



Original Article: **A Comparative Analysis of Human Resource for Health at three Teaching Hospitals in Sri Lanka: Availability and Workload**

Sameera N.T.P.¹, Fernando K.P.C.²

^{1,2}Ministry of Health

Keywords: Human Resources for Health, Hospital efficiency, Surgical throughput, Resource allocation, Sri Lanka

Correspondence to: Dr. N.T.P. Sameera
Email: sameerathantreege@yahoo.com

Abstract

Background: This study investigates the availability and workload of Human Resources for Health (HRH) at three major teaching hospitals in Sri Lanka: National Hospital Sri Lanka (NHSL), Colombo South Teaching Hospital (CSTH), and Colombo North Teaching Hospital (CNTH). Understanding these hospitals' operational capacities and efficiency is crucial for enhancing healthcare delivery.

Methods: A descriptive cross-sectional study was conducted using secondary data sources. Data extraction sheets were distributed to relevant hospital administrative personnel. The study analyzed bed strength, staff numbers, patient admissions, outpatient visits, and surgical throughput. Comparisons were made to evaluate efficiency and resource utilization across the three hospitals.

Results:

NHSL has the highest bed

strength (3,321 beds), followed by CNTH (1,836 beds) and CSTH (1,242 beds). Bed occupancy rate was highest at NHSL at 75.76%, whereas CSTH and CNTH recorded 75.51% and 61.68%, respectively. Bed turnover was highest at CSTH (10.83/month), while the average length of stay was found to be lowest at CSTH (2.09 days). NHSL employs 1,135 doctors and 3,554 nurses, CSTH employs 537 doctors and 529 nurses, and CNTH employs 418 doctors and 607 nurses. NHSL handled the highest number of admissions and clinic patients, while CNTH had the highest number of clinic patients per doctor, indicating a higher operational efficiency but more significant strain on healthcare providers.

Conclusions: NHSL, CSTH, and CNTH exhibit significant differences in operational capacities and efficiencies. To balance workload and improve healthcare outcomes, strategic resource management, enhanced staffing, and improved operational systems are

recommended. Future studies should explore patient satisfaction and outcomes to improve policy decisions further.

Keywords: Human Resources for Health, Hospital efficiency, Surgical throughput, Resource allocation, Sri Lanka.

Introduction and Background

Trained health workers are vital for the provision of good healthcare. The WHO's Workforce 2030 strategy aims to ensure everyone has access to healthcare by optimizing the health workforce through planning for future needs, improving training, and using data for better decisions (1). The WHO's National Health Workforce Accounts (NHWA) helps countries build strong health worker data systems (2). This data is crucial for making informed decisions on healthcare staffing and training. (2). Similar to most other countries, Sri Lanka also faces significant challenges regarding the health workforce. In order to achieve 25% of SDG targets, the aggregate number of physicians, nurses and midwives is 4.45/1000 population (3). However, as of January 2022, the line ministry and provincial council institutions employed 23,039 doctors, 40,408 nurses, and 9,024 midwives (a total of 72,471). This indicates an aggregate density of only 3.32 physicians, nurses, and midwives per 1,000 population, resulting in a shortfall of 24,539 (4). However, approximately 1,500 doctors practice full-time in the private sector, and defence establishments and universities employ nearly 320 and 760 medically qualified persons; the total number of practising doctors can be estimated at 25,619. This brings the total number of doctors, nurses, and midwives in Sri Lanka to about 75,051, reducing the shortfall to approximately 21,959 (4).

The Sri Lanka Medical Council (SLMC) had 33,284 active registrations as of December 2022. This suggests that only about 77% of medical practitioners registered with the SLMC are working in Sri Lanka, with the remaining 23% either practising overseas or retired from active practice. This aligns with findings from a study conducted 15 years ago, which estimated that of medical practitioners holding active registrations with the SLMC, approximately 15% were working overseas, 12% were in the private sector, and approximately 3% were employed as academics by universities (4). In the past two decades, the lack of human resources has been identified as a significant barrier to improving healthcare accessibility in developing countries. This is partly due to the health workforce being under-recognized and underappreciated despite the increased availability of other resources, such as financial and medical supplies.

