

Assessment of Healthcare Status of Thanjavur District, Tamil Nadu: A Medical Geographical Approach

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ABSTRACT: Environment, location and demographic structure have great impact on an individual's health and provision of healthcare service of any region. Development of human resource is possible by proper provision of healthcare services. Healthcare status of Thanjavur district has been assessed for such analysis. Spatial analysis of the medical parameters of eight taluks of the district have been analysed with secondary data collected from the district health office, government hospitals, medical colleges and census report. Disease profile is identified on the basis of the diseases diagnosed among the patients who came to health centers only. Disease profile, patient concentration, healthcare facilities available in primary, secondary and tertiary healthcare centres are analysed. On the basis of these various factors five healthcare regions have been delineated. Thanjavur taluk being the headquarter of the district and having urban and accessibility advantages has better healthcare facilities. On the other hand Thiruvaiyaru taluk having low urban population, low healthcare facilities are provided.

KEYWORDS: Medical geography, demographic structure, healthcare, patient concentration, healthcare region

I. INTRODUCTION

Medical Geography (Health Geography) is the branch of Human Geography that deals with the geographic aspects of health (status) and healthcare (systems) (Lang L., 2000). Medical geography studies the impact of environment and location on an individual's health as well as the distribution of health services. Medical geography can provide a spatial understanding of a population's health, the distribution of disease in an area, and the environment's effect on health and disease. It deals also with accessibility to health care and spatial distribution of health care providers (Wikipedia).

Medical geography is an important field in geography because it aims to provide an understanding of health problems and improve the health of people based on the various geographic factors influencing them (Dutta A., 1992). World Health Organisation (1946) defines health as "a state of complete, physical, mental and social wellbeing and not merely the absence of disease or infirmity." Human resource is a vital factor for the development of a country. Development of human resource is possible only through proper provision of healthcare services. The location of health care facilities depends largely on the nature of the health care system in operation, and will be heavily influenced by historical factors due to the heavy investment costs in facilities such as hospitals and surgeries.

Medical geography has a long history. Since the time of the Greek doctor, Hippocrates (5th-4th centuries BCE), people have studied the effect of location on one's health. During mid 1800s, John Snow, a doctor of London plotted the distribution of deaths of Cholera throughout London on a map (Mishra R.D., 1970). Like its mother field, medical geography has seen major shifts in its ideology, approach, methodology, and scope in the last few decades.

Thanjavur district of Tamil Nadu is a deltaic region. Physiographically the district consists of low land. Due to low flat surface and stagnation of water, many common diseases occur in the district. The most common diseases are acute diarrhoea, worm infection, ear discharge, scabies, dental problems, eye vision defect, night blindness, anaemia, leprosy, filaria. The incidence of diseases, health condition and demographic structure vary from region to region. Provision of healthcare facilities influences health condition of the people. Thanjavur district is selected as the study area to assess its health care facilities.

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 10, October 2015

II. OBJECTIVES

This study attempts to identify the healthcare facilities in Thanjavur District, Tamil Nadu. The paper is to achieve the following objectives:

1. To analyse various diseases and to identify the disease prone areas in the district.
2. To assess the provision of basic healthcare facilities in different taluks of the district.
3. To find out the accessibility, adequacy, and service area of the basic healthcare centres in Thanjavur district.

III. STUDY AREA

Thanjavur district is located on the east coast of Tamil Nadu in the Cauvery delta. Thanjavur district is one of the largest districts of Tamilnadu with an area of 3,396.57 km². The district lies between 9°50'N to 11°25'N latitude and longitudinal extension is from 78°45' E to 79°25' E. It is bounded by Thiruchirappalli district on the North West, Pudukkottai district on the south west, Nagapattinam District on the north east, Tiruvarur district on the east and Palk Strait of the Bay of Bengal on the south. Physiographically this district consist of lowland with the natural division namely the delta area and uplands. There are no hills anywhere in the district. Maximum elevation is 60 meter above sea level in the western extremity.

The climate of the region in general is monsoon with four seasons. These are 1) *the hot weather season*, 2) *the south west monsoon season*, 3) *the retreating monsoon season* and 4) *the cold weather season*.

