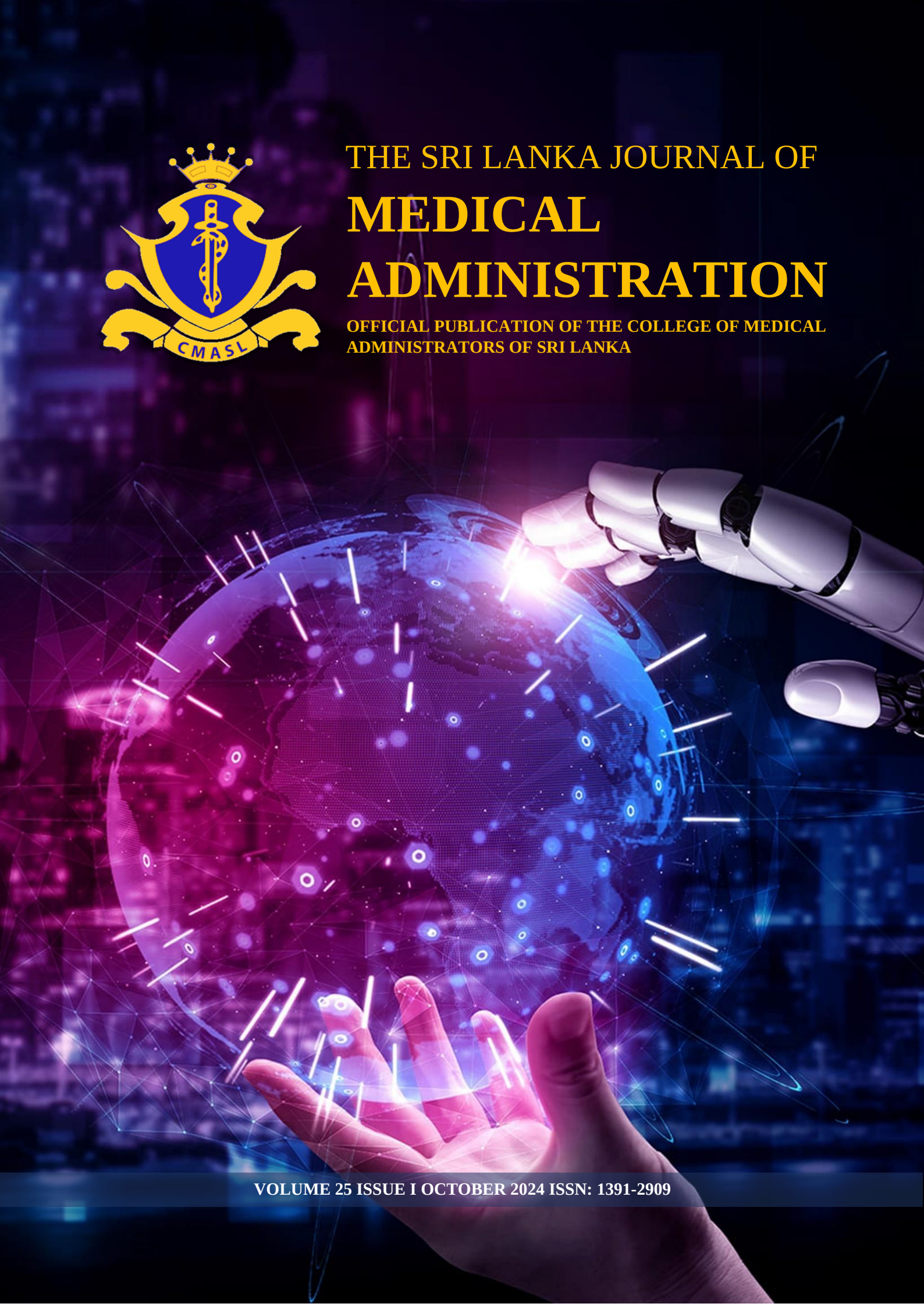

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'Transforming Healthcare:
Fostering Leadership, Professionalism and Efficiency'

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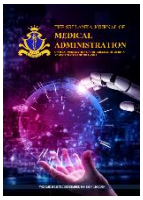

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Our Objectives

- To guide health development in Sri Lanka.
- To contribute to the formulation and implementation of national health policies and strategies.
- To regularly review the status of medical administration in the country and analyze problems in the health sector; to guide the Ministry of Health and the private health sector.
- To promote postgraduate studies and continuous professional development in the field of medical administration.
- To promote /facilitate health systems research that contributes to the health policies formation and promote publications related to medical administration.
- To promote and foster professional advancement of medical administration.
- To foster fellowship among the professionals engaged in the field of medical administration.
- To develop partnerships and links with similar professional bodies in Sri Lanka and in other countries.

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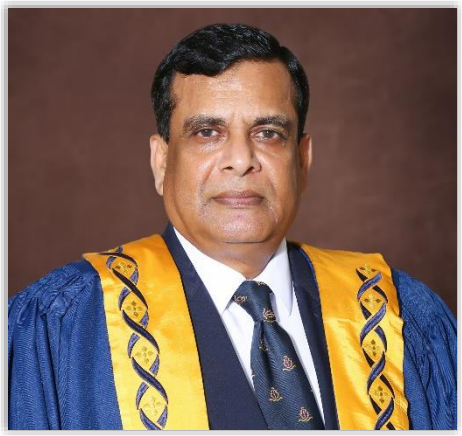
TABLE OF CONTENTS

Presidential Message
Transforming Healthcare: Leading with Vision, Professionalism, and Efficiency



Fellow Members,

It is my great privilege to address you at a time when healthcare systems globally, and here in Sri Lanka, are at a critical juncture. Our healthcare sector, renowned for its resilience, is now called upon to move beyond resilience into a phase of proactive transformation. The theme of this year, "Transforming Healthcare: Fostering Leadership, Professionalism, and Efficiency," captures the very essence of the challenges and opportunities we face in shaping the future of healthcare in Sri Lanka.

Transforming Healthcare is not just about responding to external pressures; it is about actively reshaping our institutions and systems to be forward-thinking, innovative, and adaptive. In this rapidly evolving landscape, we must ensure that healthcare is not only sustainable but also equitable, accessible, and future-ready for all citizens. This transformation requires visionary leadership, a commitment to professionalism, and an unwavering focus on efficiency in the use of resources.

Leadership plays a key role in this transformation. As medical administrators, we are more than just managers of institutions—we are the leaders and innovators who must guide and inspire change. Our leadership must be purpose-driven, with every decision aimed at ensuring the well-being of our people and the sustainability of the healthcare system. Leadership in healthcare is not only about managing today's challenges but also about creating a pathway for future generations.

Professionalism remains the cornerstone of a successful healthcare system. It is our commitment to ethical standards, transparency, and accountability that will build trust and ensure that healthcare delivery meets the highest standards. Professionalism also demands that we constantly develop and nurture a skilled and motivated workforce that is capable of

delivering patient care with compassion and integrity. In a time of transformation, the foundation of professionalism becomes more important than ever.

Efficiency is essential for sustainability. We operate in an environment where resources are finite, and the demands on our system continue to grow. Efficiency, therefore, is not about doing less with less—it is about doing more with less through innovation, smart resource management, and data-driven decision-making. By focusing on efficiency, we can deliver better care, streamline processes, reduce waste, and ensure that healthcare resources are utilized in the best possible way.

This year, I am proud to introduce Volume 25, Issue I of the CMASL Journal. This journal is a testament to the dedication and commitment of our members to advancing healthcare management in Sri Lanka. The articles in this issue reflect the wealth of knowledge, experience, and forward-thinking ideas from our members. I encourage all of you to engage with the contributions made by your peers, which offer valuable insights into the leadership, administration, and policy shaping the future of healthcare in our country.

As we look ahead, our focus must be on creating a healthcare system that is both sustainable and adaptable to the challenges that lie ahead. With strong leadership, a commitment to professionalism, and a focus on efficiency, we can ensure that Sri Lanka's healthcare system not only withstands the tests of time but continues to thrive and innovate. Together, we can shape a healthcare system that is high-quality, equitable, and efficient—one that serves every citizen of Sri Lanka with excellence.

Let us unite in this shared vision, and I am confident that together, we will build a healthier and brighter future for Sri Lanka.

Sincerely,

Dr. Kumara Wickremasinghe,
President,
College of Medical Administrators of Sri Lanka

Editorial
Harnessing the Butterfly Effect: Building an Efficient Healthcare System in Sri Lanka through Research and Clinical Audits

Sri Lanka's healthcare system, once celebrated for its universal access and strong health outcomes, now finds itself at a critical juncture. Amidst economic downturn and a rising burden of diseases, the healthcare sector is struggling to meet the growing needs of the population. The COVID-19 pandemic further exposed existing weaknesses, highlighting the need for a more resilient and efficient healthcare infrastructure. While challenges abound, the path forward lies not only in grand systemic overhauls but also in incremental, evidence-based changes. The Butterfly Effect, a concept rooted in chaos theory, offers a powerful metaphor for how small, strategic adjustments can lead to significant, far-reaching improvements. By leveraging research and clinical audits, Sri Lanka can create the conditions for these small changes to trigger a cascade of positive outcomes, ultimately transforming the healthcare system.

The Butterfly Effect: A Systemic Approach to Healthcare

The Butterfly Effect, as described in chaos theory, suggests that a small, localized change—like the flap of a butterfly's wings—can set off a chain reaction that results in large, unpredictable effects elsewhere. In complex systems like healthcare, this principle holds great relevance. Small, seemingly minor interventions can ripple through the system, resulting in profound improvements in efficiency, quality, and patient outcomes. The key lies in understanding where these small changes can be most effectively applied and ensuring that they are driven by robust evidence and continuous evaluation.

In Sri Lanka, where the healthcare system is already stretched thin, the Butterfly Effect can be harnessed through two critical tools: research and clinical audits. Research generates the evidence needed to guide change, while clinical audits ensure that these changes are implemented, monitored, and refined. Together, these tools can serve as the catalysts for systemic improvement, allowing Sri Lanka to build a more efficient, resilient, and sustainable healthcare system.

The Role of Research: Generating Evidence for Small but Impactful Changes

Research is the foundation upon which any meaningful healthcare reform must be built. In Sri Lanka, investment in local research is essential to address the unique challenges faced by the healthcare system. While global health research provides valuable insights, local studies can offer more relevant and actionable data that account for Sri Lanka's specific social, economic, and cultural context.

One area where research can initiate small but impactful changes is in the management of chronic diseases, which are on the rise in Sri Lanka. Local research can help identify more effective strategies for managing NCDs in the Sri Lankan context, such as adapting treatment protocols to better suit the country's resource limitations or focusing on community-based interventions that emphasize prevention and early detection.

Similarly, research into healthcare delivery models can identify ways to optimize resource use and improve patient outcomes. In a country where healthcare resources are often scarce, even small adjustments—such as improving the triage process in hospitals or expanding the use of telemedicine—can make a significant difference. These research-driven innovations, while seemingly small at the outset, can create ripples that lead to substantial improvements in the efficiency and quality of care.

Clinical Audits: Ensuring Continuous Improvement and Accountability

While research provides the evidence needed to guide change, clinical audits are the mechanisms through which these changes are implemented and refined.

In the context of the Butterfly Effect, clinical audits represent the small, deliberate actions that can lead to significant, long-term change. By regularly reviewing and evaluating care practices, audits help identify inefficiencies, inconsistencies, and opportunities for improvement. They also provide a feedback loop, ensuring that changes based on research are not only implemented but continuously monitored and adjusted as necessary.

For example, a clinical audit might examine how well hospitals are adhering to protocols for managing hypertension, a common condition in Sri Lanka. The audit could reveal that certain hospitals are more successful than others in controlling patients' blood pressure due to differences in some practices. By identifying and disseminating these best practices, the audit process can help improve hypertension management across the entire healthcare system.

Moreover, clinical audits can play a critical role in resource management, an area where Sri Lanka's healthcare system is particularly vulnerable. With shortages of essential medicines, medical equipment, and staff, it is crucial to ensure that existing resources are used as efficiently as possible. A clinical audit might identify that certain diagnostic tests are being overused in some hospitals, leading to unnecessary costs and delays in care, while being underutilized in others. By standardizing practices based on evidence, clinical audits can help optimize resource use, ensuring that every healthcare facility operates as efficiently as possible.

Research and Clinical Audits: A Synergistic Approach

The true potential of the Butterfly Effect in healthcare lies in the synergy between research and clinical audits. Research provides the evidence for small, targeted interventions, while clinical audits ensure that these interventions are implemented effectively and adapted based on real-world performance.

This iterative process of research, implementation, and auditing allows for continuous improvement, ensuring that even small changes have a lasting impact. It also creates a culture of accountability and quality improvement within the healthcare system, making it more responsive to the needs of patients and better equipped to handle future challenges.

Conclusion: Flapping the Wings of Change

Sri Lanka's healthcare system is at a tipping point. While the challenges facing the system are immense, they are not insurmountable. By embracing the principles of the Butterfly Effect—where small, strategic changes can lead to far-reaching improvements—Sri Lanka can build a healthcare system that is more efficient, resilient, and sustainable.

The path forward lies in leveraging the power of research and clinical audits. Through research, the country can generate the evidence needed to guide small but impactful

Dr. Chandana Wijesinghe,
Editor,
College of Medical Administrators of Sri Lanka

Original Papers

The Sri Lanka Journal of Medical Administration

https://sljma.sljol.info/

Original Article:

Improving the laboratory investigation price revising process at Sri Jayawardhanapura General Hospital

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Keywords:
Laboratory Costing, Price Revision, Economic Sustainability

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Abstract

Sri Jayawardhanapura General Hospital (SJGH) is a non-profit public enterprise that offers reasonable services. The hospital relies on government grants and revenue generated by patient care services for funding. One of its crucial departments is a laboratory, which serves as a vital support service and the main profit center. However, the frequent rise of consumable prices during economic crises significantly impacts the variable costs of laboratory tests, resulting in financial losses.

Calculating the cost incurred by laboratory investigations is essential for implementing a price revision strategy to address this issue. Given the absence of a recognized method for calculating investigation costs, adopting the World Health Organization's Laboratory Test Costing Tool (LTCT), a user-friendly Microsoft Excel-based tool, is recommended. This tool is specifically designed to assist in calculating laboratory test costs, ensuring a more accurate understanding of expenses incurred.

Additionally, establishing key indicators to signal the need for price revision and assigning responsibility to initiate the price revision process when these indicators are triggered will streamline the process and improve its responsiveness to financial challenges. By employing such a system, SJGJ can better manage its laboratory costs, maintain service quality, and ensure sustainable operations even during economic hardships.

Introduction

SJGH is a tertiary care health institution with more than a thousand beds. It is a gift given by the government of Japan in 1983. It is a not-for-profit-oriented government enterprise dedicated to providing patients with excellent quality patient care at an affordable price (1).

The hospital offers a broad spectrum of treatment modalities encompassing all four major specialities and various subspecialties, including, but not

limited to, cardiothoracic, ophthalmology, otolaryngology, rheumatology, neurology, orthopaedics, urology, and numerous others. Its facilities boast state-of-the-art diagnostic technologies, including CT scans, MRI scans, ultrasound scans, and a sophisticated laboratory, ensuring comprehensive and modern diagnostic capabilities for patients' needs.