Teaching hospitals in Sri Lanka, such as the National Hospital Sri Lanka (NHS), offer specialized care, conduct undergraduate and postgraduate training of health workers, and have access to a higher number of specialists, advanced equipment, and infrastructure compared to other hospitals. This focus on education sets them apart (5). The expectations for HRH in teaching hospitals are high, requiring a sufficient and well-distributed workforce to ensure the delivery of quality care, support ongoing education and training, as well as contribute to research and development in the health sector (6). Achieving these expectations necessitates strategic planning, effective management, and continuous monitoring of HRH needs and utilization (7,8).

In the Sri Lankan context, assessing the availability and workload of HRH in major teaching hospitals is crucial for identifying gaps and inefficiencies, making informed policy decisions, and guiding resource allocation (4). By comparing HRH between the NHSL, Colombo South Teaching Hospital (CSTH), and Colombo North Teaching Hospital (CNTH), this study aims to provide insight into the current state of HRH in these key institutions and offer recommendations for optimizing the workforce to meet future health challenges.

Methods

This comparative study was conducted as a descriptive cross-sectional study to assess the availability and workload of Human Resources for Health (HRH) in three major teaching hospitals in Sri Lanka: NHSL, CSTH, and CNTH. The study utilized a quantitative approach, with all data collected from secondary sources. To facilitate data collection, administrative approval was obtained from the directors of each hospital. Following approval, data extraction was carried out with the assistance of key stakeholders. Data extraction sheets were designed to capture comprehensive HRH-related information. Collected data were systematically organized and reviewed for completeness and accuracy. Any discrepancies or missing information were addressed through follow-up with the respective officers. The gathered data were analyzed to present an overall profile of each hospital's HRH. Comparative analysis was conducted to highlight differences and similarities in HRH availability and workload across the three teaching hospitals.

Results

General Introduction to the Hospitals

The NHSL, founded in 1864, is Sri Lanka's largest government hospital, with over 3,300 beds and 7,500 staff, offering a wide range of specialities. It performs a range of surgeries and treats over 2 million outpatients annually. NHSL also oversees several key institutions, including dental care, kidney care, and training medical professionals (9), (10). The CSTH is a major government hospital treating over 1 million patients annually. With over 1,100 beds and 2,600 staff, it offers comprehensive care across various clinical specialities. As a teaching hospital for the University of Sri Jayewardenepura, CSTH boasts specialized units and an around-the-clock outpatient department. It also includes intensive care units and specialized care for sexually transmitted diseases (11). The CNTH, a major teaching hospital approximately 18km from Sri Lanka's capital, is the largest healthcare provider in its district. With over 2,500 staff and 1,700 beds, CNTH offers comprehensive medical services and advanced facilities. It also supports medical education for students and nurses at the University of Kelaniya (12). Each of these hospitals plays a pivotal role in the healthcare system of Sri Lanka, contributing significantly to patient care, medical education, and research. The following sections will provide a detailed analysis of the availability and workload of health human resources in these three major teaching hospitals.

The primary statistics of all three hospitals have been collected and are presented alongside the calculated hospital metrics in Table 1 below.

Table 1: Hospital Statistics from January to April 2024

Indicator	NHSL	CSTH	CNTH
Wards	85,	41	43
Beds	3321	1,242	1,836
Admissions	94,492	53,845	51,985
Deaths	1,814	503	1,027
Midnight Total	301,936	112,553	135,909
Bed Occupancy Rate	75.76%	75.51%	61.68%
Bed Turnover Rate	7.11 per month	10.83 per month	7.07 per month
Average Length of Stay	3.19	2.09	2.61

The data indicates that all three hospitals managed over 50,000 admissions for the months of January 2024 to April 2024, and maintained satisfactory bed occupancy and turnover rates, as shown in the table above.

Outpatient Department (OPD)

NHSL – Setting

In March 2023, the NHSL shifted its outpatient department to the newly built seven-story building housing 40 clinic rooms, an emergency room, a pharmacy, X-ray facilities, and many other services. The entire OPD complex operates as a paperless unit through the “Hospital Health Information Management System”. OPD services at NHSL are broadly categorized into four main groups: OPD, Clinic, Other, and Specialist Care Services. The OPD consists of five stations managed by five consultants, 38 medical officers, 90 nursing officers, and 100 healthcare assistants. NHSL conducts 40 specialist clinics, supported by the relevant unit consultants, medical officers, ten nursing officers, and 30 healthcare assistants. The Orthopaedic Workshop and the Department of Physiotherapy and Occupational Therapy fall under the 'Other' services category. While there are no dedicated paramedical staff (such as pharmacists and radiographers) exclusively assigned to the OPD complex, these professionals work in

the complex on a roster basis to support its operations.

