

Workforce Distribution and Maternal Service Utilization in Divisional Hospitals in Sri Lanka: District-Level Comparative Analysis

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Publication Date: 2026/06/22

Abstract:

➤ *Background*

Sri Lanka has achieved notable improvements in maternal health through a strong public healthcare system supported by skilled healthcare workers and extensive institutional coverage. Divisional Hospitals (DHs) play an important role in providing maternal health services, particularly in rural and semi-urban areas. However, variations in workforce distribution, infrastructure availability and service utilization across districts may affect the efficiency and equity of maternal healthcare delivery.

➤ *Objective*

To assess the distribution of healthcare workforce and its relationship with maternal service utilization in Divisional Hospitals in Sri Lanka through a district-level comparative analysis.

➤ *Methods*

A descriptive cross-sectional analytical study was conducted using secondary aggregated data from Divisional Hospitals across 26 districts and the National Institute of Health Sciences for the year 2025. Data included the number of Divisional Hospitals, Medical Officers, Nursing Officers, Supporting Staff, Midwives, Labour Rooms and institutional deliveries. Descriptive and comparative analyses were performed using Microsoft Excel. Key performance indicators, including deliveries per hospital, deliveries per midwife, deliveries per labour room and staff-to-hospital ratios, were calculated to evaluate workforce allocation and service utilization.

➤ *Results*

A total of 494 Divisional Hospitals, 1707 Medical Officers, 3019 Nursing Officers, 3909 Supporting Staff, 616 Midwives and 344 Labour Rooms were identified. Overall, 262 deliveries were reported during the study period. Kandy District recorded the highest number of deliveries (88), while several districts reported very low or no deliveries despite having healthcare personnel and labour room facilities. National averages were 0.53 deliveries per hospital, 0.43 deliveries per midwife and 0.76 deliveries per labour room. Considerable disparities were observed between districts, with evidence of underutilized resources in some areas and high service demand in others. The findings indicate a mismatch between workforce and infrastructure allocation and actual maternal service utilization.

➤ Conclusion

Significant district-level disparities exist in workforce distribution, maternal health infrastructure and service utilization within Sri Lanka's Divisional Hospitals. The low utilization of maternity services despite substantial resource availability suggests inefficiencies in resource allocation and possible bypassing of primary-level maternity care facilities. Strengthening evidence-based workforce planning, optimizing resource distribution and improving utilization of existing maternal health services are essential to enhance the efficiency and equity of maternal healthcare delivery.

Keywords: *Maternal Health Services, Divisional Hospitals, Health Workforce Distribution, Maternal Service Utilization, Midwives, Labour Rooms, Healthcare Resource Allocation.*

How to Cite: Chathurtha Seneviratne; H. M. N. Pushpa Kumari; Nadarasamoorthy Gandharupan; Eranda Senevirathna; Yathavan Selvarajan (2026) Workforce Distribution and Maternal Service Utilization in Divisional Hospitals in Sri Lanka:

District-Level Comparative Analysis. *International Journal of Innovative Science and Research Technology*, 11(6), 941-948. <https://doi.org/10.38124/ijisrt/26jun421>

I. INTRODUCTION

Sri Lanka's public health system has long been recognized as a model for achieving favorable maternal and child health outcomes within a resource-constrained setting. Since independence, the country has made substantial progress in reducing maternal mortality and improving access to institutional delivery services through a well-organized, government-led healthcare system. A key feature of this success has been the strong emphasis on preventive and primary healthcare services, supported by an extensive network of health institutions and a trained workforce, particularly in maternal care (1).

Divisional Hospitals (DHs) represent an important tier within Sri Lanka's healthcare delivery system, functioning as first-line curative care institutions that bridge primary care and higher-level referral hospitals. These hospitals play a crucial role in providing essential maternal health services, including antenatal care, delivery services, and postnatal care, particularly in semi-urban and rural settings. The availability of skilled health personnel such as medical officers, nursing officers, and midwives, along with infrastructure such as labour rooms, directly influences the capacity of these institutions to deliver safe and effective maternal healthcare services.

