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Determinants of health care facilities and patients' accessibility to PHC in Madurai district

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Abstract

Health geography as an interdisciplinary field of study concerned with variations of disease incidence as expressed in mortality or morbidity with the demonstration of possible cause and effect relationship with health utilization, elements of physical, biological and socio-cultural environments in space. The study area Madurai district lies between 9° 30' north to 10° 30' North latitudes and 77° 30' east to 78° 30' East longitudes. The data for the present study was collected from primary and secondary source. The main objectives of the study are; To analyze the identification of spatial distribution of health care centers in Madurai district. To analyze the significance of health care location and its efficiency. To analysis the patient's perception and satisfaction level who avail these health care services. The two important techniques used in the present study are statistical technique and GIS. The maps are prepared using GIS Software. The relationships and the interdependence nature of different variables are analyzed using the correlation matrix capable of explaining the relationships of one variable with all other variables. Apart from this, the multivariate statistical technique factor analysis is used to find the major associations and interrelationships between PHC diseases among patients, derived by using SPSS 7.5. To identify health service area in Madurai District, spatial analysis techniques were applied. The Study describes about patients' perception and utilization of travel behaviour pattern among sex and age variation and healthcare planning of PHC's in Madurai District.

Keywords: PHC, patients perception, health determinants, factor analysis, GIS

1. Introduction

Primary health care is a comprehensive teamwork between medically qualified physician as well as a wide range of nursing and paramedical personnel^[1, 2, 3]. Quite often, primary health care systems are further subdivided into three levels-the most peripheral level which is in direct contact with the community and is usually managed by one or more members from within the community who are trained and equipped in preventive and Promotive health care as well as in the most basic clinical and emergency care^[4, 5, 6].

The study an attempt is made to understand the patient and satisfaction level on health care delivery system in the Madurai District. For this purpose a primary survey was conducted on the basis of stratified area random sampling of the study area. In this chapter, the characteristics of the patients *viz.*, their economic and social status, health problems and related aspects, perception on treatment and health centres and the satisfaction level of people on the health care system analyzed^[7, 8, 9, 10].

Health geography is the application of geographical information, Perspective, and Methods to study of health, Disease, and health care^[11, 12, 13]. The present study attempts to describe the health care system and patients performance for PHC in Madurai district. Emerging disease and accessibility of health facilities, in relation to various social, economic and environmental factors as observed for different PHC centers of Madurai district and also on studying each PHC and its role on environment health relationship in relation to the spatial distribution of PHCs, health care needs of the population^[14, 15, 16].

PHC centres is mainly related to total number of population. Using Remote Sensing and GIS is a very valuable tool for Public Health Practice and Research, for can be helpful for health decision maker to guide them where to direct health policies and better to visualize health problem and it is recommended that, Public Health Practitioners and Researchers to consider the use of remote sensing and GIS^[17, 18, 19, 20].

Transportation barriers are often cited as barriers to healthcare access. Transportation barriers lead to rescheduled or missed appointments, delayed care, and missed or delayed medication use.

These consequences may lead to poorer management of chronic illness and thus poorer health outcomes [21, 22, 23]. The travel medicine provider, tailored risk communication that is cognisant of the unique health beliefs and barriers to travel health for VFR travellers is needed, including enhanced communication through the use of interpreters and supplementary written communication [24, 25]. In particular, limited availability of health care facilities and services and perceived low quality of care meant that those in need of health care services frequently had to travel for care. The barrier of geographic distance was worsened by transportation problems. We also observed that where health services were available most people could not afford the cost [26, 27, 28].

The purpose of this audit is to assess patient waiting time and doctor consultation time in a primary healthcare clinic and to formulate strategies for improvement [29, 30]. The results demonstrate that treatment destinations, medical specialties for which treatment was sought, age, gender and travel season are significant factors in understanding overseas travel for medical care [31, 32].

This survey study suggest that bypassing the nearest health care facility was common among women in Ghana and that available services at lower levels of primary care are not meeting the needs of a large proportion of women. Among the benefits women perceived from bypassing were clinician competence and availability of supplies [33, 34]. Liberating clinicians and administrative team members from other tasks and commitments allows them to focus on the immediate needs. Provision of food, rest breaks, decompression time, and adequate time off may be as important as provision of protocols and protective equipment as days turn into weeks, then months [35, 36].

2. Study Area

Madurai district is located in the central part of southern Tamilnadu of India. It is bordered by Dindigul and Tiruchirappalli district on the north, Sivagangai district on the east, Virudhunagar on the south and Theni on the west. Madurai district is at 9° 30' and 10° 50' of North Latitude and from 77° 00' to 78° 30' of East longitude. (Fig 1). The total geographical area is 384,680 hectares.