The main rivers of the district are Cauvery, Vennar, Kudamurutti and Arasalar. The other rivers are Peminiar, Korayar and Verasolamar. This district is enriched with fertile soil due to the deposition of river Cauvery and its tributaries. The district has 8 taluks namely Kumbakonam, Orathanadu, Papanasam, Pattukkottai, Peravurani, Thanjavur, Thiruvaiyaru, Thiruvidaimarudur.

Thanjavur district is predominantly agricultural district. Since the district enjoys tropical monsoon climate, the temperature and rainfall condition favour farming activities. Almost all types of crops have been cultivated through the region. The district is called as the Rice Bowl of Tamil Nadu.

In Thanjavur district, one medical college, one district headquarter's general hospital, 9 taluk hospitals, 15 main primary health centres and 44 additional primary health centres are located. 526 pharmacies, 106 test labs are also found in this district.

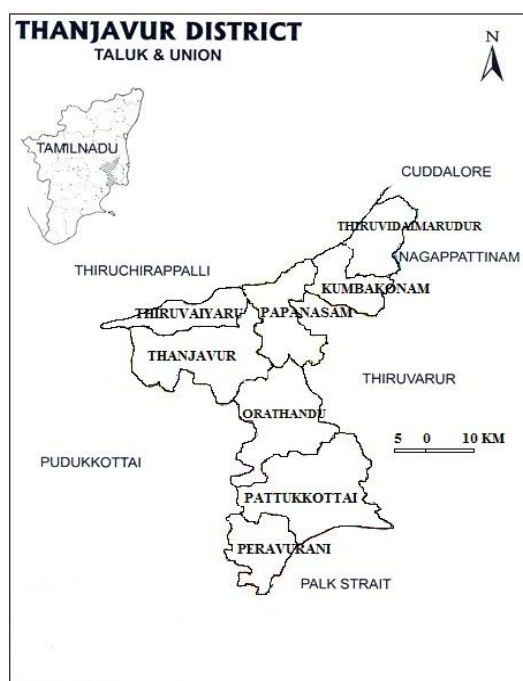


Fig.1: Location map of Thanjavur District

International Journal of Innovative Research in Science, Engineering and Technology

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IV. DATABASE AND METHODOLOGY

The study is based on the secondary data. The population details have been collected from the census office. The details of the health service centres are collected from the district health office of Thanjavur. Details of govt hospitals are collected from district head quarter's general hospital of Kumbakonam. Information about medical college and Rajamirasudhar hospitals are collected at that respective hospital. Mortality and morbidity data are collected from state medical statistics office in Chennai. Particulars regarding pharmacies and test labs are collected from drug control Association in Thanjavur district.

First, the demographic structure has been identified. Then, the incidence of various diseases and the disease prone areas are identified. The incidence of diseases is calculated on the basis of incidence rate. Concentration of patients is assessed by using the Index of concentration. Then disease prone areas are delineated.

The analysis of hierarchy of health centres and their distribution and facilities available in primary, secondary and tertiary level are identified. Indicators selected to assess the healthcare are *number of doctors, nurses, operation theatres, eye-testing machines, X ray units, test labs, mother and child care facilities, Ambulance, beds, Rural Health training centres, blood banks, generator, ECG, machine, Laproscope, Drug centre, Malaria Fileria centres etc.* Weightage is assigned to each indicator according to the availability and summed up and the Composite Index is considered as health index. Then the healthcare regions are delimited and their salient features are analysed.

V. DEMOGRAPHIC STRUCTURE

Occurrence of diseases and provision of healthcare facilities depend on demographic structure. The total population of Thanjavur district is 2,402,781 of which male and female population are 1,183,112 and 1,219,669 respectively (Census, 2011). In 2001, Thanjavur had population of 2,216,138 of which males were 1,096,638 and remaining 1,119,500 were females (Census, 2001). The district has a population density of 691 people per km². Its population growth rate over the decade 2001-2011 was 8.42%. Thanjavur has a sex ratio of 1031 females for every 1000 males, and a literacy rate of 82.72% (Census, 2011). Out of total population 64.61 % population of Thanjavur districts lives in rural areas of villages. The total population of Thanjavur district living in rural areas is 1,552,325 of which males and females are 765,784 and 786,541 respectively (Census, 2011). Density of population is high in Papanasam, Kumbakonam and Thanjavur taluk and least in Thiruvudaimarudur, Orathanadu, and Peravurani. Kumbakonam and Thanjavur Kumbakonam, Thiruvudaimarudur taluks have low sex ratio.

