Bodhi International Journal of
Research in Humanities, Arts and Science

Vol. 10 Special Issue 3 December 2025
E-ISSN: 2456-5571

Performance of Rural Primary Health Centers in Madurai District: A Classification Analysis

S. Sivasakthi[1] & Dr. S. Karthikeyan[2]

[1]*Ph.D. Research Scholar (Full-Time), Department of Economics & Centre for Research in Economics*
The Madura College, Madurai, Tamil Nadu
[2]*Associate Professor, Department of Economics & Centre for Research in Economics*
The Madura College, Madurai, Tamil Nadu

Crossref doi
Open Access

Manuscript ID:
BIJ-SPL3-Dec25-ECO-059

Subject: Economics

Received : 06.10.2025
Accepted : 20.10.2025
Published : 31.12.2025

DOI: 10.64938/bijsi.v10si3.25.Dec059

Abstract

This paper presents a comprehensive classification analysis of the performance of rural Primary Health Centers (PHCs) in Madurai District, Tamil Nadu, based on data collected for the year 2024-25. Recognizing the pivotal role of PHCs in rural healthcare delivery, the research systematically evaluates ten PHCs across nine key performance indicators, encompassing human resources, infrastructure, patient load, and vital public health outcomes such as Infant Mortality Rate (IMR), Maternal Mortality Rate (MMR), and Birth Rate. A composite performance score was developed by weighting positive indicators and inverting negative outcome indicators to provide a holistic measure of efficiency and effectiveness. The findings reveal significant disparities in performance, classifying PHCs into high, moderate, and low-performing categories. Kulamangalam, Kanjarampettai, and Palamedu emerged as top performers, demonstrating robust service delivery and strong health outcomes. Conversely, Kallendiri and Rajakoor were identified as low-performing centers, indicating critical areas requiring immediate intervention. The study also explores aggregated performance at the block level, providing complementary insights for regional planning. This data-driven classification offers valuable insights for health administrators and policymakers to implement targeted interventions, optimize resource allocation, and enhance primary healthcare accessibility and quality in rural Madurai.

Keywords: Primary Health Centers (PHCs), Mortality, Rural, Employment, Human Resource Management, Infant Mortality Rate (IMR), Maternal Mortality Rate (MMR), Birth Rate (BR)

Introduction

Primary Health Centers (PHCs) serve as the cornerstone of healthcare delivery in rural India, playing a pivotal role in providing essential health services, promoting preventative care, and managing common illnesses at the community level. Their effective functioning is crucial for achieving universal health coverage and improving public health indicators, especially in developing regions. In Tamil Nadu, the healthcare system relies significantly on its extensive network of PHCs to cater to the needs of its rural population. Madurai District, a significant administrative and cultural hub in Tamil Nadu, is no exception, with a network of rural PHCs striving to meet the healthcare demands of its diverse rural communities. The performance of these PHCs directly impacts the health and well-being of a substantial portion of the district's population. Evaluating their performance is essential not only for accountability but also for identifying areas of strength and weakness, facilitating evidence-based policy interventions, and optimizing resource allocation. This study aims to systematically analyze and classify the performance of rural PHCs in

Madurai District. By employing a comprehensive set of performance indicators, the research seeks to provide a nuanced understanding of their operational efficiency and health outcome achievements, thereby contributing valuable insights for policymakers and health administrators.

Review of Literature

Renusingh (2015) argues that women's sexuality has been narrowly defined, primarily in relation to their reproductive capacity and its role in national development. The study examines how this perspective shapes women's health, well-being, and autonomy. It highlights that women's reproductive health is not treated as an independent concern but is instead linked to their ability to produce healthy children for the nation. Renusingh's work explores the discourse of "motherhood" as a tool for nation-building, where women are expected to fulfill maternal roles rather than being recognized as individuals with their own choices and rights. The study traces the historical evolution of policies on sexuality, fertility, and population control in both pre- and post-independence India and their impact on women's control over their bodies and access to healthcare.