One of the defining strengths of Sri Lanka's maternal health achievements has been the establishment of a well-trained cadre of government midwives, which replaced traditional birth attendants early in the country's health system development. This policy decision has had a long-term impact on improving maternal and neonatal outcomes, contributing to high rates of institutional deliveries and skilled birth attendance (1). Public Health Midwives (PHMs) serve as frontline providers of maternal care, ensuring continuity of care from the community to healthcare institutions. Their role in antenatal, intrapartum, and postnatal care is widely recognized as a cornerstone of Sri Lanka's maternal health system.

Despite these achievements, disparities in healthcare resource allocation and service utilization remain an important concern. Variations in workforce distribution, infrastructure

availability, and service output across districts may lead to inefficiencies and inequities in service delivery. Studies have shown that even within Sri Lanka's relatively equitable health system, socioeconomic and geographic inequalities can influence access to maternal healthcare services. For instance, disparities in postnatal home visits by PHMs have been linked to socioeconomic factors, highlighting inequitable service distribution across different population groups (2).

Furthermore, the performance and effectiveness of maternal healthcare services are closely linked to the competencies and workload of healthcare providers. Research assessing the performance of PHMs has demonstrated that while overall knowledge levels in antenatal care are satisfactory, gaps exist in natal and postnatal care competencies, along with variations in service delivery practices (3). Additionally, job dissatisfaction and workload imbalances among healthcare workers may affect the quality and consistency of maternal care services. These findings suggest that workforce distribution alone is insufficient; the quality, training, and motivation of staff are equally critical in determining service outcomes.

Globally, the relationship between health workforce availability and service utilization has been widely studied, with evidence suggesting that adequate staffing levels and appropriate skill mix are essential for improving maternal health outcomes. In low- and middle-income countries, shortages or maldistribution of healthcare workers often result in underutilization of services in some regions and overburdening of facilities in others. Although Sri Lanka has largely overcome workforce shortages at the national level, district-level disparities may still persist, affecting the efficiency of service delivery.

In addition to human resources, the availability of infrastructure such as labour rooms is a key determinant of maternal service capacity. The number of functional labour rooms and their utilization rates reflect both the readiness of health institutions to provide delivery services and the demand for such services within a given population. A mismatch between infrastructure and service utilization—such as

underutilized labour rooms or overcrowded facilities—may indicate inefficiencies in resource allocation.

Given this context, there is a need for comprehensive analyses that examine both workforce distribution and service utilization across different regions. While previous studies have focused on specific aspects of maternal healthcare, such as midwifery services or community-based care, there is limited evidence on how multiple components—including staffing, infrastructure, and service outputs—interact at the institutional level, particularly within Divisional Hospitals.

This study aims to address this gap by conducting a district-level comparative analysis of workforce distribution and maternal service utilization in Divisional Hospitals in Sri Lanka. By examining key indicators such as the number of healthcare personnel, availability of labour rooms, and the number of deliveries conducted, this study seeks to identify patterns of resource allocation and utilization across districts. Such an analysis will provide valuable insights into the efficiency and equity of maternal healthcare service delivery and inform policy decisions aimed at optimizing resource distribution within the healthcare system.

II. JUSTIFICATION

The workforce distribution in Sri Lanka's divisional hospitals and its influence on maternal service utilization can be understood through a district-level comparative lens by integrating findings from relevant studies on maternal healthcare utilization, health workforce adequacy, and healthcare system factors in Sri Lanka and comparable contexts.

➤ *Workforce Distribution in Divisional Hospitals*

Divisional hospitals in Sri Lanka form a pivotal part of the public healthcare infrastructure, serving rural and semi-urban populations. According to a study assessing flood preparedness in government healthcare facilities, including 11 divisional hospitals in the Eastern Province, workforce shortages are a significant challenge. About 77.4% of surveyed respondents reported insufficient staff to maintain normal service delivery during disasters. Additionally, absenteeism during floods affected service availability considerably, and a gap in disaster management training was evident in many facilities (Farley et al., 2017).