The laboratory department is a pivotal area with modern equipment to conduct various investigations precisely and efficiently. Manned by a highly qualified and experienced team comprising medical consultants, medical officers, and medical laboratory technicians, the department is dedicated to conducting investigations that uphold stringent standards of quality and accuracy.

The laboratory is organized into four distinct sections based on the types of investigations conducted: the biochemistry section, the haematology section, the microbiology section, and the histopathology section. Each section specializes in specific areas of investigation, contributing to the comprehensive range of diagnostic services.

The laboratory extends its services to inward patients, clinic patients, individuals attending the outpatient department (OPD), and outsiders. The investigation price is decided by the pricing committee based on several concerns. The last price revision was in 2019. Laboratory investigation costs depend on many factors categorized into reagent and consumable costs, personal cost or salary, equipment costs, facility costs, service and maintenance costs, and cost for quality maintenance (2).

Since 2019, consumable prices have changed on many occasions. The last price rise was in June, a blanket increase of 33% in all reagent and consumable prices. Service and maintenance costs rise annually with a new agreement. Despite changing the price of several items that the laboratory investigation directly depends on, laboratory investigation prices have remained the same since 2019. Performing an investigation at the current rate results in an economic loss.

The hospital's health financing is the grant received from the government and the income generated by providing patient care services. Due to the economic crisis, the number and amount of grants received have been reduced. Performing laboratory tests with loss directly affects the hospital's health financing and the laboratory's financing.

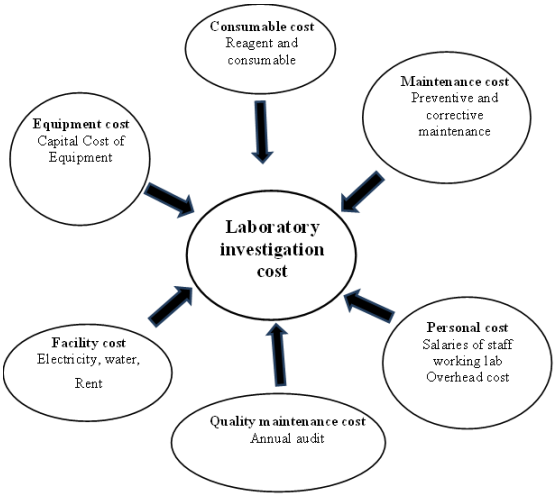


Figure 1 Factors affecting laboratory investigation cost

The health system comprises six building blocks: service delivery, health workforce, health care financing, information, medical products and technologies, leadership, and governance. Integrity among subsystems is essential for maintaining equilibrium among them. Reducing finance affects the whole system. Further reduction of financing to laboratory results in the unavailability of laboratory investigations,

ultimately reducing readiness for service delivery. The failure of a subsystem ultimately leads to the failure of the whole system (3).

Problem analysis

Problem identified

Laboratory investigation prices do not change with the price change of items essential for performing laboratory investigations, resulting in economic loss to the hospital.

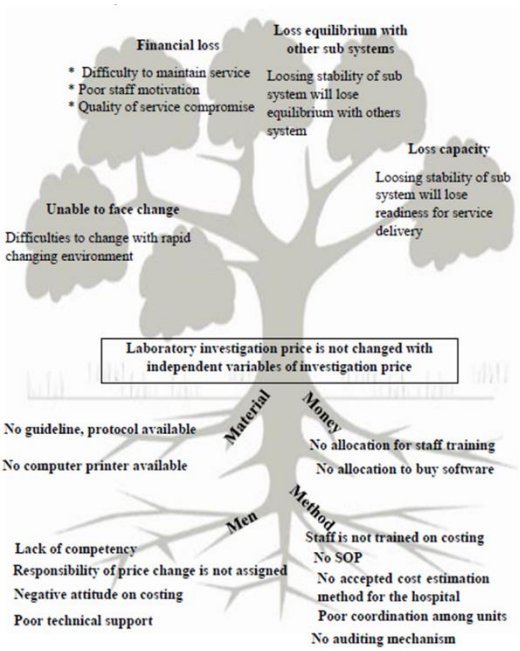
Price revision starts with identifying the need for it. The current practice is that when the hospital administration is sensitized to increasing reagent costs, the price revision process is initiated. The price revision committee calculates the investigation cost. An expected profit is added to the calculated price, and the final price is decided upon. After granting board approval for the decided price, the hospital's billing system (Systolic System) is fed the new price.

Problem analysis

Methods

No accepted cost calculation method adapted by the hospital

Investigation cost calculation is a technical process. It is the most challenging part of the investigation price revision process. Different methods, such as activity-based costing, cost per request, and cost per investigation, are being practised for laboratory investigation cost calculation by laboratories worldwide (4). There has yet to be an established method for cost calculation at SJGH. The technique practised during the last price revision was based only on reagent cost. It was a manual



method, time-consuming, and associated with many assumptions.

Figure 2: Root causes for relatively fixed investigation price that is poorly sensitive for rapidly changing variable investigation cost

Nonavailability of staff training program on cost calculation

The costing committee calculates laboratory costs. This committee comprises a deputy director, relevant medical consultant, medical officer planning, medical laboratory technician, and assistant accountant. Most of the committee members are medical professionals who don't have good knowledge of cost accounting. In addition to committee members, different staff officers may have to participate in the process. Updating costing knowledge is essential, but no training program, reading material, or guidelines are available.

Poor coordination among units

Price revision is a complex process requiring much effort and involvement by

various divisions. Data must be gathered from hospital sections such as the supply division, stores, laboratory, IT department, planning unit, and account section. These units are independently functioning, and poor coordination among them makes the process much more difficult.

Guidelines, manuals, or SOPs developed for hospitals are not available

Price revision is a complex process that needs a lot of technical knowledge and experience. Furthermore, it is a continuous process. It needs to be done regularly when the need arises. A standard operation procedure, guideline, and manual will make the process easier and standardized.

Nonavailability of auditing mechanism

An audit is a systematic assessment of a process against defined criteria that provides feedback. Due to the non-availability of a laboratory-centred regular financial auditing mechanism, profit and loss cannot be assessed. Feedback following an audit is an essential trigger for initiating price revision (5).

Men

Responsibility for price revision is not assigned.

Indications for price revision need to be regularly assessed, thereby promptly identifying and initiating the process. This will essentially prevent loss. This responsibility needs to be assigned to a staff officer who can suggest to the administration that the price revision process begins (4).

Lack of competency on price revision among price revision committee members

Investigation cost calculation requires knowledge, skills, and experience in costing. The committee used incomplete methods with many assumptions. Providing adequate knowledge and skills will rectify the gaps in the process.

Negative attitude toward costing

Most of the staff, except the hospital administration, have a negative attitude toward cost. They feel it is unnecessary and not important and would increase workload (6). This negative attitude makes staff deviate from the price revision process.

Poor technical support

Cost estimation is a technical process that needs experts' assistance. Less involvement from the accounting department and IT section makes the process difficult. Furthermore, there is no outsourced mechanism to assist with the price revision.

Material

No software available

There are Management Information Systems (MISs) that can detect and provide profit and loss details accurately and quickly. Furthermore, they identify losses and provide suggestions to overcome those. This software makes it easy for hospital administration to pick up and correct the problem.

Money

There is no allocation to buy software.

MISs and accounting software are expensive. The existing "Systolic System" cannot provide details of profit and loss to the administration for decision-making. Due to the economic crisis, the hospital faces difficulties investing in software to overcome such problems.

No allocation for staff training

Staff training should be ongoing until they are familiar with their duties.

The objective of the study

To suggest an effective laboratory investigation price calculation mechanism rectifying gaps in the price revision process at SJGH.

Proposal

The main problem identified is that a system for price revision needs to be established. This process needs to be sensitized to indicators of price revision and an accurate, user-friendly, and accepted method for investigation cost calculation.

The existing price revision mechanism was initiated after the hospital administration was sensitized to changes in consumable prices, which depended on its knowledge and attitude. Objectively recognizable indicators for price revision, such as variables on which the investigation price depends, need to be identified. Price revision should be initiated following the designated personnel's recognition of indicator changes.

The method used to investigate cost calculation was not acceptable. It is associated with many assumptions, considering only consumable costs, and is time-consuming. This should be changed to an accepted, user-friendly method. Staff knowledge of costing, skills, and attitude toward cost accounting should be improved.

Solutions

Identifying investigation cost calculation method

WHO designed a laboratory test costing tool

The laboratory test costing tool (LTCT) is a simple, Microsoft Excel-based tool designed by WHO in line with the theme "Better lab for better health initiative". The tool uses six variables for cost calculation. Those are reagent and consumable cost, equipment cost, personal cost, facility cost, maintenance cost, and cost for quality maintenance. It can be used to calculate single-test costs as well as annual costs. LTCT can be obtained free of charge, and the user manual is also available on the WHO website for training purposes.

The SJGH laboratory performs more than four hundred different types of tests. The tool calculates the cost for a single test at a time by feeding details. This process is time-consuming at its initiation. Only a few variables must be changed when details are fed to calculate the new cost.

Customized and designed manual methods for the hospital.

Most of the laboratory analyzers and equipment were obtained through government grants. The laboratory building is a gift from the Government of Japan. A government grant pays an employee's salary. Only the hospital bears reagent and consumable costs, maintenance costs, electricity, water, telephone, and some overhead costs. Therefore, considering only recurrent costs and designing a suitable method is more justifiable for patients.

Designing a customized method is time-consuming and needs expert knowledge. Regular manual updating and calculation processes are complex.

Purchasing suitable software for investigation cost calculation

The software will provide accurate, efficient, and fast results. Further, it will be more customer friendly. Software is usually expensive. It needs a specific platform to run, and data security needs to be ensured before installation. Also, most software may not be customized according to the hospital's needs.

Rectify the initiation of the process.

Identification of indicators for price revision and delegating the responsibility for monitoring and initiation of the process to a staff officer

Investigation cost depends on many variables, such as reagents, salaries, maintenance, etc. The formation of objectively verifiable indicators will rectify the process initiation. The monitoring process should be delegated. Delegating this to an existing officer is economically more favourable but may be associated with human error.

Installation of MIS that is capable of suggesting the need for investigation price revision

MIS provides accurate and timely results. A quick decision can be taken depending on it. Further, it might support the decision.

MIS is expensive and needs access to existing data. It requires equipment such as computers and printers.

Recommendations and implementation

The external macro environment is unstable politically and economically, so investing in high-cost solutions such as purchasing MIS, decision support systems, or suitable software is not practicable.

Custom design of the solution is a time-consuming process. Due to the prevailing economic crises inside the country, variable costs change frequently. Time-consuming solutions may economically damage the hospital, leading to instability. A further manual process may not be suitable for this rapidly changing environment.

It is essential to develop indicators to identify the need for price change, assign the duty to monitor those indicators, and suggest that the administration initiate the price revision process.

WHO laboratory test costing tool is an easy, customer-friendly solution for cost estimation. It is a free Microsoft Excel-based tool. The hardware requirement is only a computer compatible with Microsoft Excel version 10 or newer. The training manual is available on the WHO website. Further staff training, preparation guidelines, and the translation to Sinhala can be done.

Implementation

LTCT calculates the cost of a single investigation at a time. The SJGH laboratory performs more than four hundred different types of investigations. Feeding to LTCT and obtaining results for all investigations will take an extended period. Prioritizing investigations, which need results first, is a suitable option to prevent delay.

According to the prioritized list, data can be fed to WHO LTCT. A trained MLT can do it. Available laboratory computers can be used.

Price revision is a continuing process. A suitable employer should be appointed to identify the need for price revision.

Guideline manual and training sessions can be arranged during the process.

Conclusion

The laboratory of SJGH is an essential supportive service and a profit centre. Due to economic crises, most items contributing to the variable cost of laboratory investigation have changed, indicating the need for price revision. Price revision starts with investigation cost estimation. The hospital practices no identified cost calculation method. Cost estimation is done many times using different techniques that were not standard methods, were associated with assumptions, and were time-consuming.

LTCT is a free, Microsoft Excel-based tool introduced by WHO for calculating laboratory test costs. It can be introduced to the hospital. Further, a suitable staff officer should be appointed to recognize the need for the price change and initiate the price revision process.

References

1. Official website of Sri - Jayewardenepura General Hospital [Internet]. sjgh.health.gov.lk. Available from: https://sjgh.health.gov.lk/
2. Laboratory test costing tool; (User manual/training manual (2019) World Health Organization. Available at: https://www.who.int/europeipublications/i/item/WHO-EURO-20 19 -3 484 - 43 243 - 60 604 (Accessed: 20 May 2024).
3. WHO (2010) 'Monitoring the Building Blocks of Health Systems: a Handbook of Indicators and', p. 110.
4. Booth, R.A. 'Clinical laboratory costing', Canadian Agency for Drugs and Technologies in Health, p. 18.Available at: https://www.cadth.ca/sites/default/files/symp 2016/presentations/april12-2016/Concurrent-Session-E3-Ron-Booth.pdf 2016 (Accessed: 20 May 2024).
5. Laboratory Quality Management System; Handbook World Health Organization. Available at: https://www.who.int/pLrblicationslilit eml9789241548274 (Accessed: 20 May 2024).
6. Mouseli A, Barouni M, Amiresmaili M, Samiee SM, Vali L. Cost-price estimation of clinical laboratory services based on activity-based costing: a case study from a developing country. Electronic Physician. 2017 Apr;9(4):4077

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Original Article:

Assessment of Training Needs of the Office staff (Management assistants and Development Officers) in the National Hospital of Sri Lanka

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Keywords: Training Need Assessment, Management Assistants, Development Officer, Office staff

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Abstract

Introduction: In the dynamic landscape of healthcare administration, the role of hospital office staff is pivotal for maintaining the seamless functioning of the hospital. Training Needs Assessment is a proactive approach to aligning the skills of hospital office staff with the evolving demands of the healthcare landscape, ensuring compliance and promoting excellence in administrative practices and, consequently, contributing to improved patient outcomes.

Objective: This study aims to identify the training needs of hospital office staff in the National Hospital of Sri Lanka (NHSL).

Methodology: A descriptive cross-sectional study was conducted in NHSL with the office staff from June to August 2023. The total population was 181. Among them, 123 people were selected from simple random sampling proportionately to the category. The self-administered questionnaire was used to collect the data. The questionnaire assessed the activities and capabilities of office staff necessary for their daily tasks. Participants were asked to score these activities based on their importance and current performance level. Mean scores for the importance of the training areas and current performances were calculated, and gaps were identified by subtracting. Training needs with the highest gaps (gap equal or more than 2) were prioritized as training needs for office staff in NHSL.

Results: Procurement for the public sector, handling audit inquiries, file management including personal file management, salary conversion, pension management, gathering, organizing, analyzing statistically, & disseminating data and information were prioritized as training needs for next year.

Conclusions and recommendations: Those prioritized training needs were included in the next year's (2024)

annual action plan with the permission of the Deputy Director General -NHSL.