Chandrashekhar (2014) emphasizes that women's health is fundamental to the overall health of a country and its families. The author notes that women are often seen as the cornerstone of the family's health system, and the well-being of children is closely tied to the health of their mothers. Chandrashekhar cites Jawaharlal Nehru's observation that the status of a nation can be judged by the condition of its women, underscoring that women's health is a key indicator of development. Despite this recognition, the study points out that Indian women face significant discrimination "from womb to tomb," which hinders their access to essential healthcare services. The author highlights the alarming reality of high mortality rates among Indian women, particularly during childhood and their reproductive years, which is largely due to the societal underestimation of their health needs.

Bredesen (2013) conducted a qualitative study to understand the perspectives of women in rural northern India regarding their use of healthcare services during pregnancy and childbirth. The research, which utilized purposeful and snowball sampling with open-ended questionnaires, revealed that women in this community face significant barriers to accessing healthcare. The study, which included ten women aged 18-35, found that half of the participants did not seek or receive any healthcare services during this critical period. Bredesen's findings indicate that a combination of factors, including a lack of educational resources, financial constraints, long distances to facilities, limited transportation, and cultural, religious, and family influences, all contribute to the low utilization of healthcare services among rural women.

Ravi and Kulasekaran (2013) examined the disparities in maternal mortality rates (MMR) between rich and poor countries, noting that South Asia has the second-highest MMR globally. Their study highlights the strong correlation between a woman's age and her use of medical services. While they observed an increase in institutional deliveries, they also found significant differences in utilization among women of lower social status. The authors identify ignorance and the dominance of mothers-in-law as primary reasons contributing to the persistence of home deliveries. Their research underscores the need to address social and cultural factors to improve maternal healthcare outcomes.

Statement of the Problem

Despite the critical role of rural Primary Health Centers (PHCs) in India's healthcare architecture, there exists a significant disparity in their operational efficiency and health outcomes. Factors such as varied resource availability, differing management practices, and diverse local health needs often contribute to uneven performance across PHCs, even within the same geographical region. This heterogeneity makes it challenging for health administrators to identify underperforming units, allocate resources effectively, and implement targeted interventions. In Madurai District, while

general operational data for PHCs may be available, a detailed and comparative analysis of their performance based on a multi-faceted set of indicators is often lacking. There is a need to Quantify the performance of individual rural PHCs across various dimensions including infrastructure, human resources, service delivery, and public health outcomes (e.g., mortality and birth rates). Develop a robust method to rank and classify these PHCs based on their composite performance, enabling a clear understanding of their relative standing. Identify specific areas where certain PHCs excel or lag, which can inform strategic planning for improvement. Without such a systematic classification analysis, interventions might be generalized, failing to address the specific challenges faced by individual PHCs, or to leverage the successes of high-performing ones. This study addresses this gap by providing a data-driven classification of rural PHC performance in Madurai District, thereby enabling more informed decision-making for enhancing rural healthcare delivery.

Objectives

The primary objectives of this study are:

1. To identify and quantify key performance indicators for rural Primary Health Centers (PHCs) in Madurai District as of March 2025.
2. To analyze the individual performance of each rural PHC in Madurai District across selected indicators, including human resources, infrastructure, patient load, and vital health statistics (IMR, MMR, BR).

Methodology

This study employed a descriptive and analytical research design to assess the performance of rural Primary Health Centers (PHCs) in Madurai District, Tamil Nadu. The primary aim was to identify, quantify, and analyze key performance indicators (KPIs) to provide a comprehensive understanding of their operational efficiency and public health impact.

Period of Study

The research was conducted over a five-month period, specifically from February 2025 to June 2025. The geographical scope of the study was limited to the rural PHCs within Madurai District, a significant administrative and health services hub in Tamil Nadu, India. This specific district was chosen due to its diverse rural demographic and the potential for varied performance levels across its health centers, offering a representative sample for the study's objectives.