CSTH – Setting

The Outpatient Department (OPD) complex at Colombo South Teaching Hospital (CSTH) primarily operates in the Millennium Building, with additional services housed in Complex A and Old Building H. The OPD offers a comprehensive range of services through 16 specialized clinics, each managed by relevant consultants and their medical officers. In addition to these clinics, CSTH provides the “Mithuru Piyasa” counselling service. OPD patients are attended to by two consultants and 40 medical officers, supported by 26 nursing officers and 30 healthcare assistants. The hospital uses a Hospital Information Management System (HIMS) for efficient management and record-keeping of all OPD patients, a system that has recently been extended to include the nephrology clinic as well.

CNTH – Settings

Colombo North Teaching Hospital (CNTH) operates its outpatient services in a dedicated building complex known as the “OPD and Clinic Complex”. This modern facility houses 49 different clinics, each operating with the aid of relevant specialty consultants. Within the complex, there are three dedicated consultants, 27 medical

officers, 30 nursing officers, and 50 healthcare assistants, ensuring smooth operations. The OPD functions on a daily basis to cater to the healthcare needs of patients. Notably, the cardiology and VP (Vascular and Plastic Surgery) OPD clinics operate through an information system called the Hospital Information Management System (HIMS), facilitating

efficient management and record-keeping. Additionally, the endocrinology clinic utilizes its own privately funded information system for enhanced patient care.

Information gathered from all three OPD complexes including OPD, and clinic data compiled together in the table 2 below.

Table 2: OPD and Clinic Statistics from January to April 2024

	NHSL			CSTH			CNTH		
OPD	169,959			118,363			106293		
Clinics	Red Numbers	Other Patients	Total Patients	Red Numbers	Other Patients	Total Patients	Red Numbers	Other Patients	Total Patients
Medical	5,919	42,581	48,500	1,823	17,334	19,157	2,896	50,300	53,196
Surgical	2,761	16,559	19,320	1,498	5,243	6,741	2,052	5,152	7,204
Orthopaedic	3,550	16,650	20,200	551	5,189	5,740	744	3,874	4,618
Paediatric				187	1,136	1,323	500	1,586	2,086
Gyn Obs				1,688	4,252	5,940	1,651	4,272	5,923
Cardio									
Thoracic	833	5,315	6,148						
Cardiology	7,162	52,570	59,732	2,013	15,478	17,491	1,428	5,467	6,895
Neurosurgical	2,281	8,654	10,935						
Neurology	2,783	13,869	16,652	900	5,285	6,185	1,049	2,069	3,118
Epilepsy & Headache	542	6,308	6,850						
Stroke	138	1,092	1,230						
ENT	2,120	9,350	11,470						
Genito Urinary / Urology	1,227	5,937	7,164	792	1,922	2,714	524	2,205	2,729
Skin	2,571	14,284	16,855						
Psychiatric	2,191	13,526	15,717	1,942	7,165	9,107	915	7,962	8,877
Substance clinic	102	313	415						
Dementia	11	89	100						
Clozapine	63	562	625						
Endocrine	1,242	7,692	8,934						
Gastroenterology	609	3,707	4,316	628	2,040	2,668	673	3,676	4,349

Nephrology	1,763	9,460	11,223	127	1,856	1,983	407	4,556	4,963
Oncology Clinic	77	478	555						
Rabies	2,355	8,214	10,569						
Plastic surgery	315	1,995	2,310						
Diabetes	3,506	20,742	24,248						
Burns	22	121	143						
Rheumatology	4,589	21,777	26,366	726	6,746	7,472			
Chest clinic (Asthma)	438	2,654	3,092						
Vascular	617	4,298	4,915				550	1,798	2,348
ESWL Clinic	0	0	0						
Urological Cancer Clinic	0	0	0						
Transplant clinic	109	616	725						
Haematology clinic	39	204	243	135	1,414	1,549	337	2,205	2,542
Breast Clinic	65	377	442						
Total	56,911	276,319	333,230	13,010	75,060	88,070	13,726	95,122	108,848