Keywords: Training Need Assessment, Management Assistants, Development Officer, Office staff

Introduction

Training Need Assessment (TNA) is defined as a "method to determine whether training is necessary and, if so, what specific training is required to bridge the gap between the desired and current capabilities of participants" (1). The process involves five main steps: identifying organizational goals and functions, determining the design of the need analysis, collecting data through various methods such as interviews and questionnaires, analyzing the data, and providing feedback. Several types of need analysis can be used, including performance analysis, feasibility analysis, needs versus wants analysis, goal analysis, and job/task analysis (2), (3).

Training Need Assessment ensures that training programs are directly aligned with organizational goals and address specific employee skill gaps, leading to more efficient and effective training initiatives. By identifying the precise needs and capabilities of the workforce, TNA helps prioritize resources, reduce unnecessary training costs, and enhance employee performance. Additionally, TNA fosters a more targeted approach to professional development, leading to improved job satisfaction and retention rates as employees receive relevant and beneficial training to their roles. Overall, TNA contributes to the strategic growth and competitiveness of an organization (2) (3).

National Hospital of Sri Lanka (NHSL) is the largest hospital in Sri Lanka, with more than 3300 bed capacity and around 7400 staff. It serves as the key training centre for undergraduate and postgraduate medical students, as well as other healthcare professionals. The Health Education Unit in NHSL is responsible for performing training needs analysis, incorporating the requisite training into the annual action plan and conducting training and educational programs for the hospital staff. However, the Health Education Unit primarily focuses on the clinical staff.

Objective

To assess the training needs of the office staff (Management Assistants and Development Officers) at the National Hospital of Sri Lanka

Justification

Assessing the training needs of office staff in a hospital is a critical and strategic undertaking with multifaceted justifications. Firstly, it serves as a proactive measure to optimize the performance and efficiency of the office staff. By identifying and addressing specific gaps in their knowledge and skills, organizations can enhance the overall productivity of administrative processes (4). Sri Lanka National Hospital is the largest tertiary care hospital in Sri Lanka, and it has more than 180 office staff. For every annual action plan, it is necessary to include staff training needs in the coming year. It will be a waste of resources if we request or include training without proper training need analysis. Therefore, it is necessary to assess training needs yearly. There is no proper questionnaire to assess training needs analysis for office staff in hospital settings. This questionnaire will be used as a common questionnaire for assessing the training needs of office staff and preventing resource waste.

Resource allocation is a key consideration for any organization. By assessing training needs, hospitals can allocate resources judiciously, investing in targeted programs that address areas requiring improvement. This approach prevents unnecessary spending on generic or redundant training initiatives.

In conclusion, assessing the training needs of hospital office staff is a strategic investment with far-reaching benefits, encompassing organizational effectiveness, regulatory compliance, employee satisfaction, and the overall delivery of high-quality healthcare services.

employee satisfaction, and the overall delivery of high-quality healthcare services.

Methodology

A descriptive cross-sectional study was conducted following the five steps of training needs analysis. Initially, organizational goals and objectives were identified, and the target group, which consisted of office staff (management assistants and development officers), was selected. Subsequently, key informant interviews and focus group discussions were held with the medical officer of education, administrative officers, the accountant, and the chief nursing officer matrons to select how to conduct TNA. A gap analysis, utilizing a self-administered questionnaire, was selected to assess the training needs of the selected category.

The study was conducted from June to August 2023. All the permanent office staff (development officers and management assistants) were selected for the study population. Temporary attached office staff and staff on long-term leave, such as maternity leave, were excluded from the study. A sample size calculation for a finite population (5) was used to calculate a sample.

Sample size calculation for finite population

SS/ [1 + {(SS − 1)/Pop}]

SS = Sample size

Pop = Population

Total population = 181

Development officers – 30 (16.57%)

Management Assistant – 151 (83.43%)

Sample size = 123 (Development officers – 20, Management Assistants – 103)

The total population was 181, and 123 people (proportionate to the available development officers and management assistants) were selected from simple random sampling proportionately according to the category.

The self-administered questionnaire was used to collect the data. The questionnaire was prepared by the Hennessy-Hicks Training Needs Analysis Questionnaire (6), the Training Need Assessment Questionnaire for the Hospital Office Staff - TH Jaffna, and the Recognized Training Needs Analysis of Health Staff – 2019 (7). The questionnaire was prepared in English and translated into Sinhala and Tamil. The questionnaire consisted of 30 activities that are performed by the Hospital Office Staff routinely to fulfil their job tasks and career development. For each activity, participants were requested to give a score based on a 1 to 7 Likert scale according to the importance and the current level of performance.

The investigator took the name list of office staff from the hospital's chief secretary.

Then, they randomly selected the participants and distributed the questionnaire. After one day, questionnaires were collected. Then, data were entered into SPSS and analyzed using SPSS.

Administrative clearance was taken from the Deputy Director General of Health Services – NHSL.

Results

Mean scores for the importance of the training areas and current performances were calculated, and gaps were identified by subtracting. Training needs with the highest gaps (gap equal to or more than 2) were prioritized as training needs for office staff in NHSL (Table 1).

The following training needs were prioritized and included in next year's annual action plan.

1. Procurement for the public sector
2. Handling audit inquiries
3. File management, including personal file management (e.g. file coding, updating, record keeping, etc.).
4. Salary Conversion
5. Pension management
6. Gathering, organizing, analyzing statistically, and disseminating data and information.

Prioritized training needs were included in next year's (2024) annual action plan with the permission of DDG-NHSL.

Further, according to the results, performances for the "Introducing innovative ideas at work" was rated higher than the importance.

Discussion

The results of our research reveal a critical insight into the perceived importance of various training areas for the office staff at NHSL. By calculating mean scores for both the importance of training areas and the current performances, we were able to identify substantial gaps, thus illuminating areas that necessitate immediate attention and improvement. The significance of this research lies in its potential to inform targeted training interventions, enhancing the overall efficiency and proficiency of the office staff at NHSL.

The prioritization of training needs was guided by the identification of gaps, specifically focusing on those with a gap equal to or greater than 2. This systematic approach enabled us to pinpoint the most pressing training needs for the office staff (8). These needs, determined through a meticulous analysis, have been thoughtfully incorporated into the next year's annual action plan for NHSL.

This training recognizes the importance of procurement in the public sector and addresses the nuances and intricacies of procurement processes. By honing the skills of office staff in this area, NHSL aims to enhance efficiency, transparency, and compliance with relevant regulations.

The ability to effectively handle audit inquiries is paramount for any organization, ensuring adherence to audit standards and facilitating smooth audit processes. This training focuses on equipping office staff with the necessary skills to navigate audit inquiries seamlessly, minimizing disruptions, and ensuring accountability.

Acknowledging the importance of organized file management, this training covers file coding, updating, and record-keeping aspects. By improving file management skills, NHSL aims to streamline processes, reduce errors, and

Table 1 – Importance, performance, and gap mean score for the tasks

	Activity	Importance mean score	Performance mean score	Gap mean score
1.	File management includes personal file management (e.g., file coding, updating, record keeping, etc.)	5.7	3.2	2.5
2.	Government payroll system	5.1	2.9	2.2
3.	Salary Conversion	5.2	2.9	2.3
4.	Handling audit inquiries	5.5	2.6	2.9
5.	Procurement for the public sector	5.3	2.2	3.1
6.	Pension management	5.5	3.1	2.4
7.	Using computers and other electronic equipment (e.g. Printers, Photocopier)	4.9	3.0	1.9
8.	Communicating with the staff effectively (e.g. overcoming language and technical barriers)	5.5	3.9	1.6
9.	Accessing and gathering information and the ability to work online	4.1	3.2	0.9
10.	Working as a member of a team	4.9	3.3	1.6
11.	Preparation and checking of documents (e.g. Salary conversion, vouchers, etc.)	4.3	3.6	0.7
12.	Store/ supply chain management	4.8	3.2	1.6
13.	Referring and understanding the guidelines and circulars relevant to our work	5.0	4.1	0.9
14.	Demonstrating our juniors how to perform tasks	3.5	3.1	0.4
15.	Establishing a relationship with the staff and public	4.1	3.4	0.7
16.	Applying the knowledge gathered from reading guidelines and circulars to our practice (e.g. Salary conversion)	4.4	3.5	0.9
17.	Doing routine administrative work	3.4	3.1	0.3
18.	Managing the work stress	3.9	3.5	0.4
19	Gathering, organizing, analyzing statistically, and disseminating data and information	5.8	3.9	1.9
20.	Maintaining good relationships with our colleagues	4.8	4.0	0.8
21.	Maintaining inventory	6.2	5.1	1.1

22.	Personally coping with the changes in the workplace and managing conflicts	4.7	4.2	0.5
23.	Preparation of various types of reports and presentations (oral and written)	5.7	5.3	0.2
24.	Giving required information to our staff and public	4.9	3.6	1.3
25.	Planning and organizing our work	4.7	4.1	0.6
26.	Introducing innovative ideas at work	4.3	4.5	-0.2
27.	Preparing duty rosters for your subordinates	5.6	5.0	0.6
28.	Organizing our own time effectively (Time management)	5.2	4.8	0.4
29.	Utilizing limited resources efficiently	4.6	4.5	0.1
30.	Assuring the quality of work and quality improvement	5.1	4.8	0.3

enhance overall document control within the organization.

This training addresses the complexities associated with salary conversion processes, ensuring that office staff are well-versed in salary calculations, conversions, and related procedures. A thorough understanding of salary conversion is critical for financial accuracy and employee satisfaction.

Given the significance of pension management, this training aims to equip office staff with the knowledge and skills required for effective pension administration. Enhancing pension management expertise contributes to employees' financial well-being and ensures compliance with pension regulations.

This training addresses the essential skills needed to handle data effectively in an era driven by data. From gathering and organizing to statistical analysis and dissemination, this training empowers office staff to make informed decisions based on reliable data.

The training needs of a specific staff category within an institution can be assessed through dialogue with institutional Heads, supervisory personnel of the target category, and feedback from clients who utilize services provided by the identified staff, highlighting perceived deficiencies. However, this study focused solely on data collection via questionnaires, which constitutes a limitation. Conducting key informant interviews with supervisors and clients can facilitate a comprehensive 360-degree analysis of training needs.

Conclusion

In conclusion, the training needs analysis conducted has provided valuable insights into the areas where improvement and development are necessary within the organization. The prioritized training needs, which include procurement for the public sector, handling audit inquiries, file management, salary conversion, pension management, and data management, reflect the diverse range of skills and knowledge required for efficient and effective operations.

Addressing these training needs is crucial to enhancing the workforce's competencies

and ensuring that the organization can meet its objectives effectively. The knowledge and skills gained through training in these areas will contribute to the organization's overall success and growth.

Recommendations

As a recommendation, it is essential to institutionalize the practice of conducting a training needs analysis every year. This systematic approach allows us to adapt to changing requirements and align our training initiatives with evolving organizational goals. Moreover, it ensures that any training needs identified in one year but not addressed can be rolled into the following year's action plan. This helps prevent the waste of valuable resources and ensures that training efforts are targeted and aligned with organizational priorities.

Additionally, the gap analysis between the identified needs and the current skill levels should be an integral part of the analysis process. Prioritizing training needs based on this gap analysis ensures that resources are allocated to areas where the organization benefits most, resulting in a more efficient and cost-effective training strategy.

By adopting a continuous and strategic approach to training needs analysis, the organization can stay agile and responsive to changing demands while using its resources best. This approach is a key driver for sustained growth, efficiency, and overall success in the public sector's ever-evolving landscape.

References

1. Kavita G. Manual on Training Needs Assessment. Proj Improv Local Adm Cambodia. 2017;1–22.
2. Opatha HHDNP. Human Resource Management. In: Human Resource Management - Department of HRM, uNIVERSITY OF Jayewardenepura. 2019.
3. Markaki A, Malhotra S, Billings R, Theus L. Training needs Assessment: tool utilization and global impact. BMC Med Educ. 2021;21(1):1–20.
4. Puspita SP, Nurhalim AD. Importance of Training Needs Analysis for Human Resources Development in Organizations. E-Mabis J Ekon Manaj dan Bisnis. 2021;22(2):151–60.
5. Kaur S. REVIEW ARTICLE SAMPLE SIZE DETERMINATION (FOR DESCRIPTIVE STUDIES). Int J Curr Res. 2017;9(3):48365–7.
6. Hicks C, Hennessy D. Training Needs Analysis Questionnaire and Manual. 1996.
7. Education, Training and Research Unit M of H. Recognized Training Needs Analysis of Health Staff. Vol. 2019. 2019.
8. Arti Bansal DJPT. A Literature Review on Training Need Analysis. J Bus Manag. 2017;4(2):136–43.

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Original Article:

Cardio Vascular Disease Risk Assessment by Medical Officers According to the Guidelines at Healthy Lifestyle Centers in Western and North Western Provinces and the Factors Affecting Implementation of Guidelines

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Keywords: CVD risk assessment, Knowledge

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Abstract

Introduction: Healthy Lifestyle Centers (HLC) were established in 2011 to carry out Cardiovascular Disease (CVD) Risk Assessments and follow up with patients. The capacity of primary care institutions (PCI) for CVD risk assessment has not been studied in the recent past.

Objective: To evaluate the existing CVD risk assessment guideline and assess its application process by Medical Officers (MOs) and facilities available at HLCs for CVD risk assessment.

Methodology: A descriptive study with three components was carried out. Component one – CVD risk assessment Guideline evaluated through Key informant interviews (KII); component two- assessment of the Knowledge and practices on CVD risk assessment of all MOs working in HLCs using a self-administered questionnaire and an observational checklist; component three- assessment of available facilities and resources to carry out CVD risk assessment using a checklist.

Results and Discussion: The study was conducted in 141 HLCs accessible during the Covid period. Assessment of CVD risk assessment guidelines showed Problems in methodological standards and in the identification and summary of evidence. MOs need to gain Knowledge in screening those under 35 years, in reading the WHO/ISH Risk Prediction Chart and in advising on further management and follow-up. All HLCs have at least one medical officer, but there is a lack of nursing officers and health care assistants.

Conclusions and recommendations: There was a gap in Knowledge in screening criteria and management of those under 35 years of age. It is recommended to carry out training at national level every six months so all staff newly appointed to primary care could be trained. It is also recommended to appoint at least one nursing officer or a Public

Health Nursing Officer (PHNO) to an HLC.

Keywords: CVD risk assessment, Knowledge

Introduction and Justification

Reducing the rapidly rising burden of Noncommunicable Diseases (NCDs) in Sri Lanka is a national imperative [1]. Healthy Lifestyle Centers (HLC) were established in 2011 to conduct Cardiovascular Disease (CVD) Risk assessment using the WHO PEN protocol [2]. By March 2020, there were 1013 Healthy HLCs established in the country [1]. However, the annual participation in HLC for CVD risk assessment remains at 8 % of the target population, and male participation is only 25% of the total participants [3].

Steps survey 2021[4] shows that 34% of the population above 18 years has hypertension and 14.7% of the same population has raised fasting blood sugar. But less than 30% of them are aware of their risk factor status, throwing light on the importance of regular screening for NCDs. At present there is a primary care reorganizing taking place in Sri Lanka to gear them to tackle current health problems including NCDs [5].

The directorate of NCD has developed the national guideline for CVD risk Assessment based on the PEN package tools [6] and is conducting a training programmes physically as well as on line to train MOs [7]. In addition to the training package, the essential service package [8] is developed for primary care units. The package has identified essential equipment, and human resources needed for management of NCDs. Also, nineteen essential drugs were identified to treat NCDs at PCI [9].