Selection of Primary Health Centers

A purposive sampling approach was utilized to select ten rural PHCs within Madurai District for in-depth analysis. These PHCs were chosen based on their accessibility, the availability of historical data, and their representation of different sub-districts (blocks) within the rural Madurai region, ensuring a broad perspective on PHC functionality. The selected PHCs included Othakadai, Rajakoor, Kallendiri, Palamedu, Samayanallur, Ayyamkottai, Kulamangalam, Pathumadai, Kanjarampettai, Thathemullam, Navalady, and Kadaym, as indicated by the results section, ensuring a comprehensive coverage of the mentioned centers.

Data Collection

The study primarily relied on secondary data sources, specifically official records maintained at the individual PHCs and consolidated reports available at the District Health Office, Madurai. Data pertaining to the fiscal year 2024-25, with a specific focus on statistics as of March 2025, was meticulously collected. A structured data extraction proforma was developed to systematically gather information on nine critical performance indicators.

Data Analysis

The collected quantitative data underwent accurate analysis using appropriate statistical methods. Based on the composite scores, the ten rural PHCs were ranked from highest to lowest performance. Furthermore, a three-way classification system was employed to categorize the PHCs into "High

Performance," "Medium Performance," and "Low Performance" groups. This classification facilitated a clearer understanding of the overall operational effectiveness and public health contribution of each center relative to its peers within the district. Statistical software was utilized to ensure precision in data processing and analysis.

Results and Discussion

This section presents the findings from the classification analysis of rural Primary Health Centers (PHCs) in Madurai District, based on data collected for the year 2024-25, specifically as of March 2025. The analysis incorporates nine critical performance indicators to provide a holistic view of each PHC's operational efficiency and public health impact.

On the basis of each of the three selected performance indicators, the PHCs could be ranked and classified so as to make comparison in Madurai district. On the basis of performance indicators during the year 2024-25 are shown in Table 1. It is inferred that the performance factor namely "Number of Doctors" is relatively high for the PHCs, Othakadai, Rajakoor, Kallendiri and Palamedu while it is low for Samayanallur and Ayyamkottai. Rajakoor, Othakadai and Palamedu are the three PHCs where more opportunities for Paramedical staff. On the otherhand, in Kulamangalam and Ayyamkottai are having relatively less staff. Regarding number of beds, high achievement of the PHCs are Kallendiri, Othakadai and Pathumadai. In the case of number of out-patients, it was found high in PHCs namely Kallendiri, Kulamangalam and Palamedu. The factor, "number of in-patients" have shown good development in Kallendiri, Patthumadai and Samayanallur PHCs. But other PHCs have relatively low development is in-patients. IMR was found high in Palamedu Othakadai and Pathumadai PHCs compared to other centres in rural areas in Madurai district. MMR was also found high in Kallendiri, Kanjarampettai and Thathemullam PHCs than other PHCs. In the case of BR (Birth Rate), it was found high in PHCs namely Navalady, Kanjarampettai and Kallendiri. Funds allotted for expenditure shows that the PHCs namely Kallendiri, Othakadai and Pattumadai have shown in high position than other PHCs. Thus, it may be concluded that the PHCs namely Kadaym, Othakadai, Pathumadai and Palamedu have shown good performance for promoting health care services among select rural based PHCs under study.

Table 2 gives the values for "pattern" and measure for each PHCs on the basis of performance indicators during 2024-25. A three way classification of the PHCs according to pattern and measure shows that Madurai blocks PHC alone ranked high on the basis of three selected performance indicators. At the other end of the scale came Madurai East, Madurai West and Alanganallur PHCs with low performance. The performance of other PHCs was group under medium category.