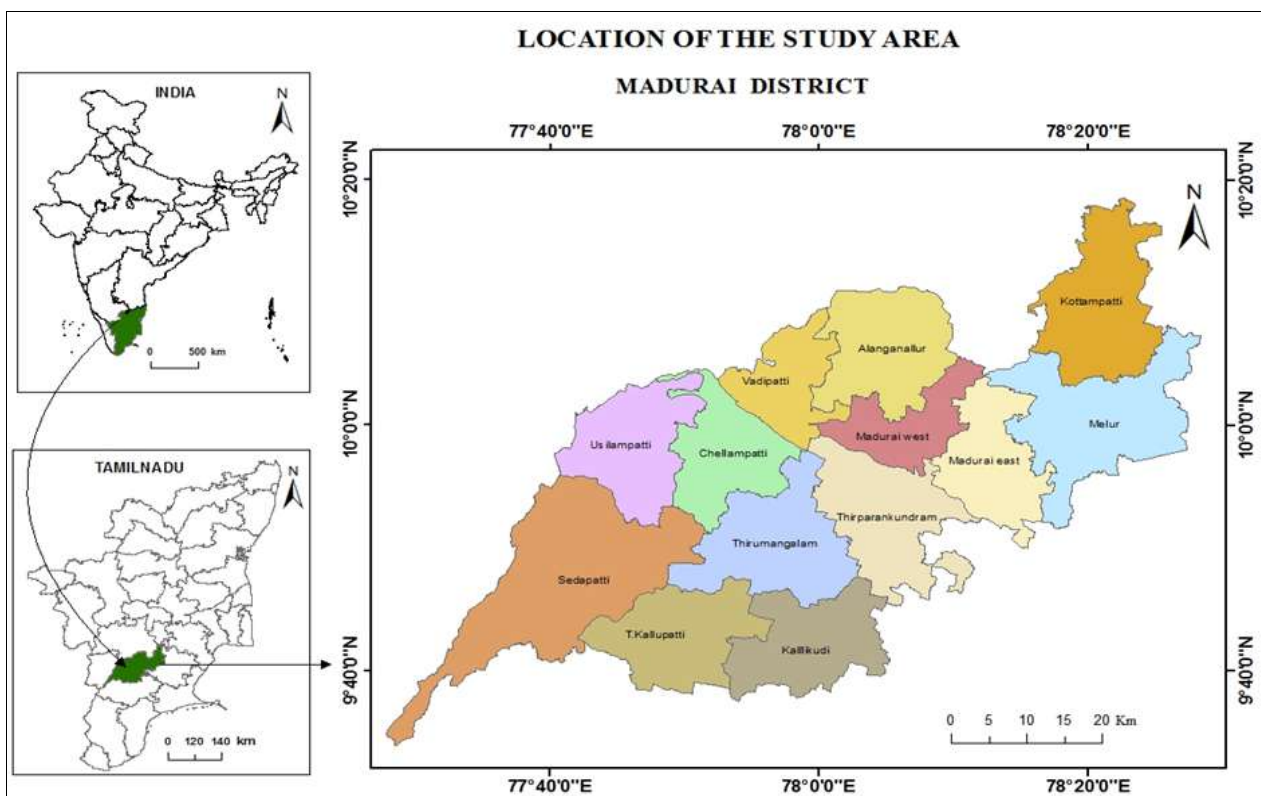


Fig 1: Location of the Study Area

3. Aims and Objectives

- To analyze the identification of spatial distribution of health care performance in Madurai district
- To analyze the significance of health care location and its efficiency.
- To analysis the patient's perception and satisfaction level who avail these health care services.

4. Materials and Methods

The two important techniques used in the present study are statistical technique and GIS. The maps are prepared using GIS Software. ArcGIS is one of the important GIS software, which is used to prepare the maps. The relationships and the interdependence nature of different variables are analyzed

using the correlation matrix capable of explaining the relationships of one variable with all other variables. Apart from this, the multivariate statistical technique factor analysis is used to find the major associations and interrelationships between PHC diseases among patients [37, 38, 39]. With the help of correlation matrix, derived by using SPSS 7.5 version.

5. Analysis and Discussion

In This factor loading matrix identified 13 major dimensions with a total percentage of 73.40. The first dimension is the patients access to primary health care. That explained a total variance 12.62 with an Eigen value of 4.2 and this is designated as the primary dimension of the study. That first

ten factors explained more than 64.08 percent of total variance the remaining three factors explained only 9.32 percent of the total variance. The second factor with an Eigen value of 3.78 and explained a total variance of 8.52. Factor loading represented in the table show the variable

with their respecting loading. The variance is accounted by each parameter with respect to all factor (Table1). The primary dimension and each factor dimension show only the variables significant their respecting factor.

