

Patient's Satisfaction with Primary Healthcare Services and Its Link to Socio-Economic Conditions in Madurai District

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Abstract

This study explores the socio-demographic characteristics, healthcare access, and patient satisfaction in Madurai district. Using a combination of GIS mapping, Z-score statistical analysis, and primary and secondary data, the research investigates the spatial distribution and accessibility of primary healthcare centers (PHCs) across urban and rural regions. Stratified random sampling was employed to collect 260 questionnaire responses, which were analyzed to assess socio-economic diversity, satisfaction with medical services, and transportation metrics. The results highlight disparities in healthcare access, with dominant groups including males, middle-aged individuals, and farmers. High patient satisfaction levels and moderate accessibility were observed, with most respondents travelling less than 30 minutes to health facilities. However, underrepresentation of college-educated individuals, high-income earners, and minority communities underscores areas requiring policy attention. The study offers critical insights into healthcare dynamics and emphasizes the need for targeted interventions to improve equity and accessibility in health services.

Key Words; Socio-Economic, PHC, Patient satisfaction, GIS, Z-score.

Introduction

Health services play a crucial role as essential social services, forming part of a broader system designed to support both individual and societal goals. According to the WHO Constitution, health is a fundamental dimension of socio-economic development (WHO). Primary Health Care (PHC) addresses diverse determinants of health by integrating physical, mental, and social well-being into a cohesive framework [1]. This approach emphasizes practical, scientifically validated, and socially acceptable methodologies and technologies. A conceptual framework examines consumer interactions and behaviors within health systems, highlighting the importance of micro-level control measures [2-4]. Studies have analyzed the spatial distribution of healthcare facilities and behavior patterns across different demographics, including age and sex groups [5-13]. Challenges such as limited availability of healthcare services, low perceived quality, and geographic and economic barriers often force individuals to travel for care [14-18]. GIS has emerged as an effective tool for supporting spatial decision-making in public health, enabling advanced analytical approaches for healthcare planning [19-23]. For rural and underserved areas, addressing primary care workforce shortages and optimizing the planning of human and physical resources is vital [24-25].

Objectives

To analyze socio-demographic characteristics in Madurai district, focusing on factors such as gender, age, education, occupation, and economic status. To assess patient satisfaction levels with healthcare services, including factors such as quality of care, transportation availability, and costs.

Study Area

Madurai, the oldest historical city in Tamil Nadu, is a prominent centre located in the heart of southern Tamil Nadu, India. This district, encompassing both urban and rural regions, is characterized by its semi-urban features. (Fig 1).According to the 2011 Census, Madurai has a total population of 30, 38,252 of which 15, 26,475 were male and 15, 11,777 female making it the 118th largest district in the country by population and the 13th highest in the state by literacy rate. Spanning an area of 3741.73 sq.km the district. At the block level, approximately 60-75% of the rural population has access to a healthcare center within a 5-kilometer radius. This accessibility, coupled with the district's diverse demographic composition, makes Madurai a significant area for studying healthcare access and patient satisfaction, with satisfaction levels evaluated based on district averages

