COMPARATIVE ANALYSIS OF RURAL AND URBAN HUMAN RESOURCE HEALTH BUDGETS UNDER THE NATIONAL HEALTH MISSION IN TAMIL NADU

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Abstract

This article provides an in-depth comparative analysis of rural and urban health budgets under the National Health Mission (NHM) in Tamil Nadu from 2022 to 2026, focusing on 38 districts. The study examines budget trends, statistical variations, and correlations between rural and urban healthcare spending. The data reveals a steady increase in rural health investments, highlighting the government's strategic emphasis on strengthening rural healthcare infrastructure. In contrast, urban health budgets show notable fluctuations, indicating varying priorities and challenges in urban healthcare funding. Significant disparities between rural and urban health spending are identified, pointing to potential inequalities in resource distribution. The study emphasizes the need for targeted policy interventions to bridge these gaps and ensure equitable healthcare access across all regions. Recommendations are made to enhance urban healthcare investment while sustaining rural improvements, offering critical insights for policymakers seeking to optimize health resource allocation for balanced and effective healthcare delivery in Tamil Nadu.

Keywords: National Health Mission, Human Capital Management, Human Resource.

Introduction

Healthcare financing is a crucial determinant of health outcomes, particularly in developing countries like India, where access to healthcare services remains uneven across regions. The National Health Mission (NHM), launched by the Government of India, plays a pivotal role in addressing these disparities by allocating budgets for both rural and urban health system strengthening. Tamil Nadu, one of the leading states in healthcare performance, offers a valuable case for analysing the regional distribution of health budgets.

Tamil Nadu's diverse socio-economic and geographical landscape presents unique challenges in healthcare delivery. Rural areas often suffer from inadequate infrastructure, workforce shortages, and limited access to specialized care, while urban areas face issues related to overcrowding, resource allocation, and the rising burden of non-communicable diseases. Despite these challenges, the state's healthcare system strives to bridge the rural-urban gap, with the NHM playing a central role in budgetary allocations aimed at improving both primary and specialized care.

The period from 2022 to 2026 provides a significant timeframe for examining budgetary trends, particularly under the NHM, which seeks to address health inequalities by prioritizing rural healthcare investment while ensuring urban health systems are adequately funded. This comparative analysis focuses on budget allocations across Tamil Nadu's 38 districts, offering insights into how funds are distributed between rural and urban regions and how these allocations impact overall health system performance.

The study aims to analyse the trends in rural and urban health budgets, determine the statistical differences between these budgets, and explore correlations over the years. By doing so, it seeks to provide a comprehensive understanding of budgetary patterns under the NHM and their implications for healthcare delivery in both rural and urban settings. This research's findings can inform future health policy decisions, ensuring that budget allocations are optimized for addressing regional healthcare disparities.

With healthcare financing being critical to ensuring equitable access and improved health outcomes, this study offers valuable insights into how the NHM's financial support is shaping the healthcare landscape in Tamil Nadu, particularly the balance between rural and urban health systems.

Methodology

This study utilizes secondary data from official NHM budget documents for 38 districts in Tamil Nadu, covering both rural and urban health expenditures from 2022-2026. Descriptive statistics, including mean and standard deviation, are used to observe trends, while paired samples t-tests are applied to identify significant differences between rural and urban budgets. Correlation

analyses explore the relationship between rural and urban budget allocations. The study provides a statistical foundation to understand how the NHM budget evolves over time across these regions.

Table 1. District-Wise Distribution of Rural Human Resource Health Budgets

S.No	Districts	2022-23 Rural	2023-24 Rural	2024-25 Rural	2025-26 Rural
1	Ariyalur	1031.01	1096.94	1477.68	1495.46
2	Chengalpet	1021.86	1092	1583.87	1601.01
3	Chennai	3970.71	4122.71	3340.82	3385.25
4	Coimbatore	2281.25	2459.12	3247.63	3284.72
5	Cuddalore	2506.68	2752.19	3393.95	3434.39
6	Dindigul	2672.93	2872.82	3562.79	3606.08
7	Dharmapuri	1915.77	2041.8	2527.62	2558.03
8	Erode	2361.12	2563.28	3172.09	3209.17
9	Kallakurichi	1090.05	1182.33	1684.27	1782.68
10	Karur	1682.14	1802.55	2193.55	2220.14
11	Kanchipuram	1990.76	2127.12	2414.75	2445.38
12	Krishnagiri	2235.38	2407.06	2930.26	2965.97
13	Madurai	2547.02	2734.66	3389.22	3428.65
14	Mayiladuthurai	1762.62	1894.38	2072.57	2098.49
15	Nagapattinam	418.36	456.11	846.9	855.57
16	Kaniyakumari	1808.91	1963.6	2482.18	2510.42
17	Namakkal	2205.69	2394.45	2927	2962.28
18	Perambalur	1338.19	1418.03	1708.69	1730.76
19	Pudukottai	2596.48	2795.75	3385.74	3428
20	Ramnathapuram	2000.6	2118.27	2961.83	2997.34
21	Ranipet	823.11	829.58	1231.07	1243.95
22	Salem	3368.31	3585.12	4464.7	4517.94
23	Sivagangai	1946.3	2094.76	2635.59	2666.07
24	Tenkasi	1099.42	1181.58	1577.71	1595.8
25	Thanjavur	2541.01	2752.4	3327.36	3367.08
26	Theni	1596.04	1694.83	2012.13	2037.04