People who underwent screening are given Personal Medical Records (PMR) to record their individual health status [15]. In the HLCs several registers and records such as participant register males and females [16,17] are used to document the details of the screened population.

Directorate of NCD has also developed guidelines on the management of common NCDs at the primary care level, including diabetes [10], hypertension [11], Obesity and overweight [12], hyperlipidemia [13] and chronic respiratory diseases [14]. There are three main methods of developing guidelines [19,20]: Peer groups, Delphi Technique and consensus conference. There is an interest in developing guidelines for many other chronic diseases as it encourages good practice and, thus, health gain [18]. However, these guidelines were never evaluated.

It would be timely to evaluate the CVD risk assessment guideline, PCI infrastructure availability, and the Knowledge and practices of MOs involved in NCD screening.

General Objective

To evaluate the existing CVD risk assessment guideline and to assess the process of its application by Medical officers, and to assess the Knowledge and practice of MOs working at HLCS and the assessment facilities available at HLCs in selected Primary Care Institute (PCI) of Western and North Western Provinces.

Specific Objectives

1. To evaluate the existing CVD Risk Assessment Guideline developed by the Ministry of Health (MoH).
2. To assess the Knowledge of CVD risk assessment of MOs working at HLCS

3. To assess the practice of MOs on CVD risk assessment, management and follow-up of clients presented to HLCs.
4. To describe the facilities and resources available for assessing CVD risk of clients in selected PCI of Western and North Western Provinces

Methodology

A descriptive cross sectional study was carried out in western and north western provinces. This study consisted of three components.

Component one

In this component, the available CVD risk assessment guideline was evaluated using a Key Interviewer Interview (KII) guide. A format developed by Shaneyfelt et al [21] was used to evaluate the CVD Risk assessment guideline. The format has three parts, as given below, and all responses were marked as 'yes' or 'no.'

1. Methodological standards for guideline development (10 questions)
2. Identification and summary of evidence (9 questions)
3. Adherence to methodological standards on the formulation of recommendations (5 questions)

Component two

Under this component, the Knowledge and practice of MOs in relation to CVD risk assessment was tested. Only one MO was selected using convenient sampling method from each selected PCI.

Data was collected by a self-administered questionnaire to assess the Knowledge on CVD risk assessment and an observational check list was used to assess the practice of MOs in the procedure of CVD risk assessment and follow up of clients.

Component three

All selected PMCI were assessed using a check list on the facilities and resources available at HLCs.

Results

Evaluation of the CVD risk assessment Guideline

Table I: Distribution of Agreement Scores when Assessing the CVD Risk Assessment

Area	Response	Agree	Disagree
A. Methodological standards	1. Purpose of the guideline specified	yes	
	2. Rationale and Importance of the Guidelines explained	yes	
	3. The participants in the guideline development process and their areas of expertise are specified.	yes	
	4. Targeted health problem or technology is clearly defined.	yes	
	5. Targeted patient population is defined	yes	
	6. Intended audience or users of the guidelines are specified.	yes	
	7. the principal preventive, diagnostic or therapeutic options are available to clinicians and patients are specified	yes	

Area	Response	Agree	Disagree
	8. the health outcomes are specified	yes	
	9. the method by which the guideline underwent external review is specified.		Yes
	10. An expiration Date or date of scheduled review is specified.		Yes
B. identification and summary of evidence	1. The method of identifying scientific evidence is specified		Yes
	2. The time period from which evidence is received is specified		Yes
	3. The method of data extraction is specified	yes	
	4. The method of grading or classifying scientific evidence is specified	yes	
	5. formal methods of combining evidence or expert evidence are used and described	yes	
	6. benefits and harms of specific health practice are specified		Yes
	7. benefits and harms are quantified		Yes
	8. the effect of healthcare costs from specific health practice is specified		Yes
	9. costs are quantified		Yes
C. Adherence to methodological standards on the formulation of recommendations	1. the role of value judgement used by the guideline developers in making recommendations is discussed	yes	
	2. the role of patient preferences is discussed	yes	
	3. recommendations are specific and apply to the stated goals of the guideline	yes	
	4. recommendations are graded according to the strength of the evidence	yes	
	5. flexibility in the recommendations are specified.	yes	

Problems were observed in methodological standards and in identification and summary of evidence. The main problems in methodological standards were there was no expiry date for the guideline and external reviews of guidelines not conducted (table 1). There are many areas lagging under identification and summary of evidence. There was no formal method used to combine evidence or expert evidence.

Table 2 shows the distribution of knowledge scores among Medical Officers.

Table 2: Frequency Distribution of Correct and Wrong Answers for each Question in the Questionnaire

Question	Response	Correct answer (%)	Wrong answer WHOI (%)	Total
1. CVD risk assessment can be performed in,	a. A female aged 27 years with symptoms suggestive of diabetes mellitus	105(74.5)	36(25.5)	141(100.0)
	b. A 39-year-old male	141(100.0)	0(0.0)	141(100.0)
	c. A 46-year-old male with Ischemic Heart Disease	105(74.5)	36(25.5)	141(100.0)
	d. A 67-year-old female with peripheral vascular disease	99(70.2)	42 (29.8)	141(100.0)
2. Referral to a specialist clinic should be done when,	a. Total cholesterol level is ≥ 5mmmol/dl	120(85.1)	21(14.9)	141(100.0)
	b. Proteinuria is present	120(85.1)	21(14.9)	141(100.0)
	c. The client is less than 35 years of age with symptoms of diabetes	39(27.7)	102(72.3)	141(100.0)
	d. The Blood pressure is >140/90mmHg	105(74.5)	36(25.5)	141(100.0)
3. The following is necessary to calculate the CVD risk	a. Family History of CVD	90(63.8)	51(36.2)	141(100.0)
	b. Body Mass Index	87(61.7)	51(36.2)	141(100.0)
	c. Fasting Blood Sugar level	126(89.4)	15(10.6)	141(100.0)
	d. Alcohol consumption	99(70.2)	42(29.8)	141(100.0)
4. Regarding the CVD risk	Risk of 10% to <20% denotes yellow areas of the WHO/ISH Risk Prediction Chart	21(14.9)	120(85.1)	141(100.0)

Question	Response	Correct answer (%)	Wrong answer WHOI (%)	Total
5. Regarding CVD risk	Review cardiovascular risk according to the guideline every 6 months in moderate risk patients	93(66.0)	48(34.0)	141(100.0)
6 When serum Cholesterol value is not available in a 45-year-old man, how do you assess the CVD risk	a. Take Serum cholesterol value as 5 mmol/dl and calculate CVD risk	108(76.6)	33(23.4)	141(100.0)
7. Cardiovascular Risk prediction charts should not be applied to	b. Patient with diabetes nephropathy	111(78.7)	30(21.3)	141(100.0)
	a. Patient with hypertension	132(93.6)	9(6.4)	141(100.0)
	b. Patient aged 45 years	135(95.7)	6(4.3)	141(100.0)
	c. Patient with a history of hyperlipidemia	138(97.9)	3(2.1)	141(100.0)
8. How often do you review a patient with a CVD risk of less than 10% and BP 120/80 mmHg	One year	105(74.5)	36(25.5)	144(100.0)
9. If a 37 year old person come to assess CVD risk what is the age category are you would use?	40-49 years	72(51.1)	69(48.9)	141(100.0)
10.Patient will be categorized as diabetes if he/she has,	a. FBS above 140mgl/dl	81(57.4)	60(42.6)	141(100.0)

According to table 2, There seems to be lack of Knowledge in reading WHO/ISH Risk Prediction Chart. Also, awareness of referral criteria seems to be low.

The knowledge scores obtained showed no relationship with whether the MO followed training (mean score =16.1) or not (mean score =16.5). Also mean knowledge score of those who have followed training with

physical presence (mean =16.5) is high compared to the mean score of those who have followed training on line(mean=15.25) though not statistically significant.

Observational check list was used to assess the practices of MOO when assessing CVD risk. Table 3 shows the practice o medical officers.

Table 3: Distribution of Selected Practices among Medical Officers

Item	Carried out	
	Yes (%)	**No (%)**
Included following areas when taking history from the client		
Age	141(100.0)	0(0.0)
Gender	141(100.0)	0(0.0)
Symptoms suggestive of chest pain	112(79.4)	29(20.6)
Past medical history	141(100.0)	0(0.0)
Family history	141(100.0)	0(0.0)
Drug history	135(95.7)	6(4.3)
Smoking history	141(100.0)	0(0.0)
Areas covered in Examination		
Blood pressure	141(100.0)	0(0.0)
Height	141(100.0)	0(0.0)
Weight	141(100.0)	0(0.0)
BMI	141(100.0)	0(0.0)
Waist circumference	135(95.7)	6(4.3)
CVD Risk Assessment		
Did the CVD risk assessment	141(100.0)	0(0.0)
Correctly mark in the CVD risk	141(100.0)	0(0.0)
Correctly classify the client according to the CVD risk	129(91.4)	12(8.6)
Correctly give instructions to the client regarding management	111((78.7)	30(21.3)
Correctly give instructions to the clients regarding follow up	111((78.7)	30(21.3)

As shown in Table 3, during the history taking only 79.4% have inquired about history of chest pain. During examinations all of them have checked blood pressure, height, weight and BMI while 95.7% measured the waist circumference.

All MOO (100%) correctly did the CVD risk assessment and marked it in the correct place. However, only 91.4% correctly classified the clients according to the CVD risk assessment charts. Only 78.7% of MOO correctly gave instructions to the clients regarding further management and follow up of their condition based on the risk level.

Table 4 shows the human resources availability to conduct HLCs.

Table 4: Human Resources availability to conduct Healthy Lifestyle Centers

Human Resource	Number available			
	Not available	one	two	>=Three
Medical Officer	0	80	24	37
Nursing Officer	78	8	55	0
Public Health Nursing officer	111	30	0	0
Health Care Assistant	8	86	47	0

According to table 4, all HLCs had at least one MO. However, 78 HLCs did not have a Nursing Officer(NO) and only 30 institutions had a Public Health Nursing Officer(PHNO). It was observed that eight HLCs didn't have Health care Assistants (HCAs). .

Table 5 shows the availability of Records, Registers and guidelines.

Table 5: Availability of Records, Registers and Guidelines at Healthy Lifestyle Centers

Records, Registers and Guidelines	Availability	
	Yes (%)	No (%)
Personal Medical Record	141(100.0)	0(0.0)
Participant's register	133(94.3)	8(5.7)
CVD risk assessment guideline	133(94.3)	8(5.7)
Diabetes Management guideline	125(88.7)	16(11.3)
CVD Risk Assessment Chart	133(94.3)	8(5.7)

All HLCs have Personal Medical Records (table 5). Participant registers were available in 133 HLCs (94%). CVD risk assessment guideline and the CVD risk assessment charts were available in 94% of the HLCs .

All 141 HLCs has Blood Pressure machines while only 133 HLCs had cholesterol meters and glucometers.

Discussion

This research had to be carried out during the Covid epidemic as the epidemic was reported immediately after commencing the data collection. During this period many HLCs were not open and there was no screening taking place. Also, some primary care institutions were converted to intermediate care centers. In addition, due to travel restrictions, it was not advisable to visit the stations for the research. 141 primary care institutions which had fully or partially functioning HLCs were visited for the study. As this research did not cover participation at HLCs, it was possible to conduct the research fully in the 141 functioning HLCs.

In the methodological standards the lack of an expiry date for the guideline was identified as an issue. When policies or guidelines are developed, it is important to identify an expiry date after which new policies or guidelines need to be developed based on Knowledge at that time.

MOs showed lack of Knowledge in handling those under 35 years of age and on referral criteria. This needs to be covered in the future trainings.

It is shown that those who had followed online training on CVD risk assessment had less Knowledge compared to others who have followed the course physically. The skills of MOs in clinical examination was 100%. All 141 MOs did the CVD risk assessment correctly and also marked it correctly.

Although medical officers were available in all PCIs nursing officers were not available in 78 PCIs. In eight HLCs the participants registers, and CVD risk assessment guidelines and charts were not available.

Conclusions

1. The CVD guideline lacked methodological standards and identification and summary of evidence.
2. There is a gap in Knowledge in screening criteria and management of those under 35 years of age.
3. Ther is lack of a NOs in many PCIs.

Recommendations

1. It is recommended to carry out training at national level for MOs every six months.
2. It is recommended to appoint at least one NO or a PHNO to a HLC.

References

1. World Health Organization. Review on the national NCD prevention and control programme in Sri Lanka. 2021.
2. World Health Organization. Tools for implementing WHO PEN (Package of essential non communicable diseases interventions). www.who.int. 16.2.2020.
3. Ministry of Healthcare, Nutrition & Indigenous Medicine, Colombo, Quartely NCD Bullatine. Sri Lanka, 2019.
4. Ministry of Health and Department of Census and Statistics (2021). Non-Communicable Diseases Risk Factor Survey(STEPS Survey), Sri Lanka. Sumathi Printers Pvt. Ltd. Colombo 14. ISBN 978-624-5719-78-5.
5. Primary Care System Strengthening Project. Module ii -On line Training on primary care guidelines. Personal Communication Director PSSP on 1.2.2020.
6. Ministry of Health. National Guideline for Cardiovascular Risk Management for Primary Health Care Providers, Colombo, Sri Lanka:2021
7. Personal Communication with Director NCD on 12.3.2023.
8. Ministry of Healthcare, Nutrition & Indigenous Medicine. Essential Health Service Package Sri Lanka: 2019.
9. Ministry of Health. Circular on Revised NCD essential medicines list to manage NCDs at primary care institutions. 2024
10. Ministry of Health. Management of Diabetes Mellitus, Guideline for Primary Health care providers, Colombo, Sri Lanka: 2018.
11. Ministry of Health. National Guideline for Management of hypertension for Primary Health Care Providers, Colombo, Sri Lanka: 2021
12. Ministry of Health. Guideline on management of overweight and obesity among adults in Sri Lanka, Colombo, Sri Lanka:2018
13. Ministry of Health. National Guideline for Management of Dyslipidemia for Primary Health Care Providers, Colombo, Sri Lanka: 2021
14. Ministry of Health. Management of Common Chronic Respiratory Diseases Guideline for Primary Health Care Providers, Colombo, Sri Lanka:2020

15. Ministry of Health. Personal Medical Record, Colombo, Sri Lanka: 2020
16. Ministry of Health. Participants register (Female)-H1236B, Colombo, Sri Lanka: 2020
17. Ministry of Health. Participants register (Male)-H1236A, Colombo, Sri Lanka: 2020
18. Delamother T, Guidelines that doctors will Follow. BMJ: 1993; (307), Pp 307-218
19. Audet AM, Greenfield S, field M. Medical Practice Guidelines: Current activites and future direction. Ann Intern Med : (1990). (113); pp 709-1.
20. Fink A, KosekoffL, Chassin M, Brook RH. Consensus methods: characteristics and guidelines for use. Am J. public Health. : 1984 ; (74):pp 979-83.
21. Shaneyfelt TM, Mayo-Smith MF. Rothwangl J. A guidelines following guidelines? JAMA, March 26, 1999: Vol 281;(20). Pp 1900-1905.