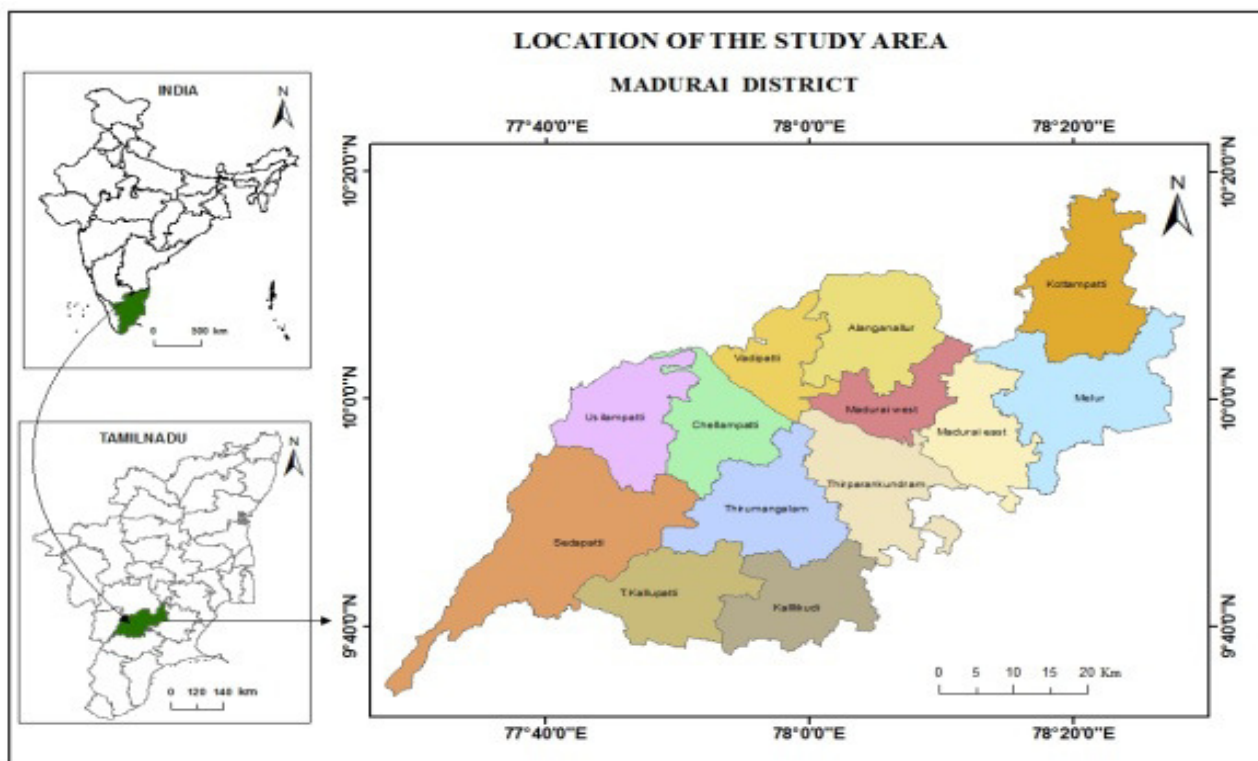


Fig 1 Location of the study area

Data base and methodology

The study examines healthcare access, patient satisfaction, and socio-demographic characteristics in Madurai district using geospatial and statistical approaches, leveraging both primary and secondary data sources for a comprehensive analysis. Primary data were collected through a stratified random sampling method, comprising 260 questionnaire responses that covered socio-demographic attributes, healthcare preferences, satisfaction levels, transportation modes, and associated costs. Secondary data were sourced from district health office records, census handbooks, and other relevant government documents, providing additional context through medical and demographic statistics. Geospatial tools, including GIS and GPS, were employed to analyze the spatial distribution of Primary Healthcare Centers (PHCs), map accessibility, and estimate travel distances to healthcare facilities. Z-scores were calculated to assess the relationship between observed variables, such as gender, age, education, and income, and their respective means. Quantitative analysis involved statistical summaries to identify patterns and variations among socio-demographic groups, while geospatial analysis visualized healthcare accessibility for rural and urban populations. Madurai district, characterized by its mix of urban and rural regions, served as the study area, with 60-75% of the rural population reportedly accessing health centers within a 5-kilometer radius. This integrated methodology provides a robust framework for evaluating healthcare

access, satisfaction, and disparities in representation across socio-demographic groups in the district.

$$z = \frac{x - \mu}{\sigma}$$

where μ (mu) and σ (sigma) are the mean and standard deviation of the population.