Proportion of urban population is high in Thanjavur taluk. Highest literates are found in Thanjavur and lowest in Peravurani. Birth rate shows gradual declining trend in five taluks namely Thiruvudaimarudur, Papanasam, Peravurani, Thiruvaiyaru and Orathanadu during 1991-2001. Still birth rate also, shows declining trend. Thiruvudaimarudur, Thanjavur and Papanasam taluks show declining trend of maternal mortality rate while in other taluks it varies.

VI. DISEASE PROFILE

Thanjavur district is a rural district with 65% rural population. It is rather difficult to assess the disease profile in the rural areas because this estimate is based on the diseases diagnosed among the patients who came to the health centres only. In the absence of other reliable information sources, disease profile is identified from the most prevalent diseases, reported at the primary health centres. The most prevalent diseases reported are acute diarrhoea, worm infection, ear discharge, scabies, dental problem, eye vision defect, night blindness, anaemia, leprosy and filaria diseases.

The patients with various diseases reported from every taluk are analysed with reference to total population and disease incidence rate has been obtained. Disease incidence rate is a ratio between patients and population. Incidence of diseases has been calculated only for the diseased persons recorded in primary health centres. Acute diarrhoea is caused by bacterial infection of gastrointestinal track of digestive system. The occurrence of this disease may be attributed to poor sewage and drainage facilities resulting in stagnation of sewage water and unhygienic living condition. Incidence rate of it is more than 50 in Kumbakonam and Peravurani taluks and below 50 in Thiruvaiyaru. In other taluks it is moderate.

International Journal of Innovative Research in Science, Engineering and Technology

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Vol. 4, Issue 10, October 2015

Worm infection is water borne disease. Occurrence of this disease is common in this district due to more stagnation of water because of flat low lying land. Occurrence of this disease is high, that is, more than 1500 in Kumbakonam taluk and is low that is less than 1000 in three taluks of the central part of the district.

Ear discharge is high (above 225) in two taluks in southern part and one in north eastern part of the district. In north eastern part in Kumbakonam and Thiruvudaimarudur taluks, incidence rate is less than 175. In rest of the taluks, incidence rate of this disease is moderate (175-225).

Scabies is a parasitic infestation of skin. It is also fungal in nature and mostly occurs due to water logging and polluted water bodies of this district. Thanjavur district is famous for betel and nut cultivation. Most of the people of the district have the habit of chewing betel, hence dental problem is common in this district. High dental problem is noticed in Kumbakonam taluk where incidence rate is more than 30 per thousand populations. Night blindness is caused by vitamin 'A' deficiency and malnutrition due to lack of awareness and education. Occurrence of anemia disease is also due to malnutrition and lack of awareness of nutritive diets. Leprosy incidence rate is high (above 75) in Orathanadu taluk.

Filaria is an infection of lymphatic system and transmitted by the infected vector mosquito. It is communicable and exogenous disease. Under the scheme of preventive and control of diseases there are two filaria control units in the district, each in Thanjavur and Kumbakonam. During 1996, 394 filaria cases are treated in Thanjavur taluk and 259 in Kumbakonam. These taluks are main zone for filarial disease because in these taluks mosquitos are high due to wet condition.

VII. DISEASE ENDEMIC AREA

The incidence of various diseases are ranked taluk wise and summed up. The average of this aggregate value is represented as Disease Index. The taluks which have less than the value may be considered as High endemic area and the taluks which have greater than this value may be considered Low endemic area. On the basis of the disease index Endemic Areas are delimited.

Table 1: Disease Endemic Area

Level	Taluks
High endemic	Orathanadu, Peravurani, Kumbakonam, Pattukkottai
Low endemic	Thiruvudaimarudur, Papanasam, Thiruvaiyaru, Thanjavur

Concentration of patients at primary, secondary and tertiary health centres are found out. Occurrence of disease is mainly based on environmental factors. Even though Thanjavur taluk is a less disease prone area it has high concentration of patients. This may be due to patients coming from different parts of the district to avail higher level of health care facilities. Orathanadu taluk has high disease incidence but concentration of patients is low, this is due to lack of awareness of disease and education.