27	Thiruvallur	2615.35	2797.53	3361.7	3402.1
28	Thiruvarur	1750.82	1878.77	2320.41	2348.39
29	Tirupathur	747.39	794.62	1226.13	1239.59
30	Tiruppur	2359.57	2354.88	3053.92	3090.72
31	Tiruvannamalai	2968.72	3202.25	3961.37	4011.21
32	Tirunelveli	2400.95	2511.57	2985.75	3025.34
33	Trichy	2403.3	2584.89	3202.35	3242.3
34	Tuticorin	1892.99	1933.19	2593.5	2623.73
35	Udhagamandalam	1515.1	1621.76	2225.66	2252.1
36	Vellore	2530.69	2703.14	3013.5	3053.6
37	Villupuram	2822.36	3104.37	3783.3	3784.3
38	Virudhunagar	2311.94	2466.47	3226	3266.91
	Total	77130.9	82386.88	101505.56	102767.96

Source: National Health Mission, Tamil Nadu

Table 1 represents the rural health budget for Tamil Nadu shows a steady increase from ₹77,130.90 lakhs in 2022-23 to ₹102,767.96 lakhs in 2025-26, highlighting the state's commitment to strengthening healthcare infrastructure in rural areas. Key districts like Chennai, Coimbatore, and Salem receive higher allocations, with Salem peaking at ₹4,517.94 lakhs in 2025-26. Emerging areas such as Dharmapuri, Villupuram, and Virudhunagar also see significant budget increases. This trend reflects Tamil Nadu's strategic focus on enhancing rural healthcare services and improving accessibility and quality of care across all regions.

Table 2. One Sample T- Test Result for Rural Human Resource Health Budget 2022-2026

One-Sample Test

Test Value = 0

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
2022-23 Rural	2.050	38	.047	3955.43077	49.8099	7861.0516

2023-24 Rural	2.050	38	.047	4224.96821	53.2196	8396.7168
2024-25 Rural	2.051	38	.047	5205.41333	68.0989	10342.7278
2025-26 Rural	2.051	38	.047	5270.15179	69.0091	10471.2945

Table 2 represents the one-sample t-test results for rural health budgets from 2022 to 2026 indicating statistically significant increases in the budget allocations for each year. The test shows that the mean differences between the actual budget allocations and the test value of zero are positive, with a significance level of 0.047 for all years. This suggests that the rural health budgets have grown steadily over time. The mean differences range from 3,955.43 in 2022-23 to 5,270.15 in 2025-26, with confidence intervals indicating consistent increases in financial support for rural health systems across these years.

Table 3. District-Wise Distribution of Urban Human Resource Health Budgets

S.No	Districts	2022-23 Urban	2023-24 Urban	2024-25 Urban	2025-26 Urban
1	Ariyalur	86.25	86.25	1	1.01
2	Chengalpet	261.61	261.61	233.23	236.19
3	Chennai	3008.68	3222.76	3615.06	3660.98
4	Coimbatore	512.55	512.55	850.13	860.93
5	Cuddalore	311.73	311.73	135.33	137.05
6	Dindigul	259.91	259.91	180.12	182.41
7	Dharmapuri	185.1	185.1	29.27	29.64
8	Erode	271.92	371.92	337.04	341.32
9	Kallakurichi	171.11	171.11	26.02	26.35
10	Karur	135.02	135.02	117.89	119.39
11	Kanchipuram	116.76	116.76	109.13	110.52
12	Krishnagiri	227.98	227.98	182.93	185.25
13	Madurai	463.05	563.05	818.83	829.23
14	Mayiladuthurai	104.7	104.7	37.77	38.25
15	Nagapattinam	92.89	92.89	43.64	44.2
16	Kaniyakumari	229.24	229.24	921.4	122.94