Table 3: Surgeries performed from January to April 2024

Category of Surgery	NHSL	CSTH	CNTH
Major Surgeries	7,133	1,763	3,756
Intermediate Surgeries	5,187	1,714	0
Minor Surgeries	8,494	3,537	6,842
Total Surgeries	20,814	7,014	10,598

Table 4: Health HR Cadres as per 31.12.2023

HRH Category	NHSL		CSTH		CNTH	
	Approved	In Position	Approved	In Position	Approved	In Position
Consultants	155	144	71	84	60	65
Medical Officers	988	991	467	455	395	353
Nursing Officers	2,928	2,839	1,100	1,016	1,045	1,012
MLTs	96	88	48	45	46	39
Radiographers	104	68	21	15	25	18

According to the data presented in the table, it is evident that all three hospitals cater to

a substantial number of patients across a wide range of specialties.

The surgeries performed over the last four months have been categorized into Major, Intermediate, and Minor surgeries and are compiled in Table 3.

According to the table above, over 30,000 surgeries were performed collectively across all three hospitals.

The data on selected health cadres have been collected and are presented in the table 4.

It is evident from the data that all three hospitals are operating with shortages in their human resources according to the above table.

Discussion

The National Hospital of Sri Lanka (NHSL), Colombo South Teaching Hospital (CSTH), and Colombo North Teaching Hospital (CNTH) have varying bed strengths and performance metrics, which reflect their capacity and efficiency in patient care. NHSL has the highest bed strength with 3321 beds, followed by CNTH with 1836 beds, and CSTH with 1242 beds. In terms of bed occupancy rates, NHSL and CSTH have similar rates of 75.76% and 75.51%, respectively, while CNTH has a lower rate of 61.68%. The bed turnover rate, which indicates the frequency with which beds are utilized, is highest at CSTH (10.83 per month) followed by NHSL (7.11 per month) and CNTH (7.07 per month). The average length of stay, a critical indicator of hospital efficiency and patient turnover, is lowest at CSTH with 2.09 days, followed by CNTH with 2.61 days, and NHSL with the highest average length of stay at 3.19 days. These figures suggest that CSTH is more efficient in terms of patient turnover and bed utilization compared to the other hospitals.

Examining the staffing levels and performance metrics provides insight into the operational capacities of these hospitals. NHSL employs 1,135 doctors and 3,554 nursing officers. CSTH has 537 doctors and 529 nursing officers, whereas CNTH employs 418 doctors and 607 nursing officers. The total admissions catered to by these hospitals reflect their respective capacities: NHSL handles 172,072 admissions annually, CSTH manages 56,394, and CNTH admits 53,340 patients. This results in an average of approximately 151 admissions per doctor at NHSL, 105 admissions per doctor at CSTH, and 128 admissions per doctor at CNTH annually. The number of clinic patients, highlighting the follow-up and specialized care provided, also varies: NHSL handles 1,212,329 clinic patients, while CSTH and CNTH manage 470,370 and 1,590,000, respectively. This results in an average of approximately 1,068 clinic patients per doctor at NHSL, 876 at CSTH, and 3,803 at CNTH annually. These figures indicate that despite having fewer doctors and nurses, CSTH and CNTH manage a substantial patient load effectively, with CNTH doctors catering to a significantly higher average number of patients in clinics, compared to NHSL and CSTH. This reflects a higher operational efficiency and, at the same time, possibly greater strain on individual healthcare providers at CNTH.

The efficiency of OPD services can be gauged by the number of medical officers and nurses handling outpatient visits. NHSL's OPD is staffed by 38 medical officers and 90 nursing officers, CSTH by 40 medical officers and 26 nursing officers, and CNTH by 27 medical officers and 30 nursing officers. NHSL's medical officers handle an average of 32,368 patients each annually, CSTH's handle 18,847, and

CNTH's manage 55,556. In terms of nursing officers, each at NHSL oversees an average of 13,666 patients annually; at CSTH, 28,996 patients; and at CNTH, 50,000 patients. These statistics suggest that CNTH's OPD medical officers and nurses manage a significantly higher patient load compared to NHSL and CSTH, reflecting a higher operational efficiency or possibly greater strain on individual healthcare providers.