Table 2: Concentration of Patients at Primary, Secondary and Tertiary Level of Healthcare Centres

Level of Concentration	Taluks
Low	Thiruvaiyaru, Orathanadu, Thiruvudaimarudur
Moderate	Papanasam, Kumbakonam, Pattukkottai, Peravurani
High	Thanjavur

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Vol. 4, Issue 10, October 2015

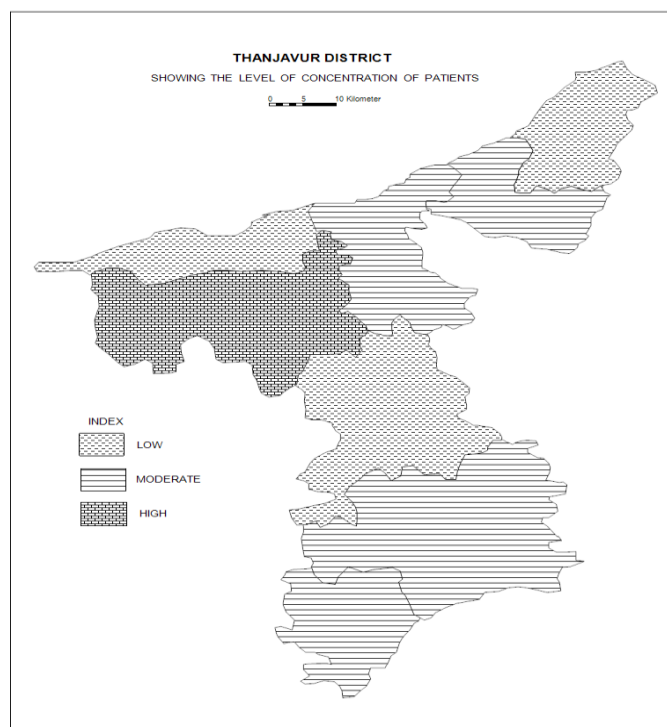


Fig 2: Level of Concentration of Patient

VIII. HEALTH CARE FACILITY

Health of human being is an important component in the socio-economic development of any region. Health care facilities help in maintaining the health of a community. Health care centres are one of the indices to identify the health care facilities of a region. According to the degree of facilities available health care centres are classified in into six hierarchical orders.

Table 3: Hierarchy of Healthcare Centres

Order	Type	Location
1 st order	Medical college Hospital	Thanjavur taluk
2 nd order	District Headquarter General Hospital	Kumbakuman taluk
3 rd order	Taluk Govt Hospital	Almost all taluk headquarter
4 th order	Non taluk Hospital	Thiruvidaimarudur, Kumbakonam, Thiruvaiyaru, Pattukkottai taluks
5 th order	Main Primary Health Centre	Located at Rural Areas
6 th order	Additional Primary Health Centres	Located at Rural Areas

The table no.4 shows that Orathanadu, Papanasam and Pattukkottai taluks have the highest health care centres where total numbers of healthcare centres are 12, 12 and 14 respectively. This is due high concentration of lower order health care centres. Health care centres are least at Peravurani.

International Journal of Innovative Research in Science, Engineering and Technology

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Table 4: Distribution of Healthcare Centres

Sl. No	Name of the Taluk	Main Primary Healthcare Centre	Additional Primary Healthcare Centre	Secondary and Tertiary Healthcare Centre	Total Health Care Centre
1	Thiruvidaimarudur	2	4	3	9
2	Kumbakonam	1	4	2	7
3	Papanasam	3	7	2	12
4	Thiruvaiyaru	2	2	2	6
5	Thanjavur	1	5	2	8
6	Orathanadu	2	9	1	12
7	Pattukkottai	3	9	2	14
8	Peravurani	1	4	1	6