17	Namakkal	211.07	311.07	182.19	184.51
18	Perambalur	64.65	64.65	28.23	28.59
19	Pudukottai	197.64	197.64	42.98	43.53
20	Ramnathapuram	165.75	165.75	82.12	83.16
21	Ranipet	137.42	137.42	79.34	80.35
22	Salem	511.69	511.69	521.41	528.03
23	Sivagangai	166.29	166.29	107.13	108.5
24	Tenkasi	163.26	163.26	129.38	131.03
25	Thanjavur	288.85	288.85	170.18	172.34
26	Theni	156.21	156.21	105.36	106.7
27	Thiruvallur	283.28	283.28	296.31	300.07
28	Thiruvarur	157.43	157.43	54.29	54.98
29	Tirupathur	135.35	135.35	135.04	136.75
30	Tiruppur	298.61	338.61	526.47	533.16
31	Tiruvannamalai	94.84	100.84	78.53	79.52
32	Tirunelveli	225.18	225.18	216.93	219.69
33	Trichy	625.96	625.96	496.13	502.43
34	Tuticorin	211.73	211.73	217.04	219.8
35	Udhagamandalam	97.5	97.5	66.22	67.07
36	Vellore	249.54	252.54	397.87	402.92
37	Villupuram	248.62	248.62	79.68	80.69
38	Virudhunagar	235.41	237.41	141.84	143.64
	Total	11364.78	11929.86	11793.46	11133.12

Source: National Health Mission, Tamil Nadu

Table 3 showcases the urban health budget allocations for various districts in Tamil Nadu from 2022-23 to 2025-26. The table highlights notable differences in allocations across districts, with major cities like Chennai, Coimbatore, and Trichy receiving consistently higher budgets compared to smaller districts like Perambalur, Nagapattinam, and Ranipet.

For instance, Chennai's budget grows from 3008.68 lakhs in 2022-23 to 3660.98 lakhs in 2025-26, reflecting the priority given to large metropolitan areas. Similarly, Coimbatore's urban health budget increases significantly, particularly from 2024-25 to 2025-26. However, some

districts like Kallakurichi and Dharmapuri show much smaller budget increases, indicating a focus on maintaining basic health services in these areas rather than large-scale expansions.

Overall, the budget data points to continued investment in urban health infrastructure, though the level of investment varies widely across districts based on their size, population, and healthcare needs. The data also reveals that certain districts experience marginal increases, while others see more significant growth, particularly in urbanized regions where healthcare demands are higher.

Table 4. One Sample T- Test Result for Urban Human Resource Health Budget 2022-2026

One-Sample Test

Test Value = 0

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
2022-23 Urban	3.935	37	.000	299.07316	145.0883	453.0580
2023-24 Urban	3.848	37	.000	313.94368	148.6553	479.2320
2024-25 Urban	3.198	37	.003	310.35421	113.6997	507.0087
2025-26 Urban	3.021	37	.005	292.97684	96.5079	489.4458

Table 4 represents the one-sample t-test results for urban health budgets from 2022 to 2026 revealing statistically significant increases in budget allocations for each year. With significance levels well below 0.05 for all years, the results suggest that the urban health budgets have consistently risen. The mean differences between the actual budget allocations and the test value of zero range from 299.07 in 2022-23 to 292.98 in 2025-26, indicating steady growth. The confidence intervals also support this, showing positive increases in financial support for urban health systems, reflecting a continued focus on improving urban healthcare.

Table 5. Paired Sample Test analysis of Rural Vs Urban Human Resource Health Budgets in Tamil Nadu

Paired Samples Test

| | | Paired Differences | | | | | | | Sig. (2-tailed) |
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | t | df | |
					Lower	Upper			
Pair 1	2022-23 Rural - 2022-23 Urban	1730.68737	624.85666	101.36513	1525.30210	1936.07264	17.074	37	.000
Pair 2	2023-24 Rural - 2023-24 Urban	1854.13211	679.71463	110.26427	1630.71546	2077.54875	16.815	37	.000
Pair 3	2024-25 Rural - 2024-25 Urban	2360.84474	892.54324	144.78963	2067.47307	2654.21640	16.305	37	.000
Pair 4	2025-26 Rural - 2025-26 Urban	2411.44316	890.00730	144.37825	2118.90504	2703.98128	16.702	37	.000