Table 1: Factor Solution: The Eigen Value and percentage of Total variance explained by each of eight factors

Dimension	Factors Name	Eigen Value	Percentage of variable	Cumulative Percentage
I	Patient's access to PHC	4.92	12.62	12.62
II	Socio-Economic conditions of Respondents	3.78	9.70	22.32
III	Disease and treatment	3.32	8.52	30.84
IV	Determinants of socio cultural factors	2.49	6.38	37.23
V	Residence and health centre	2.17	5.56	42.79
VI	Health centre and disease	1.95	5.00	47.78
VII	PHC Facilities	1.88	4.82	52.60
VIII	Economic condition and health care centre	1.57	4.03	56.63
IX	Source of PHC avail	1.54	3.95	60.59
X	Morbidity and gender ratio	1.36	3.49	64.08
XI	Gender health and illness of the patients	1.31	3.35	67.42
XII	Education and Occupational status	1.21	3.09	70.52
XIII	Awareness of health care centre	1.12	2.88	73.40

5.1 Dimension I: Patient's access to PHC

The first dimension explains patients access to PHC, and various other related factors with an Eigen value at 4.92 percent. The high positive factors explained by occupational status (0.70). In this area occurs most of working people, disposal waste was (0.56), Types of house (0.50), its depend on the diseases. Then other problems of follow habits (0.47), depends non-communicable diseases. The visiting PHC (0.47), because in this area occurs higher population. Hence mostly near primary health centre available. Doctor relaxation timing (0.40), most of the Doctor other staff available in this area. Hence patients access was good. Age (-0.66), became most of youngsters available in this area, so last 3 Month spend treatment (-0.53), was low patients' opinion (-0.53) general health was (-0.50), finally PHC access was good.

5.2 Dimension II: Socio-Economic conditions of Respondents

The second dimension explains socio economic conditions of the respondents with an Eigen value of 3.78 percent (Table 6.3). The high positive factors explained by Religion (0.59), Hindu are majority in Madurai district. Family size (0.58), majority of peoples lived at rural areas. Mother tongue and emerging health facilities are (0.47), available in the study area. Water sources are (0.41) and family size (0.41), available (0.38), monthly income (0.36) and PHC waiting time for treatment (0.31). Negative factor loading are PHC night time access (-0.51), because low staff availability. Diseases affected (-0.51) was low because they good facilities and water sources etc. Gender (-0.32), Mostly respondents are male, habits (-0.32). They have not more bad habits like drinking, smoking etc.

5.3 Dimension III: Disease and treatment

The third dimension explains types of family and private hospitals, with an Eigen value of 3.32 (Table) The high positive factor are, PHC reasons for people's choice for private PHC (0.79%) because, private hospitals have a lots of facilities, cleanness, Individual caring, Infrastructure was good, so they mostly visited private hospitals, and doctor access night time to PHC (0.79) because staff availability

was high family size (0.39) They poor are medium incomes families but they choose private hospitals opinion (0.31%), because good infrastructure and individual caring, money spend for the treatment last 3 months (0.31%) for the primary diseases affection, example fever, pregnancy treatment etc. The negative factors are emergency facilities of health care(-0.57) because that's PHC so primary services are only available in this area, mosquito affected (-0.57), That area have a high in water sources, so mosquito mostly available and affected in this area, and other kind of diseases (-0.35), like, malaria, Dengue, other emerging disease. Kind of facilities was (-0.46%), in this area.

5.4 Dimension IV: Determinants of socio cultural factors

The fourth dimension explains determinants of socio cultural factors. With an Eigen value of 2.49 to a total variance of 6.38 percent. We find the positive factor loading martial status (0.47) money spend for transport (0.33%), drinking water sources are (0.33%) and doctors relation (0.30%) negative factor loading are Income (-0.43), They are mostly in married but income status was low, communicable diseases affected (-0.42%) Doctor night time access low (-0.42%) because over workload to come to duty delay, and access level low, mother tongue (-0.38), because Madurai district is highly popular district in India, so many of Indian live in this district, they have lot of languages speech peoples live in that city area Age (-0.34), Religion (-0.32) Madurai district have a so money regions, like Hindu, Muslim and Christian etc. Patients reach to health centre from house (-0.32).

5.5 Dimension V: Residence and health centre

The Fifth dimension, residence and healthcare centre, factors with an Eigen value of 2.17. We find to a total variance of 5.56. We find the positive factor loading how get disease, cender (0.41%) and type of family (0.39) like smoking causes cancer etc. Long illness (0.33%) morbidity patients like diabetes, high blood pressure, near diseases, COVID-19, HIV. The negative factors are, mode of transport used to reach. The health centre (-0.41%) male patients mostly used in two wheelers, female are bus, or auto and times recurring to reach the health centers (-0.44)

money spend for transport (-0.36), in this area highly accessible so transport cost was low.