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Original Article:

Enhancing Resurrection Practices for Unusable General Inventory Items in Hospital Settings

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Keywords: General inventory items, resurrection practices, hospital maintenance, D.G.H. Negombo

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Abstract

Background: Effective patient care in hospitals relies on the proper functioning of medical equipment. Malfunctioning general inventory items, such as patient beds, wheelchairs, and saline stands, pose significant challenges to hospital operations and patient care. D.G.H. Negombo needs help maintaining these items due to limited financial resources and inadequate technical expertise.

Objective: To improve the resurrection practices of selected unusable general inventory items at D.G.H. Negombo.

Methodology: This cross-sectional descriptive study was conducted from August 1, 2022, to November 15, 2023, and involved three phases: pre-intervention (assessment), intervention (implementation), and post-intervention (evaluation). Data collection methods included key informant interviews (K.I.I.), self-administered questionnaires (S.A.Q.), and desk reviews. The study targeted general inventory items marked for condemnation and included unit heads and maintenance technicians in its scope.

Results: Pre-intervention assessments identified key issues such as inadequate technical skills, poor coordination, and insufficient infrastructure. Interventions implemented included skill development workshops, improved documentation practices, and enhanced communication strategies. Post-intervention evaluations demonstrated significant improvements in repair times, resource availability, and satisfaction among unit heads. Notably, 78% of wheelchairs, 79% of patient trolleys, and 76% of patient beds were successfully resurrected.

Conclusions: The interventions enhanced the resurrection of unusable general inventory items, extended equipment lifespans, and achieved substantial cost savings.

Recommendations: To sustain the progress achieved, it is recommended that D.G.H. Negombo continue focusing on the resurrection of general inventory items, engage skilled volunteers, and implement effective monitoring mechanisms by establishing a focal point.

Keywords: General inventory items, resurrection practices, hospital maintenance, D.G.H. Negombo

Introduction

Effective patient care in hospitals depends on properly functioning medical equipment. Malfunctions can disrupt services, underscoring the importance of maintaining inventory items in good working order.[1] Essential inventory items like patient beds, wheelchairs, and saline stands are essential for hospital operations. When these items malfunction and are not promptly repaired or replaced, it can lead to inefficiencies and affect healthcare quality.[2]

Background

This research addresses the challenges of repairing and restoring general hospital inventory items. When an item malfunctions, it is reported to hospital administration, which coordinates repairs through the maintenance unit or external agents. Irreparable items are marked for condemnation[3].

Justification

This research is justified by the economic challenges at D.G.H. Negombo, where limited funds hinder replacing and repairing malfunctioning inventory items. The lack of skilled maintenance personnel exacerbates the issue, and unusable items accumulate, occupying space and impeding patient care.[4] Cost-effective interventions to resurrect these items are crucial for operational efficiency.

Problem Statement

D.G.H. Negombo faces challenges in maintaining inventory items, affecting healthcare quality. The accumulation of unusable items due to limited space, inadequacy of technical expertise, and resources in the maintenance unit necessitates improved resurrection practices.[5]

Project Questions

Does D.G.H. Negombo experience challenges due to inadequate functioning of inventory items, affecting patient care quality?

Are there facilities and resources shortages hindering the resurrection of unusable inventory items at D.G.H. Negombo?

General Objective

To improve the resurrection practices of selected unusable general inventory items in D.G.H. Negombo.

Specific Objectives

To assess the current process and practices of resurrection of unusable general inventory items in D.G.H. Negombo.

To identify the gaps and deficiencies in the current process and practices of resurrection of unusable general inventory items in D.G.H. Negombo.

To develop and implement suitable interventions to overcome the identified gaps in the current process and practices of resurrection of unusable general inventory items in D.G.H. Negombo.

To evaluate the effectiveness of the interventions in the resurrection of

unusable general inventory items in D.G.H. Negombo.

Methodology

The study at D.G.H. Negombo aimed to review and restore selected unusable general inventory items through interventions designed to improve resurrection practices.

The project "Enhancing Resurrection Practices for general Inventory Items at D.G.H. Negombo" was conducted from August 1, 2022, to November 15, 2023. It focused specifically on engaging with all unit heads responsible for general inventory items and technicians of the maintenance unit within D.G.H. Negombo. The project targeted all unusable general inventory items marked for condemnation by the maintenance unit and items not used at present due to malfunctioning.

The project's inclusion criteria encompassed unit heads, maintaining inventories of general inventory items at D.G.H. Negombo, all general unusable inventory items marked for condemning by the maintenance unit, and items that are not in use at present due to malfunctioning. Exclusion criteria applied to general inventory items that were already condemned, as they were not within the scope of this project.

The methodology comprised a cross-sectional interventional study with pre- and post-assessments conducted in three phases: pre-intervention (Phase I—Planning), intervention (Phase II—Execution), and post-intervention (Phase III—Evaluation).

Pre-intervention (Phase I: Planning)

During Phase I, existing processes for unusable inventory item repair were assessed using key informant interviews (K.I.I.), self-administered questionnaire (S.A.Q.), and desk reviews. K.I.I. gathered qualitative data from stakeholders, including the director, medical officers, unit heads, and others involved in inventory management. S.A.Q. assessed unit heads' experiences, difficulties faced and requirements for resurrection. A desk review was used to examine technical issues and storage practices for unusable items. The phase also involved categorizing unusable items based on urgency, breakdown frequency, and resurrection possibility.

Intervention (Phase II: Execution)

Phase II involved executing interventions to enhance resurrection practices of obsolete general inventory items marked for condemnation. This included developing guidance for technicians, improving documentation processes, providing infrastructure support, involving voluntary professionals, implementing a color-coding system, and establishing a focal point for coordination.

Post intervention (Phase III: Evaluation)

Phase III evaluated intervention effectiveness through various metrics including inspecting resurrected items, assessing benefits, and evaluating unit heads' experiences using key informant interviews and S.A.Q.

The project plan was systematically implemented following an organized manner. Initial steps involved are conducting a SWOT analysis to identify internal strengths and weaknesses, as well

as external opportunities and threats affecting maintenance, repair, and resurrection activities. This analysis informed the development of strategies using a TWOS matrix to address identified issues and leverage opportunities. The execution plan was developed collaboratively with stakeholders and formally accepted during unit heads' meetings. A detailed project activity plan and work breakdown structure were established to visualize tasks and ensure effective project management.

Data analysis was integral to understanding the need for resurrection activities of unusable inventory items. Both qualitative and quantitative approaches were utilized. Qualitative data were collected through K.I.I. with officers handling unusable general inventory items and analyzed using NVivo content analysis software. Quantitative analysis involved sample descriptions, data related to inventory handling, desk review and S.A.Q. Pre-interventional analysis provided descriptive insights crucial for designing effective interventions aimed at improving inventory management and repair processes within the hospital setting.

Results

a) Pre-Intervention Results:

Before the intervention, the evaluation of general inventory items indicated several areas requiring improvement. Notably, the pre-intervention qualitative assessment highlighted issues such as repair time, coordination with the maintenance unit, lack of supervision and communication. These aspects were identified as key concerns affecting the efficiency and effectiveness of the maintenance processes for general inventory items.

i. Results of Pre-intervention Qualitative Assessment

Based on the results of qualitative data, current processes and practices for maintaining and repairing general inventory items were identified.

• KII

A table of coding summary were developed after interviewing the fifteen members selected for the K.I.I. of the general inventory items.

The table 1 illustrates the following codes such as insufficient space in wards and maintenance unit, lack of technical knowledge, poor attitude and practices of the maintenance unit personnel

The maintenance unit personnel's lack of technical knowledge and poor attitude and practices achieved the highest percentage (39.9%) of references. Reasons mentioned in the 1st, 2nd, 3rd, and 4th ranks were used to develop interventions.

ii. Results of pre-intervention quantitative assessment

Pre-intervention quantitative assessment was done using, desk review and S.A.Q.

• Desk Review

Selection of unusable general inventory items for the research project

Unusable general inventory items which were identified through a desk review were listed in descending order of unusable items to identify the most affected categories by an expert panel. The first five categories were selected for the application of specially designed criteria to prioritize the three most important categories.

Table 1: Coding summary of pre-intervention K.I.I. for General Inventory Items

Names of the codes and sub-codes	References	Percentage %
Insufficient Space	**34**	**23.7**
Maintenance unit space not sufficient	16	11.2
Ward space occupied by malfunctioning items	10	7.0
Difficult traceability	8	5.6
Lack of knowledge, attitude and practice	**57**	**39.9**
Technical skills and training not adequate	24	12.8
Poor communication & PR skills	25	17.5
Insufficient Recognition	8	5.6
Lack of Supervision	**13**	**9.0**
No technical or supervising officer	8	5.6
Less Documentation	5	3.5
Poor Organizing	**18**	**10.6**
The maintenance unit is not organized	8	5.6
Difficulty in finding spares and tools	10	7.0
Time Requirement	**21**	**14.7**
Delay in repairs	12	8.4
No fixed date & time for repairs	6	4.2
No mobile repair activity	3	2.1
Total	**143**	**100**

The criteria developed included following areas

1. Urgent requirement of the hospital
2. Frequency of breakdown
3. Possibility of resurrection

Based on the above criteria, marks given to the item categories were considered and wheelchairs, patient trollies and patient beds were identified as prioritized groups.

Table 2 illustrates the gravity of the situation regarding unusable inventory items and it highlights the urgency of resurrection.

Table 2: Number of unusable inventory items selected for resurrection

Name of the Inventory Item	Number of items marked for resurrection (Selected Groups)	Total number in the hospital	Percentage
Selected General Inventory Items			
Wheelchairs	64	80	80%
Patient trollies	38	89	42%
Patient beds	37	610	6%

• S.A.Q.

There were 45 participants who were unit heads of D.G.H. Negombo. They were asked regarding their opinions on the processes established for the resurrection of unusable inventory items. The areas of inquiry were satisfaction with repairs of general inventory items, space occupied by unusable general inventory items, and traceability of such items. The study instrument used for this purpose was the S.A.Q., which was applied before the interventions. Answered S.A.Q.s were analyzed to get inputs to design interventions.

The same S.A.Q. was used to assess the situation six months after the interventions are conducted.

The S.A.Q. was designed to obtain responses using a Likert scale, so the results were obtained in quantitative data format. In analysis, the responses recorded in the Likert scale were grouped and analyzed as a binary variable.

b) Interventions for resurrection of unusable General Inventory Items:

Following the pre-intervention assessment, targeted interventions were implemented to address the identified issues. The interventions aimed to improve repair time, enhance coordination with relevant units, optimize workspace allocation, and streamline communication processes. By focusing on these areas, the project sought to enhance the overall maintenance and repair procedures specifically for general inventory items within the hospital.

Project implementation mainly consisted of launching thirteen interventions identified based on the results of the pre-intervention. They are:

a) Public relations and communication workshop
b) Identification of well wishes to assist the project
c) Workshop conducted on white steel welding
d) Establishment of a precondemning store
e) Facilities improved for both in-house workers and other technicians who visit the hospital
f) Introduction of guidelines for the maintenance unit personnel
g) Issue of an information sheet to unit heads
h) Development of a job card
i) Form to hand over and take over of unusable general inventory items to outside volunteer technicians
j) Setting up of focal point with a dedicated staff
k) Assurance of uninterrupted supply of spare parts.

l) Development of Web-based platform
m) Formation of WhatsApp group

c) Post-Intervention Results:

The post-intervention evaluation demonstrated significant improvements across various parameters related to resurrection of unusable general inventory items. Notably, there was a considerable increase in satisfaction levels regarding repair times, coordination, workspace allocation, and communication. This improvement was evident by quantitative data showing higher satisfaction scores and percentages of positive responses post-intervention compared to pre-intervention. Overall, the interventions led to enhanced efficiency and effectiveness in managing the maintenance and repair processes for general inventory items at D.G.H. Negombo.

Phase III post-intervention results were obtained using two techniques: qualitative assessment through K.I.I. and quantitative assessment through S.A.Q.

i. Results of the post-intervention qualitative assessment

Based on the K.I.I. conducted after implementing interventions following results were derived.

• KII

A table of coding summary were developed after interviewing the same fifteen members who were interviewed for the pre-intervention K.I.I.

The table 3 indicates organization restructuring, resource availability, enhancement of repair speed, improvement to the documentation process and communication improvement as five main codes. Accordingly, the highest number of references (26 %) were received for code on organization restructuring. The codes representing resource availability and communication improvement indicates importance as both obtained an equal number of references giving a percentage of 20%. The two codes on improvement to the documentation process and the enhancement of repair speed received percentages of 13% and 9% respectively.

ii. Results of post-intervention quantitative assessment

Post-intervention quantitative assessment was conducted among unit heads using S.A.Q. The questionnaire used was the same as the one used for pre-intervention assessment.

Table 3: Coding summary of post-intervention K.I.I. for General Inventory Items

Names of the codes and sub-codes	References	Percentage %
Organization Restructuring	**36**	**26.0**
Clear work process	18	13.0
Implementation of best practices	3	2.2
Inventory management eased	3	2.2
Assistance from other agencies and well-wishers	12	8.7
Resource Availability	**28**	**20.3**
Skilled maintenance staff	12	8.7
Support from external sources	8	5.8
Appointment of supervisor & focal point	8	5.8
	29	**9.0**

Enhancement of repair speed		
Improved availability of spare parts	13	5.6
Attending promptly to repairs	10	3.5
Efficient coordination with outside technicians	6	4.3
Improvement to the documentation process	**18**	**13.0**
Improved documentation practices	12	8.7
Streamline record keeping	6	4.3
Communication improvement	**27**	**19.6**
Effective communication with maintenance personnel	12	8.7
Improved communication with staff members	15	10.7
Total	**138**	**100**

Table 4: Mean score of statements of the satisfaction, space and traceability in the pre & post- intervention period.

Serial No:	Domain	Pre (n =38)			Post (n=38)			Sig.
		Mean	SD	Interpretation mean score	Mean	SD	Interpretation mean score	Paired-test, p
1	Satisfaction	2.38	0.56	Average	3.87	0.31	High	15.75, p<0.001
2	Space	3.91	0.85	High	2.41	0.54	Average	9.37, p<0.001
3	Traceability	3.22	0.58	Average	4.03	0.46	High	7.83, p<0.001

Table 5: Number and percentage of resurrected selected inventory items

Name of the unusable equipment	Number of items marked for condemning	Number resurrected	Percentage resurrected
Selected General Inventory Items			
Wheelchairs	64	50	78%
Patient trollies	38	30	79%
Patient beds	37	28	76%

Table 4 highlights that the interventions made for the unusable inventory items at D.G.H. Negombo had a positive impact on all three domains.

Since the mean scores can provide an overall summary of participants' attitudes or perceptions towards the various aspects covered in the questionnaire, the mean score results obtained in this study endorse the researcher's assumptions made when planning the project and the intervention.

Number of selected inventory items resurrected through the interventions of the project.

Table 5 indicates that the research project's interventions were able to resurrect a reasonable number of items that had previously been condemned. General inventory items that were resurrected include fifty wheelchairs (78%), thirty patient trollies (79%), and twenty-eight patient beds (76%).