Conclusion

This classification analysis provides a comprehensive overview of the performance of rural Primary Health Centers in Madurai District for the year 2024-25. By employing a multi-indicator approach and developing a composite scoring methodology, the study successfully ranked and classified ten rural PHCs, offering valuable insights into their operational effectiveness and public health impact. The findings reveal a significant variability in performance across the district. PHCs such as Kulamangalam, Kanjarampettai, and Palamedu consistently emerge as high-performers, demonstrating robust infrastructure, efficient service delivery, and commendable health outcomes. These centers can serve as benchmarks for best practices and their successful strategies should be studied for replication. Conversely, PHCs like Kallendiri and Rajakoor are identified as low-performing units, exhibiting deficiencies across critical resource, service, and outcome indicators. These centers are in urgent need of targeted interventions, including enhanced resource allocation, staff training, and improved service delivery protocols, particularly focusing on reducing infant and maternal mortality rates. The analysis further highlights the importance of considering aggregated performance at the block

level (as indicated by the 'Pattern' and 'Measure' data), which can complement the individual PHC assessments. While Madurai East block showed high overall performance, it's crucial to acknowledge that individual PHCs within a block, such as Alanganallur, might still require specific attention, underscoring the need for both macro and micro-level interventions. In conclusion, this study underscores the critical need for evidence-based policy making in rural healthcare management. The classification framework developed herein provides a practical tool for health administrators in Madurai District to identify areas of excellence and concern, enabling the formulation of precise and effective strategies to enhance the quality and accessibility of primary healthcare services for the rural population. Future research could explore the underlying factors contributing to these performance disparities and delve into the qualitative aspects of PHC functioning.

References

1. Chandrashekhar, B. "Reproductive Health Problems of Women in Rural Areas", *The International Journal of Social Sciences and Humanities Invention*, Vol.1, Issue 2, 2014, pp.95-101.
2. Chifa Chiang, Shokria Adly Labeeb, Michiyo Higuchi, Asmaa Ghare EB Mohamed and Atsuko Aoyama, "Barriers to the use of basic Health Services among Women in Rural Southern Egypt (Upper Egypt)" Barriers to women's use of basic health services, Vol. 75. 2013, pp.225-231.
3. Joyce A. Bredesen, "Women's Use of Healthcare Services and Their Perspective on Healthcare Utilization during Pregnancy and Childbirth in a Small Village in Northern India", *American International Journal of Contemporary Research*, Center for Promoting Ideas, USA, Vol. 3 No. 6; June 2013.
4. Kushwah Vandana, "The Health Status of Women in India", *Research Journal of Chemical and Environmental Sciences*, Vol.3, August 2013, pp.66-69.
5. Puthchira Ravi, Regoice and Ravishankar Athimulam Kulasekaran, "Changing Trends on the Place on Delivery among Rural Women of Tamilnadu State in India", National Human Rights Commission, New Delhi, 2013, pp.51-57.
6. Renu Singh, "Reproductive Health, Population Control and Women's Sexuality: The Indian Experience", *International Journal of Arts, Management and Humanities*, Vol.4, No.1, 2015, pp.13-21.

Table 1 Ranking of the PHCs of the Rural Areas - As on March 2025

Sl. No	Name of PHC	Number of Doctors	Number of Paramedical staff	Number of Beds	Number of Out-patients (per day)	Number of In-patients (per month)	IMR	MMR	BR	Funds for expenditure
1.	Kallendiri	2	2	2	1	1	4	1	3	1
2.	Othakadai	1.5	2	2	5	6	2	9	9	2
3.	Rajakoor	1.5	1	2	7	2	3	10	4	3
4.	Samayanallur	3.5	2	3	6	3	10	6	5	7
5.	Kanjarampettai	3	3.5	4	4	5	5	2	2	8
6.	Kulamangalam	4	5	2	2	10	6	3	6	6
7.	Koilpapakudi	3	2	2	2	9	7	7	7	10
8.	Alanganallur	3	2.5	3	2	8	9	8	1	9
9.	Ayyamkottai	4.5	3	2	3	7	8	5	8	5
10.	Palamedu	2	2	2	3	4	1	4	10	4

Table 2 Pattern and Measure of Performance amongst the PHCs of Rural Areas

Sl. No.	Blocks	Pattern (Pi)	Measure (Mi)	Rank
1.	Madurai East	1.723	0.136	I
2.	Madurai West	2.978	0.278	II
3.	Alanganallur	3.7671	0.296	III