Surgical capacity is a critical component of hospital performance. NHSL has performed 7193 major surgeries for the four month period, CSTH has conducted 1766 surgeries, and CNTH carried out 3756 surgeries. The average number of surgeries per medical officer at NHSL is approximately 6, CSTH averages three surgeries per medical officer, and CNTH averages around ten surgeries per medical officer (NB Here the total number of doctors considered rather than doctors working in Operation theatres due to the constraints in data collection.). This comparison indicates that CNTH performs the highest number of surgeries on average over the total number of doctors, reflecting a high surgical throughput and efficiency. CSTH, while having fewer total surgeries, has a low average per doctor. Further NHSL, despite its large medical staff, shows a lower average number of surgeries per doctor, possibly due to its diverse range of medical services and higher bed occupancy rates affecting surgical throughput.

In summary, these comparisons reveal significant differences in the operational capacities and efficiencies of NHSL, CSTH, and CNTH. While NHSL has the largest bed strength and staff, CSTH and CNTH demonstrate higher efficiency in specific performance metrics such as bed

turnover and surgical throughput. The discussion of bed strength and performance, staffing levels, and operational metrics across NHSL, CSTH, and CNTH highlights several critical implications for healthcare management and policy in Sri Lanka. The analysis of three hospitals revealed imbalances in resource allocation, workforce distribution, and operational efficiency. CNTH, despite having fewer staff, managed a higher patient load, potentially straining its system. Adopting certain best practices from the more efficient CSTH could improve other hospitals. All hospitals could benefit from improved surgical capacity, standardized health information systems, and data-driven policymaking. Further studies on patient experience and outcomes would provide a more complete picture for better healthcare delivery.

Recommendations

1. It is recommended to address disparities in operational capacities and resource allocations among NHSL, CSTH, and CNTH through strategic resource management.
2. It is recommended to enhance staffing levels to ensure adequate coverage and reduce workload imbalances across the hospitals.
3. It is recommended to improve operational systems, such as health information management systems, to streamline processes and increase efficiency.
4. It is recommended to conduct further studies focusing on patient satisfaction and outcomes to provide a more comprehensive understanding of the impact of current practices.
5. It is recommended to use the findings from patient satisfaction and outcome studies to guide policy decisions and

improve healthcare delivery across these institutions.

References

1. WHO. 2016 Global strategy on human resources for health- Workforce 2030. 2016.
2. WHO. National health workforce accounts- a handbook. World Health Organization; 2017. 168 p.
3. WHO. Health workforce requirements for universal health coverage and the Sustainable Development Goals [Internet]. Vol. 1, World Health Organisation. 2016. 1–40 p. Available from: <https://apps.who.int/iris/bitstream/handle/10665/250330/9789241511407-eng.pdf>
4. Silva D De, Chandrathilake M, Silva N de. Human resources for health in Sri Lanka over the post-independence. Ceylon Med J. 2023;68:34–8.
5. Ayanian JZ, Weissman JS. Teaching Hospitals and Quality of Care: A Review of the Literature. Milbank Q. 2002;80(3):569–93.
6. Mahdavi A, Atlasi R, Ebrahimi M, Azimian E, Naemi R. Human resource management (HRM) strategies of medical staff during the COVID-19 pandemic. Heliyon [Internet]. 2023;9(10):e20355. Available from: <https://doi.org/10.1016/j.heliyon.2023.e20355>
7. Ministry of Health. National Health Strategic Master Plan 2016 - 2025 [Internet]. Vol. IV. 2016. Available from: <http://www.health.gov.lk/enWeb/HMP2016-2025/HealthAdmin-HRH.pdf>
8. Witter S, Hamza MM, Alazemi N, Alluhidan M, Alghaith T, Herbst CH. Human resources for health interventions in high- And middle-income countries: Findings of an evidence review. Hum Resour Health. 2020;18(1):1–17.
9. Samarasinghe D. National Hospital to conduct heart transplant operations. Sunday Observer [Internet]. 2014 Mar 23; Available from: <https://archives.sundayobserver.lk/2014/03/23/fea06.asp>
10. NHSL. Clinic Services [Internet]. The National Hospital Sri Lanka. 2024. Available from: http://www.nhsl.health.gov.lk/web/index.php?option=com_content&view=article&id=8&Itemid=189&lang=en
11. CSTH. About Us [Internet]. Colombo South Teaching Hospital. 2024. Available from: <https://www.csth.health.gov.lk/about-us>
12. CNTH. Welcome to Colombo North Teaching Hospital-About Us [Internet]. Colombo North Teaching Hospital - Ragama. 2024. Available from: <https://www.cnth.health.gov.lk/about.html>