Discussion

The project at D.G.H. Negombo on resurrecting unusable general inventory items aligns with global efforts to extend the life cycle of medical equipment, improving efficiency, environmental outcomes, and sustainability. Financial benefits from resurrected equipment encourage hospitals to adopt this practice, integrating it into the global healthcare economy.[6]

In India, the demand for resurrected medical equipment is growing, especially in rural markets with cost sensitivity and low purchasing power.[7] A study in Latin America highlights a shortage of qualified maintenance personnel, a situation mirrored in Sri Lanka.[8]

This project addressed issues such as spare parts shortages, technician deficiencies, and inadequate infrastructure. Interventions included engaging skilled volunteers and implementing repair and resurrection guidelines. Post-intervention evaluations showed significant improvements in repair activities, satisfaction levels, space utilization, and equipment traceability. Successful resurrection rates were 78% for wheelchairs, 79% for patient trolleys, and 76% for patient beds, increasing availability and cost savings.

However, the study's limitations include the selection of a limited number of items and challenges with external repairs and volunteer availability, affecting the project's scope and effectiveness.

Conclusion

The project aimed to enhance the resurrection of general inventory items at D.G.H. Negombo, extending equipment lifespan and optimizing resource utilization. Significant gaps in technical proficiency and coordination were identified and addressed. The interventions led to notable improvements in resurrecting items that would have been condemned, saving costs and redirecting resources to patient care. Sustained efforts and collaboration with hospital authorities and stakeholders are crucial for continued success.

Recommendations

Continued Focus on Resurrection: Expand resurrection efforts with low-cost interventions and effective monitoring.

Engagement of Skilled Volunteers: Identify and engage skilled volunteers to support ongoing maintenance and optimization.

These recommendations will enhance operational efficiency and patient care outcomes at D.G.H. Negombo.

References

1. Mutia, D.M., Kihiu, J. and Maranga, S.M. (2012). Maintenance Management of Medical Equipment in Hospitals. Industrial Engineering Letters, 2(3), pp.9–19.
2. Jamshidi, A., Rahimi, S.A., Ait-kadi, D. and Ruiz, A. (2015). A comprehensive fuzzy risk-based maintenance framework for prioritization of medical devices. Applied Soft Computing, 32, pp.322–334.

doi:https://doi.org/10.1016/j.asoc.2015.03.054.
3. Koggalage, P.D. and De Alwis, S. (2019). A Project to Improve Management of Biomedical Equipment in Selected Units of District General Hospital, Gampaha, Sri Lanka. International Journal of Research Foundation of Hospital and Healthcare Administration, [online] 7(2), pp.67–74. doi:https://doi.org/10.5005/jp-journals-10035-1109.
4. Dasanayaka, S. (2001) 'Performance of Health Care Equipments in the Public Sector Hospitals in the Eye of Good Governance, A Case Study Based on the Sri Lankan Public Sector Hospitals', (January 1986), pp. 1–25. Available at: http://www.napsipag.org/PDF/SARATH_DASANAYKA.pdf.
5. Bahreini, R., Doshmangir, L. and Imani, A. (2019) 'Influential factors on medical equipment maintenance management: In search of a framework', Journal of Quality in Maintenance Engineering, 25(1), pp. 128–143. doi 10.1108/JQME-11-2017-0082.
6. Kapoor, P., Harrington, C., Church, C., Gale, T., Tan, P. and Abou-Zaki, A., 2006. Guide to Sustaining Existing Tower Blocks in the U.K. Comfort and Energy Use in Buildings, pp.27-30.
7. Refurbished Medical Equipment: Challenges & Opportunities (2015) GreenBook. Available at: https://www.greenbook.org/marketing-research/refurbished-medical-equipment-challenges-opportunities-40073 [Accessed October 27 2022].
8. Maxwell, R. J. (1985) 'Resource Constraints and the Quality of Care', The Lancet, 326(8461), pp. 936–939. doi: 10.1016/S0140-6736(85)90862-1.

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Original Article:

Dengue Outbreak Control and Prevention: A Case Study of Gampaha District, Sri Lanka

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Keywords: Dengue, Gampaha District, Sri Lanka, public health, data-driven decision-making

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Abstract

Dengue fever remains a persistent public health challenge in Gampaha District, Sri Lanka. Despite ongoing efforts by the Ministry of Healthcare, Nutrition & Indigenous Medicine, the district reported 10,212 cases in 2022, with significant hospital admissions and deaths in high-risk areas like MC Negombo, Gampaha, and Minuwangoda. The study examines Dengue control and prevention strategies implemented from November 2022 to March 2023. Data was collected from existing records, interviews with key informants, and field observations. Major challenges were identified and prioritised using evidence-based methodologies, including the "Five Whys" root cause analysis. The analysis revealed significant challenges categorised into program-related and non-program-related issues. Key issues include inadequate use of existing data, insufficient evidence-based control measures, and operational inefficiencies. The root cause analysis identified core problems such as lack of funding, poor planning, and limited community engagement. The study highlights the critical need for data-driven decision-making and enhanced collaborative efforts. Establishing a technical body, develop context-specific programs, and improve community involvement. Resource mobilisation for research and forecasting epidemics was also emphasised. This case study provides valuable insights into the challenges and strategic interventions necessary for effective Dengue control in the Gampaha District. Emphasising evidence-based decision-making and a comprehensive action plan underscores the importance of collaborative efforts to combat Dengue in the region.

Keywords: Dengue, Gampaha District, Sri Lanka, public health, data-driven decision-making

Introduction

Dengue is a viral infection transmitted to humans through the bite of infected mosquitoes, primarily Aedes aegypti and, to a lesser extent, Aedes albopictus [1]. There is no specific treatment for Dengue or severe Dengue, but early detection and proper medical care can reduce fatality rates to below 1%. Dengue is prevalent in tropical and subtropical regions, especially in urban and semi-urban areas, and its global incidence has grown dramatically, with about half of the world's population now at risk [2]. An estimated 100-400 million infections occur annually, although over 80% of these cases are generally mild and asymptomatic. Effective prevention and control of Dengue rely heavily on vector control measures, and sustained community involvement can significantly enhance these efforts [3].

Dengue fever and the more severe Dengue Haemorrhagic Fever (DHF) became nationally notifiable diseases in Sri Lanka in 1996. The highest number of dengue cases was reported during the 29th week of 2017 [4]. The disease has a seasonal transmission pattern in Sri Lanka, with peaks occurring during the monsoon rains in June-July and October-December. Currently, nearly all districts in the country report dengue cases, with the Western Province's Colombo, Gampaha, and Kalutara districts recording the highest case rates, particularly during epidemic years. Approximately 41.8% of dengue cases in Sri Lanka are reported from the Western Province [5].

Gampaha District is one of the most affected areas by the dengue menace. It has a history of high infection rates and deaths due to Dengue. Medical Officer of Health (MOH) areas such as Kelaniya, Gampaha, Ja-Ela, Mahara, Wattala, MC Negombo, Ragama, and Attanagalle have been identified as high-risk areas. Gampaha District is ranked as the second most affected area, and it also has the highest socio-economic status in the Western Province, indicating a high potential for rapid dengue spread if control measures are not effectively implemented [6].

The Ministry of Health (MoH), along with other agencies, has intensified dengue prevention and control activities. At the national level, a National Task Force on Dengue Prevention and Control, chaired by the Secretary of Health, and an Advisory Committee on Communicable Diseases, chaired by the Director General of Health Services (DGHS), meet regularly to review the situation and make policy decisions to enhance activities. The Epidemiology Unit monitors disease trends and alerts all health authorities at the district and divisional levels. Vector surveillance and integrated vector control activities are conducted in all high-risk areas, with the Anti-Malaria Campaign leading vector surveillance and control, supported by the Entomology Division of the Medical Research Institute and the Anti-Filariasis Campaign.

Epidemiological Trend in Gampaha District

In 2022, Gampaha District reported 10,212 dengue cases. During the 49th week, 402 suspected cases were reported, marking a 4.4% increase compared to the previous week. Despite ongoing efforts, the incidence of Dengue Fever (DF) and Dengue Hemorrhagic Fever (DHF) has increased exponentially [7].

High-risk MOH areas within the district, including MC Negombo, Gampaha, Minuwangoda, Ragama, Katana, Seeduwa, and Meerigama, have shown increasing

trends in dengue cases. These areas were identified as priorities based on suspected case distributions [8].

In 2022, there were seven dengue-related deaths in the district, including two in Biyagama, three in Ja-Ela, one in Negombo, and one in Ragama. Entomological surveillance is crucial for dengue prevention and control, as emphasised by the World Health Organisation (WHO). Reducing dengue vector populations involves eliminating breeding sources, such as small containers around human dwellings. Dengue control is achievable through advocacy, social mobilisation, legislation, inter-sector collaboration, and an integrated approach to disease control and prevention [9].

National Strategies for Dengue Control in Gampaha District

The following strategies are carried out to control DF/DHF in Gampaha District:

1. Surveillance:
    - Disease Surveillance: Continuous monitoring and reporting of dengue cases to track the disease's spread and identify emerging hotspots [7].
    - Vector Surveillance involves regular assessments of mosquito populations, breeding sites, and distribution patterns. This helps identify high-risk areas and effectively time interventions [5].
    - Laboratory Surveillance (Serological): Testing blood samples from suspected dengue patients to confirm infections. This includes both rapid diagnostic tests and more comprehensive laboratory analyses to determine the prevalence of dengue virus serotypes.
2. Management of DF/DHF Cases:
    - Ensuring that healthcare facilities are equipped to manage dengue cases effectively, including having protocols for the early detection and treatment of severe cases [10].
3. Vector Control:
    - Source Reduction: Eliminating mosquito breeding sites by managing stagnant water in containers, tyres, and other potential habitats around homes and public spaces.
    - Chemical Control: Using insecticides to reduce adult mosquito populations and larvicides to target larvae. This includes fogging operations in high-risk areas and applying larvicides in water bodies that cannot be eliminated [11].
    - Biological Control: Introducing natural predators or competitors to reduce mosquito populations, such as fish that eat mosquito larvae.
4. Social Mobilisation:
    - Engaging communities in dengue prevention efforts through awareness campaigns, educational programs, and community clean-up drives. This includes schools, workplaces, and residential areas [12].
5. Emergency Response:
    - Establishing rapid response teams to address outbreaks swiftly, including deploying additional healthcare workers and resources to affected areas.

Objective

To assess the implementation of dengue control and prevention measures in

Gampaha District and propose solutions to strengthen these measures.

Design

This case study employed a mixed-method approach to evaluate the implementation of dengue control and prevention measures in the Gampaha District. The research design incorporated both qualitative and quantitative methodologies to gather comprehensive data.

Methods

The primary data collection methods included direct observations, key informant interviews, and discussions with relevant public health officials and staff. Additionally, a thorough evaluation of records related to dengue control activities and their outcomes was conducted. The nominal group technique was used to identify and prioritise the key problems hindering effective dengue control in the district.

Data Collection

The methodology for gathering information on the implementation of dengue control and prevention measures in the Gampaha District involved several key steps:

1. Direct Observations: Field visits and direct observations were conducted to assess the on-ground implementation of dengue control measures. These observations provided real-time insights into the challenges and effectiveness of ongoing activities.
2. Key Informant Interviews: In-depth interviews were held with key public health officials, including the Regional Director of Health Services (RDHS), Regional Epidemiologist (RE), and Public Health Inspectors (PHIs). Discussions were also conducted with selected staff from the RDHS office in Gampaha to gather detailed information on the operational challenges and success factors in dengue control.
3. Discussions and Evaluations: Focused group discussions were held with the RDHS, RE, Senior Public Health Inspectors (SPHI), and other relevant stakeholders to understand the perspectives and experiences of various actors involved in dengue control efforts. Additionally, records related to dengue control performance and outcomes were thoroughly evaluated to identify gaps and areas for improvement.

Problem Identification

Based on the information gathered through direct observations, interviews, and discussions, problems were identified and categorised into two main areas:

- Program-Related Problems
- Non-Program-Related Problems

Problem Prioritisation

The nominal group technique was used to prioritise problems. This technique involved gathering opinions from key stakeholders, including the RDHS, RE, SPHI, and other relevant personnel. Problems were prioritised based on their feasibility, cost-effectiveness, urgency, and impact on outcomes. The problem that received the highest score, "Use of existing data and evidence-based control and prevention measures," was selected for further in-depth analysis.

Root Cause Analysis

The root cause analysis of the prioritised problem was conducted using the "Five

Whys" technique. This method involved asking "Why?" multiple times to drill down into the underlying causes of the problem.

Results

The investigation into the implementation of dengue control and prevention measures in Gampaha District revealed several critical findings.

Identified Problems

The problems were divided into two major categories: program-related and non-program-related issues.

Program-Related Problems:

1. Program planning
2. Allocation of resources
3. Use of existing data and evidence-based control and prevention measures
4. Monitoring and evaluation of implemented measures
5. Staff training and supervision

Non-Program-Related Problems:

- Managerial issues: Lack of coordination and cooperation among public health authorities and local government institutions
- Environmental issues: Increasing use of non-biodegradable plastics and poor disposal systems, rapid urbanisation with inadequate health infrastructure
- Community/Social issues: Poor community participation in mosquito breeding site management, lack of awareness
- Demographic issue: High population density in Gampaha district
- Geographical issue: Climatic conditions conducive to mosquito breeding, including high rainfall and warm temperatures

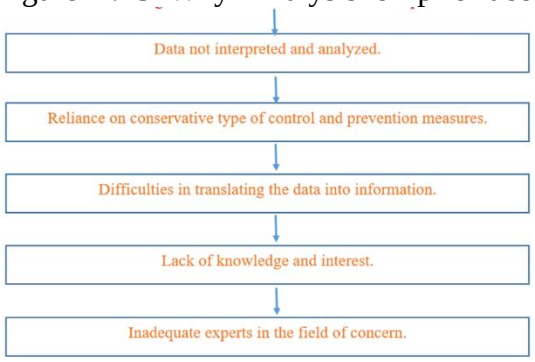
Prioritisation of Problems

Using the nominal group technique, stakeholders prioritised the identified problems based on feasibility, cost-effectiveness, urgency, and impact on outcomes. The problem with the highest priority was the "Use of existing data and evidence-based control and prevention measures."

Root Cause Analysis

The root cause analysis of the prioritised problem using the "Five Whys" technique identified the following underlying issues:

Figure 1: 5 Why Analysis of prioritised problem "Use of existing data and evidence-based control and prevention measures"



Discussion

The results of this case study highlight significant challenges in the implementation of dengue control and prevention measures in the Gampaha District. The identification of both program-related and non-program-related problems provides a comprehensive understanding of the multifaceted issues impacting dengue control efforts.

One of the most critical findings is the insufficient use of existing data and

evidence-based control and prevention measures. The root cause analysis revealed that data is not being effectively interpreted and utilised to inform decision-making. This gap is compounded by a reliance on traditional, less effective control measures and a general lack of knowledge and expertise among staff. Addressing these root causes is crucial for enhancing the efficacy of dengue control programs.

The prioritisation of problems using the nominal group technique highlighted the urgency and impact of improving data utilisation and evidence-based practices. By focusing on this priority, there is potential to make significant strides in reducing dengue incidence and improving public health outcomes in Gampaha District.