5.6 Dimension VI: Health centre and disease

The sixth dimension explains, diseases and health centers. Factors with an Eigen value at 1.95 to a total variance at 5.00. We find the positive factor loading, money spend for transport (0.51%), suffer long illness (0.54%) like high blood pressure COVID-19, near by PHC to residence (0.35%), Its accessible. Morbidity (0.34%), long illness is called morbidity like, pressure COVID-19, HIV. Negative factors are types of medical system (-0.50%), because it's a PHC, so primary needs only available bed availability (-0.44%), only fever, other primary diseases affect and pregnancy women's available for beds, so it's a minor problem faced by PHC'S.

5.7 Dimension VII: PHC Facilities

The seventh dimension explains, primary health care facilities, factors with an Eigen value of 1.88 to a total variance of 4.82. We find the positive factor loading morbidity (0.45%), in last 3 month affected peoples and health care centre facilities opinion (.40%), its an good opinion, because in this area have a good PHC'S availability reason for people preferring private PHC'S (0.40%), because bed availability low. Money spend for the transport (-0.39%), Doctors access to PHC (0.39%), negative factor loading are money spend on transport (-0.30%).

5.8 Dimension VIII: Economic condition and health care centre

The Eighth dimension explains Economic conditions and health care centers, factors with an Eigen value of 1.57 to a total variance of 4.30. We find the positive factor loading time required to residence to PHC (0.40%), types of medical system they prepared (0.40%), like bed's availability, opinion more the medical staff etc. waiting time (0.39%), and medical status (0.39%), most of the married women's like to PHC'S. The negative factor loading income level (-0.30%), so most of people visit government PHC'S.

5.9 Dimension IX: Source of PHC avail

The Ninth dimension explains, source of PHC avail, factors with an Eigen value of 1.54 to a total variance 3.95. We find the positive factor loading emergence health facility (0.35%), availably in PHC, and mosquito affected diseases (0.35%), night time access (0.30%), available private hospital preparing (0.30%), because doctors availability and other staff availability, Infrastructure was good the negative factor loading bed availability (-0.40%), and opinion PHC was (-0.40%), transport amount spend last 3 months (-0.40%), because PHC availability to access.

5.10 Dimension X: Morbidity and gender ratio

The tenth dimension explains, diseases and gender ratio, factors with an Eigen value of 1.36 to a total variance of 3.49. We find the positive loading gender (0.34%), and religion (0.34%), in this study area religions district, most of the religions like in this area, different types of festivals, culture, avail that area. The negative factor loading. Educational status (-0.40%), because most PHC receivers are low educated people. Most visited gender are female, morbidity last 3 months (-0.38%), currently affected

diseases are COVID-19, but its low affection comparing to other districts health care center near (-0.34%), because its, big area so availability was low.

5.11 Dimension XI: Gender health and illness of the patients

The eleventh dimension explains, general health and illness other patients, factors with an Eigen value of 1.31, to a total variance of 3.35. We find the positive factor loading, present general health (0.39%), and kind of diseases affect (0.39%), suffer above illness (0.33%), in this area PHC facilities was good.

5.12 Dimension XII: Education and Occupational status

The twelfth dimension explains, Education and occupational status. Factors with an Eigen value of 1.21 to a total variance of 3.09. We find the positive factor loading education status (0.52%), occupation (0.34%), martial status (0.34%), The negative factors loading education and occupation was high, so that people more aware to PHC and facilities so they prepare for private PHC'S.

5.13 Dimension XIII: Awareness of health care center

The thirteen dimension explains, awareness of health care center factors with an Eigen value of 1.12 to a total variance of 2.88. We find the positive factor loading time require to reach health centre from residence (0.37%), was good most of the female patients near health centre (0.38%), highly accessible to travel PHC in this area. The negative factor loading disposed waste (-0.41%).

6. Conclusion

In this study reveals the accessibility of health care facility is satisfactory. Awareness of various diseases is low among poor people in the study area who need more health education. Health education is poor in the study area because the post of health educator is vacant in 13 blocks. Full strength of medical personal has impact in this study. Poor personal hygiene cause more disease. The family size in the study area is that majority are joint family, which lead to poor nutrition, body mass index, etc. and a factor for morbidity. The patients who live nearest to the health center are more likely to use the services in an efficient manner.

It the centers are provided with adequate number of health services and infrastructure facility as well as health man power resources and good transportation. Them the PHC are bound to be used in an efficient manner.

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8. Ethical approval

Ethical approval not required. This article does not contain any studies with human participants or animals performed by any of the authors.

9. Conflict of Interest

On behalf of co-authors, the corresponding author states that there is no conflict of interest.

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