Result and discussion

The Socio – Economic conditions of the patients in Madurai district

The socio- economic conditions of the respondent are collected through primary survey by administering a Questionnaire. The socio-economic conditions considered in the present study are the age, sex, mother tongue, religion, educational status, marital status, family size, occupation and income.(Table 1). The study presents a detailed analysis of various socio-demographic factors influencing healthcare utilization in Madurai district. Age is a significant determinant, with respondents under 20 years showing the highest utilization of health services (25%), while those aged 40-49 years exhibit the lowest utilization (11%). Z-scores indicate that age groups under 20 years are closer to the average, except for the 40-49 and 50-59 age groups, which are slightly below average. In terms of gender, males constitute 53% of the respondents, with their healthcare usage being higher than that of females, who make up 46% of the respondents. Z-scores show a strong male representation, while the "Other" gender category is underrepresented.(Fig 2).

Economic status plays a crucial role, with the majority of respondents being agricultural workers (49%), followed by farmers (40%). Z-scores reflect that farmers and agricultural laborers have above-average representation, while government-employed, self-employed, and unemployed respondents fall below the average. The income distribution indicates that the majority of respondents fall within the middle-income group, particularly those earning between Rs 10,000-20,000 (46%) and Rs 20,000-30,000 (42%). Z-scores highlight that the middle-income brackets dominate, while those earning less than Rs 10,000 and more than Rs 30,000 are underrepresented. (Fig 2). Social factors such as religion and marital status also impact healthcare access. The majority of respondents (76%) identify as Hindu, followed by Muslims (13%) and Christians (10%). Z-scores show that Hindus are highly overrepresented, while other religions are below average.

Regarding marital status, 63% of respondents are married, and Z-scores show a high overrepresentation of married individuals. The housing conditions in the study area reveal a rural setting, with 28% living in mud houses and 25% in huts. Family size is also relevant, with 48% of respondents having 2 to 4

members in their household, and the rest falling into larger family categories. Z-scores indicate that smaller and larger families are less common. Educational status reveals a significant variation in healthcare utilization, with 45% of respondents being uneducated, 28% having primary education, and 25% having secondary education.

Z-scores indicate that illiterates and those with primary education are above the mean, while those with college education are significantly underrepresented. These socio-demographic factors, including age, gender, economic status, religion, housing, and education, play an important role in shaping healthcare access and utilization patterns in the region. The survey revealed that a significant percentage of respondents live in polluted surroundings, with 44% in polluted areas and 56% in non-polluted ones.(Fig 2). The cleanliness measures of the environment were also questioned, with 81% of respondents having proper sanitary and toilet facilities, while 19% were devoid of such facilities. This highlights the importance of maintaining cleanliness in the environment for overall health.

Table 1: A sample of the patients' characteristics (n = 260) Field Work as the source.

Variable	Response	Count	Percentage	Z Score
Gender	Male	137	53	1.49
	Female	120	46	1.13
	Other	3	1	-1.24
Age	<20	65	25	0.02
	20-39	73	28	0.18
	40-49	29	11	-0.71
	50-59	44	17	-0.40
	>60	49	19	-0.29
Education status	Illiterate	117	45	1.07
	Primary School	72	28	0.18
	Secondary School	65	25	0.02
	College	3	1	-1.24
	Others	3	1	-1.24
Occupation	Farmer	104	40	0.81
	Agricultural Laboures	78	30	0.29
	Govt. Employed	16	6	-0.97
	Private Employed	31	12	-0.66
	Self Employed	13	5	-1.03
	Un employed	18	7	-0.92
Income Level	<10000	28	10	-0.71
	10000-20000	119	46	1.13
	20000-30000	108	42	0.92
	>30000	5	2	-1.18
Religion Category	Hindu	198	76	2.70
	Christian	26	10	-0.76
	Muslim	34	13	-0.61
	Others	2	1	-1.24
Marital status	Married	164	63	2.02
	Unmarried	57	22	-0.13
	Separated	18	7	-0.92
	Widow	21	8	-0.87
Types of Houses	Hut	65	25	0.02
	Mud	73	28	0.18
	Asbestos	57	22	-0.13
	Concrete	65	25	0.02