Environmental and community-related issues also play a substantial role in dengue transmission. The improper disposal of non-biodegradable waste and rapid urbanisation without adequate health infrastructure create breeding grounds for mosquitoes. Additionally, low community participation in mosquito control efforts further exacerbates the problem. These findings suggest that a more integrated and community-focused approach is necessary to address the environmental and social determinants of dengue transmission.

Managerial and demographic factors, such as lack of coordination among health authorities and high population density, add another layer of complexity to the dengue control efforts. Strengthening managerial coordination and engaging local government institutions more effectively could enhance the overall response to dengue outbreaks.

Conclusion

Dengue control is a complex yet achievable goal that hinges on several key strategies: advocacy, social mobilisation, legislation, collaboration within and beyond the health sector, and an integrated approach to disease control. The Gampaha District case study emphasises the necessity of evidence-based decision-making and capacity building to address this persistent public health challenge effectively. Entomological surveillance has proven crucial in controlling outbreaks by providing early warnings, which enhance the district's response to Dengue during critical periods. These early warnings significantly reduce the impact of outbreaks, disease transmission, healthcare burdens, and potential mortalities.

Effective dengue control and prevention in Gampaha District require a strong system for utilising data and information scientifically. This entails thorough data interpretation and analysis to inform evidence-based decisions at the field level. The study highlights the need for sustained efforts in these areas to achieve significant improvements in managing Dengue.

Recommendations

To effectively tackle dengue outbreaks in Gampaha District, the following recommendations and plan of action are proposed:

1. Data-Driven Evidence-Based Decision Making:
    - Establish a comprehensive system to ensure that decisions at the operational level are based on robust data and evidence.
    - Implement mechanisms for systematic data collection, storage, interpretation, and analysis.

- Equip the system with experts in public health, clinical medicine, information technology, and other relevant fields.

2. Forming a Technical Body:
   - Create a technical body comprising necessary experts and stakeholders to ensure timely data analysis and interpretation.
   - This body should include representatives from various sectors, including health, academia, and technology.
3. Effective Dengue Prevention and Control Programme:
   - Develop and sustain a dengue prevention and control programme tailored to the specific regional context of Gampaha District.
   - Ensure that the programme is adaptable and responsive to changing disease patterns and trends.
4. Forecasting and Preventing Epidemics:
   - Utilise past disease trends to forecast and prevent future dengue epidemics.
   - Implement predictive models and early warning systems to stay ahead of potential outbreaks.
5. Strengthening Liaison and Social Mobilisation:
   - Enhance collaboration with civil society groups, non-governmental organisations, the media, and other stakeholders.
   - Foster community engagement and participation in dengue control efforts to improve effectiveness.
6. Resource Mobilisation for Research:
   - Identify and mobilise resources to conduct ongoing research on Dengue.
   - Focus on innovative solutions and strategies to combat Dengue more effectively.
7. Reducing Morbidity and Mortality:
   - Implement targeted interventions to reduce the morbidity and mortality associated with Dengue Fever (DF) and Dengue Haemorrhagic Fever (DHF).
   - Ensure that healthcare facilities are well-equipped and healthcare workers are adequately trained to manage dengue cases efficiently.

By focusing on these areas, the Gampaha District can significantly enhance its dengue control and prevention efforts, leading to better public health outcomes and a reduction in the disease's overall impact.

References

[1] F. N. PDNN Sirisena, "Evolution of dengue in Sri Lanka—changes in the virus, vector, and climate," International Journal of Infectious Diseases, 2014.

[2] N. Sirisena, “Dengue control in Sri Lanka – challenges and prospects for improving current,” Sri Lankan Journal of Infectious Diseases, 2016.

[3] H. Tissera, N. Pannila-Hetti, P. Samaraweera, J. Weeraman, P. Palihawadana and A. Amarasinghe, “Sustainable dengue prevention and control through a comprehensive integrated approach,” WHO South-East Asia Journal of Public Health, 2016.

[4] c. a. B. D. J. R. R. S. M. J. Y. T. P. C. S. P. L. A. G. C. R. A. M. d. S. a. S. D. F. Hasitha A. Tissera, “Severe Dengue Epidemic, Sri Lanka, 2017,” Emerging Infectious Diseases, 2020.

[5] C. H. S. D. V. Y. I. N. S. G. M. H. Gayan Parakrama Withanage, "Entomological surveillance with viral tracking demonstrates a migrated viral strain caused dengue epidemic in July, 2017 in Sri Lanka," PLOS ONE, 2020.
[6] S. D. V. Y. I. N. S. G. &. M. D. H. Gayan P. Withanage, "A forecasting model for dengue incidence in the District of Gampaha, Sri Lanka," BMC Parasites & Vectors, 2018.
[7] C. J. G. S. T. Gathsaurie Neelika Malavige, "Changing epidemiology of dengue in Sri Lanka—Challenges for the future," PLOS Neglected Tropical Diseases, 2021.
[8] A. W. K. A. W. T.-R. M. A. S. M. S. G. Shahid Ali, "The unprecedented magnitude of the 2017 dengue outbreak in Sri Lanka provides lessons for future mosquito-borne infection control and prevention," Infection, Disease & Health, 2018.
[9] C. A. &. A. B. R. M. Nayani Umesha Rajapaksha, "Health seeking behaviours, dengue prevention behaviours and community capacity for sustainable dengue prevention in a highly dengue endemic area, Sri Lanka," BMC Public Health, 2023.
[10] W. J. T.A. Kulatilaka, "Control of Dengue/Dengue Haemorrhagic Fever in Sri Lanka," Dengue Bulletin, 1998.
[11] N. G. D. A. L. U. Rasika Dalpadado, "A Challenge for a Unique Dengue Vector Control Programme: Assessment of the Spatial Variation of Insecticide Resistance Status amongst Aedes aegypti and Aedes albopictus Populations in Gampaha District, Sri Lanka," BioMed Research International, 2021.
[12] N. G. M. C. M. I. K. L. U. S. A. &. W. A. Lahiru Udayanga, "Comprehensive evaluation of demographic, socio-economic and other associated risk factors affecting the occurrence of dengue incidence among Colombo and Kandy Districts of Sri Lanka: a cross-sectional study," Parasites Vectors, 2018.

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Original Article:

Awakening Community Resilience: Strengthening Post-Crash Support for Road Traffic Accident Victims through Sarvodaya's Community-Based Initiatives (A Case Study)

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Keywords: Post-crash care, Community-based initiatives, RTA

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Abstract

Introduction: The provision of crash care presents a pressing health concern globally, with community-based initiatives offering a cost-effective approach to interventions. The objective of this study was to elucidate the potential community-based initiatives to enhance post-crash support for victims of road traffic accidents, specifically focusing on the efforts of Sarvodaya: a non-governmental organization in Sri Lanka.

Methods: This case study employed a mixed-method approach, incorporating both quantitative and qualitative components. Data collection was done using self-administered questionnaires and Key Informant Interviews. Purposive sampling was done to identify informants (n=37) for the questionnaire survey.

Results: While the informants had mixed perceptions of Sarvodaya's present initiatives to support post-crash care, the REACT – Community Life Saver initiative garnered majority for its potential to address the needs of the Road Traffic Accident victims. Community engagement was deemed insufficient, underscoring the need for enhanced awareness programs. Collaboration with existing resources, including Community Lifesaver Programs and the Red Cross, was identified as pivotal. Strategies for community-based interventions, including awareness campaigns, first aid training, improved emergency response systems, and victim advocacy, were prioritized for implementation. Implementation challenges such as resource constraints, behavioural issues of both drivers and pedestrians, communication gaps, and policy-legal concerns were highlighted. Addressing these challenges is crucial for the effective support of Road Traffic Accident (RTA) victims at the community level.

Conclusion and recommendations: The study concludes that Sarvodaya has the potential to spearhead community-based initiatives aimed at enhancing post-crash

support for road traffic accident victims, pending the effective resolution of identified constraints.

Keywords: Post-crash care, Community-based initiatives, RTA

Introduction

Road traffic accidents cause nearly 1.3 million deaths and 50 million injuries in the world each year. This situation particularly affects low and middle-income countries which is unacceptable both in absolute and relative terms. However, it has remained unchanged for the past 20 years, despite targeted global efforts to arrest it[7].

Sri Lanka records an annual average of 38,000 road accidents, resulting in 3,000 fatalities and 8,000 cases of severe injuries, posing a public health challenge for the nation[5].

A broad and integrated approach to support RTA victims, enabling them to mitigate both the immediate and long-term effects of a crash event, shall facilitate their return to functionality and independence. As such an effective post-crash response necessitates the harmonious integration of trauma care, mental health services, legal support, and legislative measures.

Post Crash response

Post-crash response refers to a coordinated set of actions and procedures undertaken immediately after a crash event to address the needs of those involved, minimize further harm, and provide appropriate medical, rescue, and support services. It encompasses various activities, including emergency medical care, extrication of trapped individuals, securing the accident scene, and notifying relevant authorities. Post-crash response aims to save lives, prevent injuries, and mitigate the impact of the accident on individuals and the community at large, thereby enhancing the survivability of crash victims6. Post-crash care consists of several components. They are outlined in figure 01

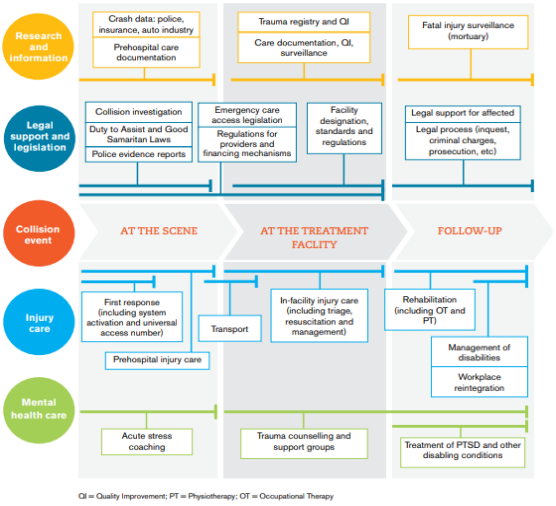


Figure 01: Key components of post-crash response (Supporting Those Affected by Road Traffic Crashes Post-Crash Response 2 Post-Crash Response, 2016)[11].

The support groups, including non-governmental organizations, play a pivotal role in providing immediate post-crash care for RTAs, addressing both victims and the broader impact of these incidents. Its function extends beyond immediate medical attention to encompass its wider influence on road safety. This study intends to explore potential community-based initiatives to enhance Post-Crash Support for Road Traffic Accident Victims by Sarvodaya which is a non-governmental organization in Sri Lanka.

Sarvodaya

The Sarvodaya Shramadana Movement of Sri Lanka consists of the main incorporated body officially known as Lanka Jathika Sarvodaya Shramadana Sangamaya, a group of legally independent units catering to specific fields of development activities

and the village-level Sarvodaya Shramadana Societies.

Sarvodaya Disaster Management Centre

The Sarvodaya Disaster Management Center (SDMC) is a key unit of Sarvodaya, which is dedicated to community-based disaster response. SDMC provides extensive training to Sarvodaya volunteers and community groups, ensuring they are equipped for effective disaster response. This is exemplified by the Community Life Saver Project, "CL REACT." During emergencies, SDMC mobilizes trained volunteers through the Sarvodaya Network to mitigate disaster risks at the community level.

Objective

The objective of this study is to elucidate Potential Community-Based Initiatives to Enhance Post-Crash Support for Road Traffic Accident Victims by Sarvodaya.

Methodology

I. Research Setting: The study was conducted at the Sarvodaya Headquarters in Moratuwa, Sri Lanka.
II. Study Design: This research employed a mixed-method approach, incorporating quantitative and qualitative components.
III. Study Methods: Data collection methods included the distribution of questionnaires and conducting Key Informant Interviews.
IV. Study Population: The study targeted officers in managerial roles at the Sarvodaya Headquarters, volunteers, and district coordinators.
V. Period of data collection: March 17, 2024, to April 6, 2024.
VI. Sampling: Purposive sampling was utilized to ensure comprehensive coverage of potential community-based initiatives aimed at enhancing post-crash support. The sample size was thirty-seven (37). Data collection continued until saturation was achieved.
VII. Study Instruments: A self-administered questionnaire was developed to collect demographic and substantive information. Key Informant Interviews were also conducted with the Head of Field Operations and the Project Manager of the Disaster Mitigation Project.
VIII. Development of the Questionnaire: The questionnaire covered various areas including participant profiles, awareness of RTAs, existing support systems, community engagement, needs and priorities, potential initiatives, implementation challenges, and suggested solutions. The questionnaire was reviewed by the Director of Sarvodaya Institute of Higher Learning, and a pretest was conducted with two Sarvodaya volunteers for validation.
IX. Method of Data Collection: The self-administered questionnaire was distributed to all participants by the principal investigator (PI). Key Informant Interviews were conducted by the PI. Data were manually recorded, and participants were given the option to respond to the questionnaire in their preferred language.
X. Data Analysis: Data were entered into Microsoft Excel 365 for analysis. Descriptive statistics, such as proportions and percentages, were used to analyze categorical data.

Results

Participants profile

The questionnaire survey predominantly included District coordinators, which collectively accounted for 88% of Sri Lanka's administrative regions (n=25). The districts not represented in the survey were Matara, Batticaloa, and Mannar. Officers in the Sarvodaya headquarters and volunteers were also represented. Figure 01 below shows the distribution of the participants (n= 37) in the questionnaire survey.

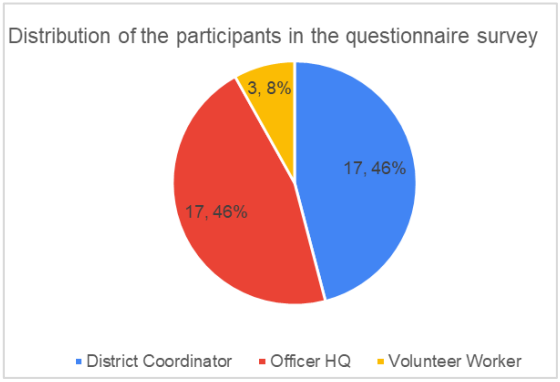
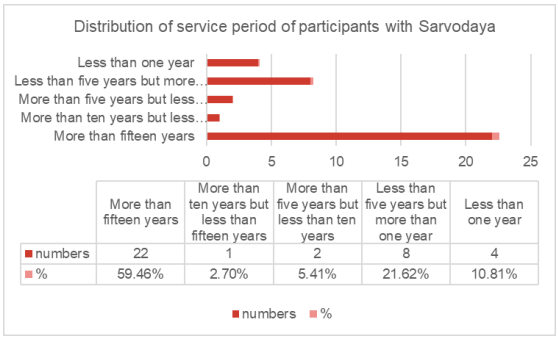


Figure 01: Distribution of the participants in the questionnaire survey.