This indicates that even in non-disaster times, divisional hospitals may struggle with adequate staffing, which can influence the capacity to provide quality maternal services. The lack of enough trained healthcare personnel — including medical officers, midwives, and nursing staff — creates bottlenecks in service delivery, especially in resource-constrained rural districts.

➤ *Maternal Service Utilization and Workforce Factors*

The utilization of maternal healthcare services is significantly influenced by health system factors, including workforce availability, facility readiness, and the distribution of skilled personnel. A study focusing on nine high-focus states in India, which face comparable challenges, revealed that district-level factors such as the average coverage of primary health centers, availability of labor rooms, and percentage of registered pregnancies strongly influence maternal service uptake. Community- and district-level resource availability plays a critical role beyond individual or household determinants (Singh et al., 2013).

In Sri Lanka, maternal mortality reduction has been remarkably effective due to strategic investments in maternal health, including deploying professionally trained midwives and strengthening health infrastructure. This is particularly emphasized in a comparative study of Sri Lanka and Malaysia, which credits such workforce-related health system developments to declining maternal mortality rates (De Silva et al., 2002).

Moreover, client satisfaction with hospital-based perinatal care in Sri Lanka varies significantly by facility level. Mothers generally report higher satisfaction in lower-level hospitals, which possibly have more personalized care and better patient-provider relationships. However, these lower-level facilities may lack the full range of resources and skilled personnel typically available in higher-level hospitals (Senarath et al., 2006). Hence, workforce distribution must balance quality, accessibility, and patient-centeredness.

➤ *District-Level Comparative Aspects*

Regional and district disparities in workforce distribution and maternal health service utilization are evident. Socioeconomic and ethnic factors, along with healthcare supply differences, affect access and utilization patterns. For instance, a study on healthcare utilization in Sri Lanka showed that wealthier individuals tend to prefer private healthcare despite universal public healthcare coverage, indicating supply-side and preference-driven inequities (Pallegedara & Grimm, 2017). Such patterns may also apply to maternal health services, where districts with a more robust workforce and better-equipped divisional hospitals likely experience higher utilization rates.

Furthermore, areas with inadequate staffing, lack of essential equipment (including functional labor rooms), and insufficient training hinder continuous maternal care, especially in emergencies or during disaster periods (Farley et al., 2017).

Strengthening Workforce Capacity: Enhancing the number and skill mix of health workers, including midwives and medical officers specialized in maternal care, in divisional hospitals is critical to ensuring skilled attendance at birth and quality antenatal/postnatal services. **Training and Continuous Professional Development:** Regular training on maternal health, emergency obstetric care, and disaster preparedness for

healthcare workers at divisional hospitals should be prioritized to maintain service quality even during crises (Farley et al., 2017). District-Level Health System Strengthening: Improved allocation and management of human resources for health that consider district-level needs and disparities will promote more equitable maternal service utilization, similar to lessons learned from high-focus regions in India (Singh et al., 2013). Enhancing Patient Satisfaction and Facility Readiness: Investments to upgrade maternity units in lower-level hospitals, ensuring they are adequately staffed and equipped, can improve women's satisfaction and encourage utilization of local maternal services (Senarath et al., 2006).

Addressing Socioeconomic and Regional Inequities: Policymakers should target underserved districts with tailored workforce deployment models and community engagement to reduce ethnic and economic disparities affecting maternal health service access (Pallegedara & Grimm, 2017). A district-level comparative analysis of workforce distribution in Sri Lanka's divisional hospitals underscores a direct link between human resource availability and maternal service utilization. Ensuring adequate, equitably distributed, and well-trained maternal health workforce in divisional hospitals is fundamental for sustaining and improving maternal health outcomes across all districts of Sri Lanka. Attention to local workforce challenges, facility readiness, and community factors will collectively bolster maternal healthcare utilization and satisfaction, contributing to Sri Lanka's ongoing maternal mortality reduction success (De Silva et al., 2002; Farley et al., 2017; Senarath et al., 2006; Singh et al., 2013).

➤ *General Objective*

To assess the distribution of healthcare workforce and its relationship with maternal service utilization in Divisional Hospitals in Sri Lanka through a district-level comparative analysis.