Size and types of family	Less than 2	31	12	-0.66
	2 to 4	125	48	1.23
	4 to 6	83	32	0.39
	More than 6	21	8	-0.87
Patients Satisfied with medical services	Very good	140	54	1.55
	Good	104	40	0.81
	Bad	16	6	-0.97
Mode of Transport	Bus	107	41	0.86
	Two Wheeler	39	15	-0.50
	Bicycle	26	10	-0.76
	Walk	88	34	0.50
Time taken to reach the health centre	>30 minutes	39	15	-0.50
	15-30	91	35	0.55
	10 to 15	91	35	0.55
	<10	39	15	-0.50
Money spent on Transportation	<5	26	10	-0.76
	5 to 10	200	77	2.76
	>10	34	13	-0.61
	Minimum	2	1	-
	Maximum	200	77	-
	Mean	63.77	24.54	-
	Standard Deviation	49.44	19.03	-

Source: Compiled by author

Patients Satisfaction with medical services

The medical services are meant for people who avail these facilities. (Fig 2). The level of satisfaction of the respondents about the health services provided by the government primary health care centers in Madurai district is given below (Table 1). About 54% have expressed that the services are very good, 40% have expressed that the services are good and 6% have expressed that it is bad. The patients belonging the north east and south east part of Madurai district (6%) are not satisfaction with the primary health care services. showing a generally positive response to medical services. Z-scores suggest that dissatisfaction ("Bad," -0.97) is minimal.

Travelling pattern of the patients

Nearness to the health centre

Distance is an important factor in the consumer travel pattern between separate locations thus affecting the spatial interaction of consumer who usually have their choice for shorter distance.

In the sample survey conducted in the study area, about 42% of the respondents reside near the primary health centre and about 49% reside near the sub-centre. Around 9% of the respondents reside near the dispensary.

Accessibility of primary health centre

The accessibility to the primary health centre is also a major aspect for the analysis. About 88% have high accessibility to the health centre and 12% have less accessibility to the health centre.

Time Taken To Reach Health Centre

Time taken to reach the health centre is important. People travel from long distance to take treatment in the health centre. The above table 1 shows the time taken to reach the health centre in the study area. About 15% of the respondents took more than 30 minutes to reach the health centre and 35 % of them were of the opinion that it took 15-30 minutes to reach the health centre. Around 35% of them needed 10-15 minutes and 15% of them reached the centre in less than 10 minutes. (Fig 2). Z-scores show longer (>30 minutes, -0.50) and shorter (<10 minutes, -0.50) travel times are less common.

Location of transportation Route

The study area is well connected to all the village panchayat roads. Almost all the respondents i.e., 100% of them were of the opinion that the villages are well connected to the health centre.

Mode of Transport

The mode of transport which people use to reach the health centre is an important aspect to be analyzed. About 41% of the respondents reach the health centre by bus and 15% reach by two wheeler (Table 1).10% of the respondents use bicycle to reach the health centre and 34% of the respondents reach the health centre by walk.(Fig 2). Z-scores indicate bus usage is above average, while bicycles (-0.76) and two-wheelers (-0.50) are below.

