and elevation varies between 300 meters and 520 meters above M.S.L

The **fourth** chapter is on the disease pattern in India. It focuses on health status of people in India, provides information on house type, drinking water, infant mortality rate, family planning, child health, maternal health, health care facility and prevalence of diseases in India.

The **fifth** and the **sixth** chapters provide district-wise and *taluka*-wise information pertaining to housing condition, child, women and adult health, and the prevailing diseases in the State and the district respectively.

The **seventh** chapter deals with the micro level analysis of the disease patterns in Vadodara district. This chapter focuses on the spatial and structural characteristics of the sample villages. An attempt has been made with the help of data generated through primary investigation to highlight aspects that are directly or indirectly related to the health of the population.

The **eighth** chapter focuses on the micro level study of the prevalence of diseases in the study area as well as the measures taken to prevent them. This was done to compensate the limitations of secondary level data.

The concluding **ninth** chapter summarizes the research and draws the conclusions. It can be concluded that health is not unidirectional rather it is

multidirectional and is influenced and affected by several physical and cultural elements of the environment.

1.11 Limitations of the Study

Secondary data pertaining to health is not always available systematically. For example, health records maintained by hospitals, health centers, dispensaries etcetera are many a times inadequate as well as unreliable and not accessible. Besides, there are gaps in recording of the data. Quality of recording the data varies from one institution to another. Many a times no standard procedure is followed to classify the diseases, which makes it extremely difficult to analyze the patterns and causes of diseases in the proper perspective. To counter the lacunae in the available secondary data, the present research would depend to a large extent on self-generated data.