➤ *Specific Objectives*

- To describe the distribution of Divisional Hospitals across districts in Sri Lanka.
- To assess the distribution of healthcare workforce in Divisional Hospitals by district, including:
 - ✓ Medical Officers
 - ✓ Nursing Officers
 - ✓ Supporting Staff (SKS)
 - ✓ Midwives
- To evaluate the availability of maternal health infrastructure in Divisional Hospitals, specifically the number of labour rooms across districts.
- To analyze maternal service utilization in Divisional Hospitals by comparing the number of deliveries conducted across districts.
- To calculate and compare key performance indicators across districts, including:
 - ✓ Deliveries per Divisional Hospital
 - ✓ Deliveries per Midwife

- ✓ Deliveries per Labour Room
- ✓ Staff-to-hospital ratios
- To identify district-level disparities in workforce distribution, infrastructure availability, and maternal service utilization and to assess potential mismatches between available resources and service output, identifying:
 - ✓ Underutilized districts (high resources, low deliveries)
 - ✓ Overburdened districts (low resources, high deliveries)

III. METHODOLOGY

➤ *Study Design*

This study employed a descriptive cross-sectional analytical design to assess workforce distribution and maternal service utilization in Divisional Hospitals (DHs) across Sri Lanka. The study used secondary, institution-level aggregated data to perform a district-level comparative analysis.

➤ *Study Setting and Scope*

The study was conducted across 26 administrative districts in Sri Lanka, including data from all Divisional Hospitals within each district. In addition, data from the National Institute of Health Sciences (NIHS) were included.

➤ *Study Population and Units of Analysis*

The unit of analysis was district-level aggregated data of Divisional Hospitals.

The study population included:

- All Divisional Hospitals within each district
- Healthcare workforce attached to these institutions
- Maternal health service outputs recorded within the study period that is year 2025

➤ *Data Sources and Data Collection*

Data for the study were obtained from administrative and institutional records compiled at district level. The dataset included the following variables for each district:

- Number of Divisional Hospitals
- Number of Medical Officers (MOs)
- Number of Nursing Officers (NOs)
- Number of Supporting Staff (SKS)
- Number of Midwives
- Number of Labour Rooms
- Number of Deliveries conducted

Data were extracted into a structured database (Microsoft Excel) and cross-checked for completeness and consistency prior to analysis.

➤ *Study Variables*

- *Independent Variables (Inputs)*
 - ✓ Number of Medical Officers
 - ✓ Number of Nursing Officers
 - ✓ Number of Supporting Staff

- ✓ Number of Midwives
- ✓ Number of Labour Rooms
- ✓ Number of Divisional Hospitals

- *Dependent Variable (Output)*
- ✓ Number of Deliveries conducted per district

➤ *Derived Indicators (Key Analytical Measures)*

To assess efficiency and utilization, the following indicators were calculated:

- Medical officers per DH – Total MOs/ Number of DHs
- Nursing officers per DH – Total Nos/Number of DHs
- Midwives per DH – Total Midwives/ numbers of DHs
- Deliveries per DH – Total deliveries/Number of DHs
- Deliveries per Midwife – Total deliveries/Number of Midwives
- Deliveries per labour room – Total deliveries/Number of labour rooms

These indicators were used to compare workforce distribution and service utilization across districts.

IV. DATA ANALYSIS

Data analysis was performed using Microsoft Excel.

The analysis included:

➤ *Descriptive Statistics*

- Frequencies and totals for all variables
- Means and ratios for derived indicators

➤ *Comparative Analysis*

District-level comparison of:

- Workforce distribution
- Infrastructure availability
- Maternal service output

➤ *Identification of Disparities*

Districts were categorized based on:

- High vs low workforce availability
- High vs low service utilization
- Underutilization (low deliveries despite high resources)
- Overburden (high deliveries with limited resources)

➤ *Ethical Considerations*

- The study utilized secondary aggregated data, with no individual patient identifiers.