Table 5 represents the paired samples test analysis reveals significant differences in health budget allocations between rural and urban areas in Tamil Nadu across four consecutive years (2022-23 to 2025-26). The results indicate that, on average, rural areas consistently receive higher budget allocations than their urban counterparts. Specifically, in 2022-23, the mean difference in budget was 1730.69, which increased to 1854.13 in 2023-24, and further escalated to 2360.84 in 2024-25, reaching 2411.44 in 2025-26. Each of these differences is statistically significant, with p-values of .000, underscoring the robustness of the findings. The growing mean difference over the years suggests an increasing emphasis on funding for rural health initiatives under the National Health Mission, reflecting a strategic focus on addressing healthcare needs in less urbanized areas. This trend indicates a commitment to enhancing health infrastructure and services in rural regions,

which may contribute to reducing disparities in health outcomes between rural and urban populations.

Hypothesis Test Summary

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of 2022-23 Rural is the same across categories of Districts.	Independent-Samples Kruskal-Wallis Test	.469	Retain the null hypothesis.
2	The distribution of 2023-24 Rural is the same across categories of Districts.	Independent-Samples Kruskal-Wallis Test	.469	Retain the null hypothesis.
3	The distribution of 2024-25 Rural is the same across categories of Districts.	Independent-Samples Kruskal-Wallis Test	.469	Retain the null hypothesis.
4	The distribution of 2025-26 Rural is the same across categories of Districts.	Independent-Samples Kruskal-Wallis Test	.469	Retain the null hypothesis.
5	The distribution of 2022-23 Urban is the same across categories of Districts.	Independent-Samples Kruskal-Wallis Test	.469	Retain the null hypothesis.
6	The distribution of 2023-24 Urban is the same across categories of Districts.	Independent-Samples Kruskal-Wallis Test	.469	Retain the null hypothesis.
7	The distribution of 2024-25 Urban is the same across categories of Districts.	Independent-Samples Kruskal-Wallis Test	.469	Retain the null hypothesis.
8	The distribution of 2025-26 Urban is the same across categories of Districts.	Independent-Samples Kruskal-Wallis Test	.469	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Result and Discussion

Rural Health Budget Trends

 - Significant increase in rural health budgets from 77,130.9 lakhs in 2022-23 to 102,767.96 lakhs in 2025-26.

 - Reflects a strong commitment to improving healthcare infrastructure in rural areas.

Urban Health Budget Trends

 - Urban health budgets fluctuated, peaking at 11,929.86 lakhs in 2023-24 and declining to 11,133.12 lakhs by 2025-26.

- Indicates potential concerns about resource allocation in urban healthcare.

- Paired samples test revealed significant differences in funding between rural and urban areas for all four years analysed.

- Highlights focused efforts to address healthcare disparities in rural regions.

Policy Implications

- Increased rural investment aims to enhance access to care for underserved populations.

- Urban health budget decline raises questions about addressing urban healthcare challenges.

Recommendations

To ensure continued improvements in health human resource delivery, it is essential to sustain increased investment in rural health initiatives, prioritizing funding to enhance access and quality of care. A comprehensive review of urban healthcare needs is also critical, as recent data indicates a decline in funding; this should aim to identify and address areas requiring immediate attention. Developing integrated healthcare models that connect rural and urban services can facilitate continuity of care and optimize resource sharing. Additionally, focusing on health equity by implementing targeted policies for vulnerable populations will help bridge existing disparities. Investing in robust data collection systems is necessary for effective monitoring of health outcomes and informed decision-making. Strengthening community engagement in health program planning will ensure that local concerns and needs are adequately addressed. Encouraging public-private partnerships can further enhance healthcare delivery in underserved areas. Expanding training and development programs for healthcare professionals in both rural and urban contexts will help mitigate staffing shortages and improve service delivery. Regular evaluation and adaptation of health policies are vital to respond to emerging needs effectively, while awareness campaigns can educate communities about available services, encouraging greater utilization, especially in rural regions.

Conclusion

The analysis of healthcare human resource funding in Tamil Nadu reveals significant disparities between rural and urban districts, highlighting the need for targeted interventions. While rural areas show promising increases in investment, urban regions require urgent attention to prevent declines in service quality. The paired sample tests indicate that the differences in funding between rural and urban settings are statistically significant, emphasizing the necessity for strategic planning to enhance healthcare accessibility and equity. To address these challenges, a multifaceted approach is essential—one that prioritizes sustainable funding, fosters community engagement, and integrates services across rural and urban healthcare systems. By implementing these recommendations, Tamil Nadu can work towards a more equitable healthcare landscape, ultimately improving health outcomes for all citizens.

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