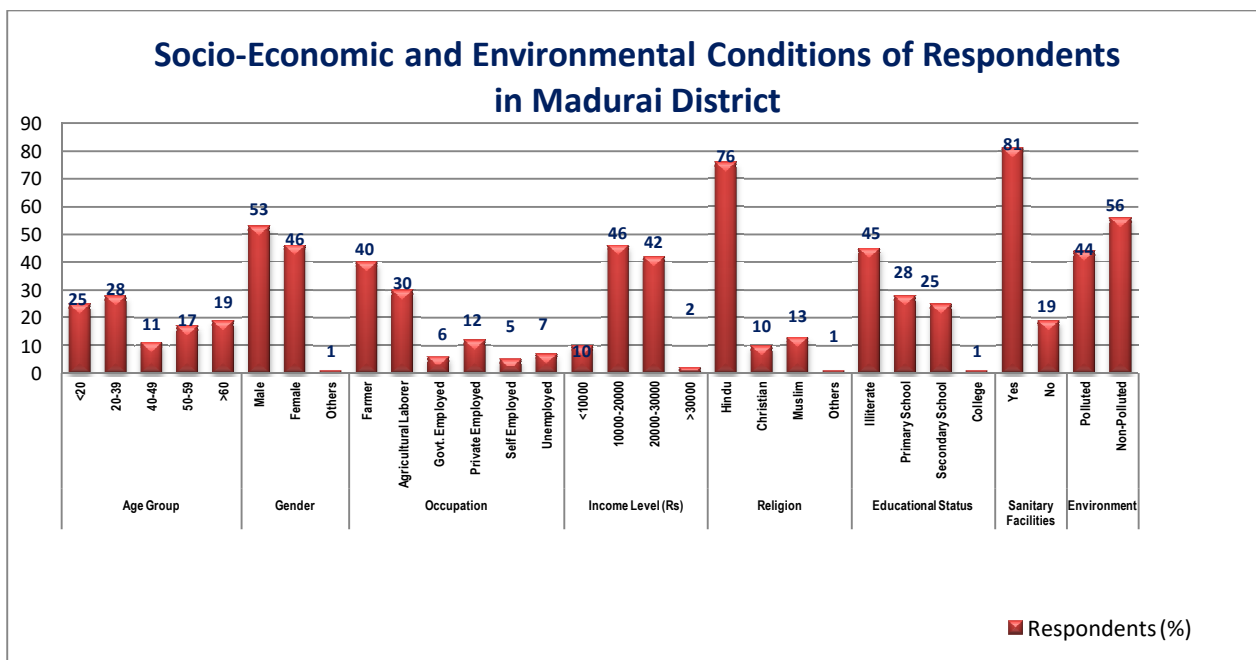


Fig 2 Socio-Economic and Environmental Conditions of Respondents in Madurai District

Money spent on Transportation

The average amount of money spent on transportation also varied considerably. More number of respondents reach the health centre by bus in micro level.(Table 1). (Fig 2). This analysis provides insights into socio-demographic characteristics and healthcare access dynamics in the surveyed population. Z-scores indicate higher expenses (>₹10, -0.61) and minimal costs (<₹5, -0.76) are rare. The mean response count is 63.77, with a standard deviation of 49.44. Most percentages cluster around 24.54% with a 19.03% standard deviation. This indicates variability in responses, particularly in gender, income, and patient satisfaction.

Conclusion

Summary of demographic, socio-economic characteristics, healthcare satisfaction, and transportation metrics for a surveyed population. Males (53%), middle-aged individuals (20-39 years), Hindus (76%), illiterates (45%), and farmers (40%) are the dominant groups. High satisfaction with healthcare services is evident, with 54% rating it as "very good." Healthcare access appears relatively good, as most respondents spend ₹5-10 on transportation and take 15-30 minutes to reach healthcare facilities. The mean response count is 63.77, with a standard deviation of 49.44. Most percentages cluster around 24.54% with a 19.03% standard deviation. This indicates variability in responses, particularly in gender, income, and patient satisfaction. However, underrepresented groups include college-educated individuals, high-income earners, government employees, and those from minority religions, highlighting disparities in representation. Overall, the survey reveals insights

into the socio-demographic landscape and healthcare dynamics, emphasizing accessibility and satisfaction among the majority, while identifying gaps in inclusion for specific groups.

Acknowledgment

The authors gratefully acknowledge the RUSA-Phase (Rashtriya Uchcharat Shiksha Abiyan Ref MKU/RUSA/RP/Sanction Order/ 2020). Department of Earth and atmospheric science, Madurai Kamaraj University, Madurai, 625021 for their financial support in carrying out the publishing of this research work.

Ethical Approval

Ethical approval not required.

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