➤ *Limitations of the Study*

- Use of aggregated data limits individual-level analysis
- Possible variations in data recording across districts
- Quality of care and outcomes (e.g., maternal mortality) were not assessed

V. RESULTS

➤ *Distribution of Divisional Hospitals*

A total of 494 Divisional Hospitals (DHs) were reported across 26 districts and the National Institute of Health Sciences (NIHS).

There was considerable variation in the number of DHs across districts. The highest number of DHs was observed in Kandy District (47 DHs), while the lowest was reported in NIHS (2 DHs). Most districts had between 10–35 DHs, indicating moderate institutional distribution with some regional imbalances.

➤ *Distribution of Healthcare Workforce*

• *Medical Officers*

A total of 1,707 Medical Officers (MOs) were working in DHs across the study areas.

- ✓ Highest concentration: Kandy District (124 MOs)
- ✓ Lower levels observed in smaller districts like Mullaitivu with 15 MOs and special institutions such as NIHS

This reflects a higher concentration of doctors in larger districts, though not always proportional to service demand.

• *Nursing Officers*

There were 3,019 Nursing Officers in total.

- ✓ Highest: Kandy District (303 Nursing Officers) and lowest in Mullaitivu with 25 NOs
- ✓ Distribution varied widely across districts

The data suggest significant variability in nursing workforce allocation.

• *Supporting Staff (SKS)*

A total of 3,909 Supporting Staff (SKS) were reported, highest in Kandy with 356 and lowest in Mullaitivu with 32.

The distribution pattern was broadly similar to nursing staff, with higher numbers in larger districts and comparatively lower numbers in smaller or less populated areas.

• *Midwives*

There were 616 midwives across all DHs.

- ✓ Highest number in Kandy with 112 and lowest in Mullaitivu with 8.
- ✓ Some districts showed relatively low midwife availability despite having labour rooms, indicating potential staffing gaps

➤ *Availability of Maternal Health Infrastructure*

• *Labour Rooms*

A total of 344 labour rooms were available across DHs.

- ✓ Highest: Kandy District (45 labour rooms) , lowest in Mullaitivu with 5.

- ✓ Some districts had labour rooms with minimal or no recorded deliveries

This indicates possible underutilization of maternal health infrastructure in certain regions.

➤ *Maternal Service Utilization*

- *Number of Deliveries*

A total of 262 deliveries were conducted across all DHs.

There was a highly uneven distribution of deliveries:

- ✓ Highest: Kandy District – 88 deliveries
- ✓ Lowest: Several districts including Kalmunei and NIHS – 0 deliveries

A small number of districts contributed to the majority of deliveries, while many reported very low or zero service utilization.

Table 1 - District-wise distribution of deliveries in Divisional Hospitals

No	District	Number of Deliveries average
1	Kandy District	88
2	Gampaha District	15
3	Colombo District	12
4	Kurunegala District	11
5	Ratnapura District	10
6	Galle District	9
7	Kalutara District	8
8	Kegalle District	8
9	Matara District	7
10	Matale District	6
11	Badulla District	6
12	Nuwara Eliya District	5
13	Puttalam District	5
14	Anuradhapura District	4
15	Hambantota District	4
16	Jaffna District	3
17	Batticaloa District	3
18	Polonnaruwa District	3
19	Monaragala District	3
20	Mannar District	2
21	Vavuniya District	2
22	Ampara District	2
23	Trincomalee District	2

No	District	Number of Deliveries average
24	Kilinochchi District	1
25	Mullaitivu District	1
26	Kalmunai	0
27	National Institute of Health Sciences	0

➤ *Key Performance Indicators*

- *Deliveries per Divisional Hospital*

- ✓ National average: $262 / 494 \approx 0.53$ deliveries per DH

This indicates that on average, less than one delivery per hospital occurred during the study period, highlighting low utilization of DH-level maternity services.

- *Deliveries per Midwife*

- ✓ National average: $262 / 616 \approx 0.43$ deliveries per midwife

This suggests significant underutilization of midwifery workforce, particularly in districts with zero or minimal deliveries.

- *Deliveries per Labour Room*

- ✓ National average: $262 / 344 \approx 0.76$ deliveries per labour room

This indicates that many labour rooms were underutilized, with some districts maintaining infrastructure that was rarely used.