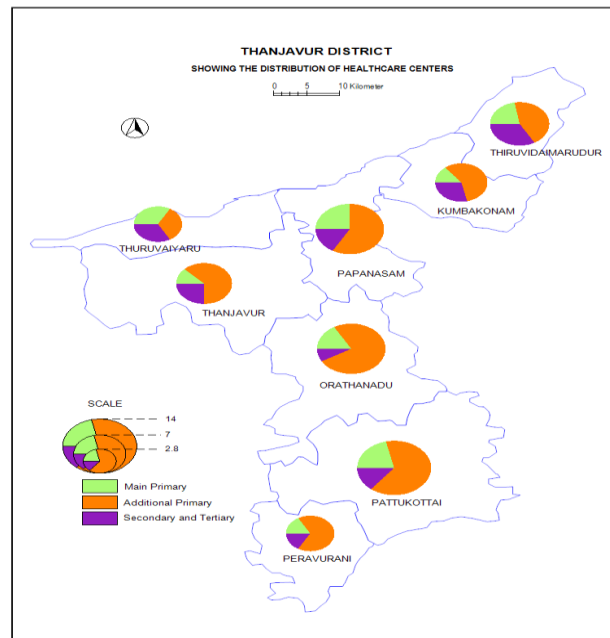


Fig. 3: Distribution of Healthcare Centres

The health status can be measured by the health service indicators. The most important indicators are doctors, nurses, beds and other diagnostic specialities.

Table 5: Distribution of Healthcare Services

Sl. No.	Name of the Taluk	Primary Level			Secondary and Tertiary Level		
		Doctor	Nurse	Bed	Doctor	Nurse	Bed
1	Thiruvidaimarudur	12	16	12	7	7	42
2	Kumbakonam	11	14	20	28	53	384
3	Papanasam	26	34	31	5	4	36
4	Thiruvaiyaru	8	12	12	5	6	16
5	Thanjavur	14	19	6	126	260	456
6	Orathanadu	22	25	12	1	5	44
7	Pattukkottai	22	27	18	22	25	258
8	Peravurani	14	15	14	5	5	48

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The highest number of doctors, nurses and beds in primary level are found in Papanasam taluk. Healthcare facilities at primary level are high in Papanasam and Pattukottaai taluks. Highest number of doctors, nurses and beds in secondary and tertiary level of healthcare are found in Thanjavur, Kumbakonam and Pattukottai taluks. Highest number of pharmacies and test labs are found in Kumbakonam and Thanjavur taluk. Overall healthcare facilities are high in Thanjavur taluk due to more facilities in secondary and tertiary level with super speciality services. This is followed by Kumbakonam taluk where district headquarter general hospital facilities are available.

IX. HEALTHCARE REGION

Disease profile, patient concentration, healthcare facilities available in primary, secondary and tertiary healthcare centres are the various factors taken as the criteria to delineate healthcare region. On the basis of these factors five healthcare regions are delineated.

The REGION-1 comprises Thanjavur taluk. This region is the high development region with better demographic structure, high urban population and high literacy rate. This region has highly developed healthcare facilities, that is, medical college hospital with super speciality services is located in this taluk. Other health indicators are highest in this taluk. Accessibility of road is high. It provides healthcare services to the entire population of the district. The REGION-2 comprises only Kumbakonam taluk. Availability of healthcare facilities in secondary and tertiary levels is moderate in this region. This region has district's headquarter general hospital and higher level of healthcare facilities. REGION- 3 comprises Pattukottai and Papanasam taluks, REGION-4 comprises Thiruvaidaimarudur, Orathanadu and Peravurani taluks. REGION-5 comprises Thiruvaiyaru taluk with low urban population, low healthcare facilities. Special facilities like X-ray unit, blood bank, ambulance, ECG machine are not available here. Number of doctors, nurses, beds, test labs and pharmacies are less in these taluks. Availability of healthcare facilities is low in primary and secondary level.

X. CONCLUSION

In order to convert human being to human resources the strategy has to be changed from disease cure to disease prevention. However, from the study it is understood that even though there are primary healthcare facilities in this district, they are not geared up to meet the objectives of the disease prevention. Lack of awareness of disease, lack of health education and unhygienic environment which are prevalent in this district, can be reduced through health education programme. Government may therefore come forward with many health education programmes.

Primary health centers may be equipped with special healthcare facilities. Government should allot more funds in the state's plan schemes to develop the less developed taluks like Thiruvaidaimarudur, Orathanadu, Peravurani, and Thiruvaiyaru.

Such an indispensable health facilities protecting the society should be located in such a way, that they are provided equality and easily to all.

The involvement of NGOs along with government efforts would help in achieving the development of human resource.

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