- *Staff-to-Hospital Ratios*

- ✓ Medical Officers per DH: $1707 / 494 \approx 3.5$
- ✓ Nurses per DH: $3019 / 494 \approx 6.1$
- ✓ Midwives per DH: $616 / 494 \approx 1.25$

These ratios suggest adequate staffing levels overall, but not necessarily aligned with service demand.

➤ *District-Level Disparities*

- *High Resource – Low Utilization (Underutilized Districts)*

Districts such as Kalmunei demonstrated:

- ✓ Adequate workforce (55 MOs, 44 midwives)
- ✓ Multiple labour rooms (20)
- ✓ Zero deliveries

This clearly indicates underutilization of both human resources and infrastructure.

- *Low Resource – High Utilization (Overburdened Districts)*

Districts such as Kandy showed:

- ✓ High number of deliveries (88)
- ✓ High but heavily utilized workforce

This suggests high service demand and potential workload pressure on staff.

VI. DISCUSSION

The findings of this study reveal a complex landscape of maternal healthcare delivery within Sri Lanka's Divisional Hospitals (DHs). While the country's centralized health system is designed to provide equitable access, this district-level analysis highlights significant disparities in resource allocation and a profound underutilization of primary-level maternity services.

➤ *Underutilization of Primary Maternal Services*

The most striking finding is the extremely low volume of deliveries conducted at the DH level. With a national average of approximately 0.53 deliveries per hospital and 0.76 deliveries per labour room during the study period of year 2025, it is evident that these facilities are not being utilized as primary locations for childbirth.

This trend suggests a "bypass phenomenon," where expectant mothers may prefer higher-level referral hospitals over Divisional Hospitals, even for uncomplicated deliveries. This preference could be driven by a perceived or actual lack of emergency obstetric care at the primary level, or a desire for the specialized medical personnel and advanced technology available at larger institutions.

➤ *Workforce and Infrastructure Mismatch*

The study identifies a clear mismatch between available resources and actual service output. While the overall staff-to-hospital ratios appear adequate—averaging 3.5 medical officers and 1.25 midwives per DH—these resources are not aligned with service demand.

➤ *Implications for Midwifery and Nursing*

Midwives have traditionally been the cornerstone of Sri Lankan maternal care. However, the data showing only 0.43 deliveries per midwife at the DH level suggests that their clinical skills in intrapartum care may be underused in these settings. If midwives in Divisional Hospitals rarely assist in deliveries, there is a risk of "skill decay," which could impact the quality of care provided during emergencies.

➤ *Inequities in Resource Distribution*

The variation in the number of DHs (from 47 in Kandy to 2 in NIHS) and the corresponding fluctuations in nursing and medical staff indicate that resource allocation may be historically determined rather than based on current population needs or service utilization patterns. Such disparities can lead to geographic inequalities, where some rural populations have access to well-staffed but empty facilities, while others may face overcrowded conditions in more "popular" districts.

RECOMMENDATIONS

To optimize resource distribution and improve the efficiency of maternal healthcare in Divisional Hospitals, the following actions are recommended:

- **Review Resource Allocation:** Conduct a needs-based assessment to reallocate healthcare personnel and equipment from underutilized districts to overburdened areas like Kandy.
- **Strengthen Referral Pathways:** Formalize the role of Divisional Hospitals within the bypass system to ensure they are equipped to handle low-risk deliveries, thereby reducing the burden on tertiary care centers.
- **Skill Enhancement Programs:** Implement mandatory rotation or simulation-based training for midwives and medical officers in low-volume districts to prevent "skill decay" in intrapartum care.
- **Community Awareness Campaigns:** Launch initiatives to build public trust in the maternal services provided by Divisional Hospitals to encourage local utilization of available labour rooms.
- **Facility Re-designation:** Evaluate the feasibility of converting underutilized labour rooms in specific districts into other high-demand primary care services if maternal demand remains consistently zero.
- **Improved Data Monitoring:** Establish a real-time digital monitoring system to track institutional delivery rates and workforce workloads to allow for dynamic staffing adjustments.

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