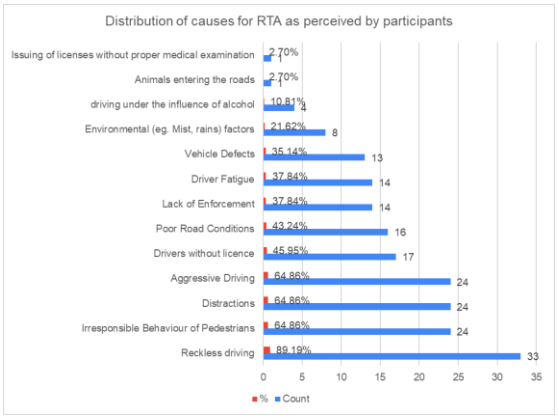


	More than fifteen years	More than ten years but less than fifteen years	More than five years but less than ten years	Less than five years but more than one year	Less than one year
numbers	22	1	2	8	4
%	59.46%	2.70%	5.41%	21.62%	10.81%

Figure 02: Distribution of service period of participants in the questionnaire survey.

According to Figure 02, over 60% (n=23) of the participants reported having worked with Sarvodaya for more than 10 years, thereby collaborating and strengthening the survey's findings.

The distribution of causes for Road Traffic Accidents in different districts as claimed by the participants is shown in figure 03.



Over half of the respondents have asserted that behavioural issues among both drivers and pedestrians are the primary contributors to Road Traffic Accidents (RTAs). These issues include reckless driving, irresponsible pedestrian behaviour, distractions, and aggressive driving.

The difficulties encountered by RTA victims in accessing post-crash support are summarized below (Table 01).

Table 01: Difficulties encountered by RTA victims in accessing post-crash care (n=37)

Difficulties	**Count**	**%**
Legal challenges	28	75.68%
Transportation challenges	21	56.76%
Financial hardship	19	51.35%
Loss of occupation	14	37.84%
Psychological Trauma	14	37.84%
Distance from urban centers	13	35.14%
Limited healthcare infrastructure	12	32.43%
Social Stigma and Discrimination	8	21.62%
Inadequate Rehabilitation Services	7	18.92%
Rural and Remote Challenges.	2	5.41%

Over 50% of respondents have stated that legal, transportation, and financial

challenges represent significant hurdles for Road Traffic Accident (RTA) victims in accessing post-crash care.

Sarvodaya initiatives

Figure 04 below demonstrates the distribution of responses made for the inquiry on existing Sarvodaya initiatives in place to support RTA victims.

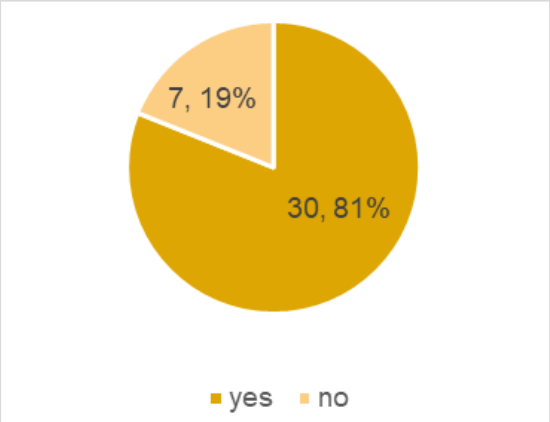


Figure 04 indicates that 81% of respondents assert that Sarvodaya currently lacks initiatives to support victims of Road Traffic Accidents (RTA). However, the remaining participants (n=7, 19%) contend that initiatives like REACT, Road Safety Programs, and community awareness programs are already operational. Furthermore, there are youth first aid teams established across 25 districts.

The potential of the "REACT – Community Life Saver" initiative to address the needs of RTA victims

Figure 05 below shows the distribution of different perceptions of the responders on the potential of the "REACT – Community Life Saver" initiative to address the needs of RTA victims.

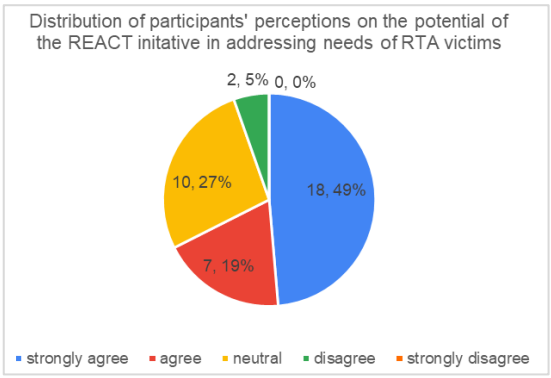


Figure 05: Distribution of different perceptions of the responders on the potential of the "REACT – Community Life Saver" initiative to address the needs of RTA victims

As per the findings above 68% of the respondents are confident that the existing "REACT – Community Life Saver" initiative has the potential to address the needs of RTA victims.

Community engagement

Figure 06 below shows the distribution of perceptions of participants on community engagement in supporting RTA victims.

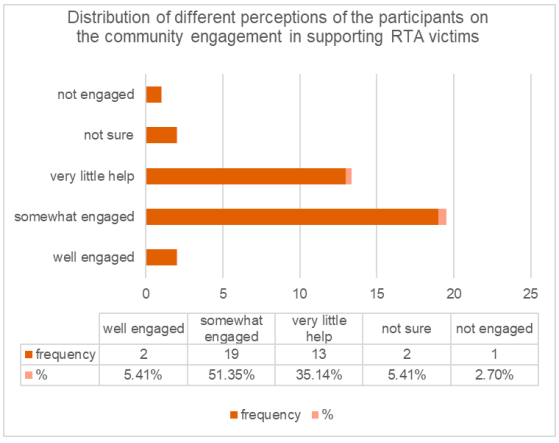


Figure 06: Distribution of perceptions of participants on community engagement in supporting RTA victims

As per Figure 06, the majority of participants claimed that the community is not well engaged in supporting RTA victims, indicating the need to drive community awareness programmes.

Existing other resources that can be leveraged to enhance support for post-crash victims

The participants claim that Community lifesaver programs, the Red Cross organization, the 1990 Suwasariya ambulance service, interested individuals in the communities, the civil defence committee, and the district disaster management committee are the potential resources that can be collaborated when driving community-based initiatives in support of crash victims.

Needs and priorities

Figure 07 below shows the distribution of perceptions of participants on the activities that require the most attention in driving community-based initiatives in support of post-crash care.

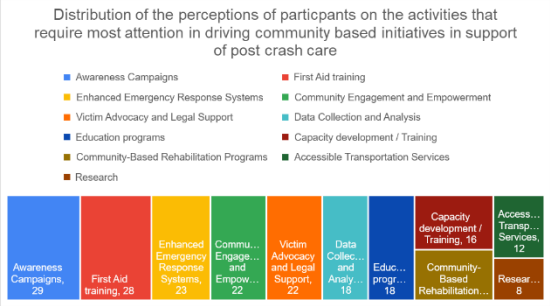


Figure 07: Distribution of perceptions of participants on the activities that require the most attention in driving community-based initiatives in support of post-crash care.

As per Figure 07, Awareness campaigns, first aid training, enhanced emergency response systems, community engagement and empowerment, and victim advocacy and legal support have been prioritized by respondents as areas to be paid more attention.

Feasibility

Table 02 below shows the distribution of potential interventions that have been prioritized by respondents as the most feasible interventions by Sarvodaya in support of RTA, in terms of resource availability, community involvement, and sustainability

Table 02: Distribution of potential interventions that have been prioritized by respondents as most feasible interventions by Sarvodaya in support of RTA victims.

Initiative	**Count**	**%**
First Aid training	21	56.76%
Awareness Campaigns	13	35.14%
Enhanced Emergency Response Systems	13	35.14%
Community Engagement and Empowerment	13	35.14%
Education programs	9	24.32%
Capacity development / Training	5	13.51%
Victim Advocacy and Legal Support	4	10.81%
Community-Based Rehabilitation Programs	4	10.81%
Accessible Transportation Services	4	10.81%
Data Collection and Analysis	3	8.11%
Research	0	0.00%

As per the above table 02 above, First Aid training, Awareness Campaigns, Enhanced Emergency Response Systems, and Community Engagement and Empowerment have been endorsed as the most feasible initiatives by Sarvodaya in terms of resources, community involvement, and sustainability.

Challenges

Participants identified the following challenges in implementing the initiatives in support of RTA victims.

1. Resource constraints
    - Inadequate training for first responders

- Absence of trained counsellors for RTA victims
- Lack of vehicles in reaching the crash site at a given time

2. Community awareness, behavioural and attitudinal challenges
   - Incompliance of drivers and pedestrians with traffic rules and regulations
   - Lack of interest in the community on road safety and post-crash assistance
   - Reluctance to be informed and participate actively
   - Fear of being videoed instead of receiving assistance from the people who gather around the victim
   - Lack of awareness within the community regarding post-crash care
   - Decreased community participation due to hardships created by the economic crisis
   - Fear of confrontation with litigation issues in the event of a crime
   - Lack of community understanding of legal matters related to post-crash care
3. Communication and coordination
   - Absence of communication loop between hospitals and the community support group
   - Lack of access to real-time RTA information management system
   - Lack of a mechanism for direct coordination of services provided by insurance companies
4. Government Intervention and Policy Issues
   - Loss of active involvement of state to facilitate community involvement to enhance post-crash care
   - Difficulties encountered in utilizing government resources required for training

SWOT Analysis

The situation analysis on the potential Community-Based Initiatives to enhance post-crash support for Road Traffic Accident Victims by Sarvodaya will be as follows.

Strengths	**Weaknesses**
1. Competent and experienced workforce 2. Potential initiatives already in operation 3. Existing community awareness programs on Road Safety 4. Existing youth first aid teams across 25 districts. **5.** Wide representativeness of the workforce across all districts	1. Resource constraints 2. No access to real-time RTA database 3. No link to the RTA alert system

Opportunities	Threats
1. Potential collaborations with Community Lifesaver Programs, the Red Cross, the *Suwasariya* ambulance service, local individuals, and district disaster management committees 2. Possible collaborations with the National Trauma Secretariat, National Council for Road Safety, and Sri Lanka Police 3. Increasing state and media attention on preventing RTA fatalities 4. Reducing RTA fatalities is a Sustainable Development Goal. Hence broader international collaboration is possible with resourceful development partners	1. The negative attitudes of the community towards post-crash assistance 2. Decreased community participation due to economic challenges 3. Confrontations are expected to protect casualties without causing additional harm from untrained individuals or inappropriate actions 4. Lack of immunity from unnecessary legal confrontation in procedural jurisdictions

Discussion

Laypeople can make post-crash care more cost-effective. They can contribute to enhance post-crash care by activating the emergency care system and facilitating the safe transportation of RTA victims to hospitals. Training of laypeople for better coordination with helpline services and basic first aid can make post-crash management more effective.

A study aimed to identify the facilitators and barriers in providing post-crash emergency care for road traffic injuries in the district of Aligarh, Uttar Pradesh. India12 reveals that nearly all respondents (98.58%) recognized laypersons as crucial facilitators in post-crash care, along with police and roadside shopkeepers. Lay persons were notably effective in calling for help, identifying nearby health facilities, and facilitating victim transport. This conclusion underscores the significance of community-based initiatives to enhance post-crash care. Nevertheless, the findings of this case study on the potential community-based initiatives to support post-crash victims by Sarvodaya reveal crucial insights into both challenges and opportunities in this domain in Sri Lanka.

This study confirms the capacity of Sarvodaya to spearhead such initiatives at the community level while identifying potential areas of interventions that are within the reach and grasp of Sarvodaya.

The unlawful behavioral conduct of drivers and pedestrians act as significant contributors to road traffic accidents. It emphasizes the need for comprehensive

strategies addressing both drivers' and pedestrians' conduct. A study done on Community-based interventions9 presents a promising strategy for reducing unintentional injuries among children and adolescents. These interventions focus on altering behaviour, promoting environmental changes, and implementing legislation to shift social norms regarding safety behaviours. A systematic review of 32 studies assessed the impact of such interventions on childhood injuries, safety behaviours, and the adoption of safety devices, targeting schools, municipalities, and cities.

Despite some ongoing initiatives by Sarvodaya such as REACT and Road Safety Programs, there is a perceived lack of support for RTA victims by Sarvodaya at present. However, as perceived by a significant portion of participants, REACT initiative, has the potential for impactful interventions to address the needs of RTA victims.

Community engagement emerges as a critical aspect, with participants expressing concerns about limited involvement in supporting RTA victims. Collaborative efforts with existing resources like Community Lifesaver Programs and the Red Cross organization could strengthen community-based initiatives.

The identified needs and priorities, including awareness campaigns, first aid training, and enhanced emergency response systems, align with the feasibility of interventions as assessed by the study. However, several implementation challenges need to be addressed, including resource constraints, communication gaps, and policy-legal concerns.

These findings are consistent with the study done in Iran8 which analyzed 36 semi-structured interviews with various stakeholders Barriers included the involvement of laypeople, lack of coordination, inadequate pre-hospital services, and infrastructure deficiencies. Recommendations for improving laypeople's involvement included public education campaigns in first aid and emergency services, and targeted training for professional drivers, police officers, and volunteers. An integrated trauma system and infrastructure improvements were also deemed crucial. While the involvement of laypeople is vital for effective post-crash management, systemic improvements such as integrating trauma systems and enhancing human and physical resources are essential.

A volunteer first responder network in Bangladesh10 utilizes an emergency hotline and 24/7 call center to dispatch trained responders via text notifications. In six years, Trauma Link expanded from one highway section to three, covering 135 km and aiding 3,119 patients from 1,544 crashes. With a 100% response rate, responders reached scenes within five minutes in 88% of cases. Most patients, mainly young men, were transported to hospitals within 30 minutes, with accurate triage decisions. Trauma Link effectively addresses barriers in rapid response, triage accuracy, first aid, and timely transport, with high community acceptance and volunteer dedication. Policymakers could integrate this model with existing emergency services, and other countries could replicate it to manage traffic injuries efficiently.

The "REACT – Community Life Saver" initiative, coupled with the youth first aid teams of Sarvodaya, shows promise in executing such operations.

Conclusion and recommendations

Sarvodaya has the potential to launch community-based initiatives to enhance post-crash support for Road Traffic Accident victims provided the identified constraints are duly addressed.

References

1. World Health Organization. Global status report on road safety 2018. WHO; 2018.
2. Ministry of Transport and Civil Aviation, Sri Lanka. Road Safety Annual Report 2020. Ministry of Transport and Civil Aviation; 2020.
3. Peden M, Scurfield R, Sleet D, Mohan D, Hyder AA, Jarawan E, Mathers C, editors. World report on road traffic injury prevention. World Health Organization; 2004.
4. Nantulya VM, Reich MR. The neglected epidemic: road traffic injuries in developing countries. BMJ. 2002;324(7346):1139-41.
5. Delivering Road Safety in Sri Lanka. (n.d.).
6. Domenech Y. Symposium Post Crash Response Kuala Lumpur-Malaysia. 2017.
7. Global plan for road safety. (n.d.).
8. Khorasani-Zavareh D, Khankeh H, Mohammadi R, Laflamme L, Bikmoradi A, Haglund BJA. Post-crash management of road traffic injury victims in Iran. Stakeholders' views on current barriers and potential facilitators. BMC Emerg Med. 2009; 9:8. https://doi.org/10.1186/1471-227X-9-8.
9. Klassen TP, MacKay JM, Moher D, Walker A, Jones AL. Community-based injury prevention interventions. Future Child. 2000;10(1):83–110. https://doi.org/10.2307/1602826.
10. Moussally J, Saha AC, Madden S. TraumaLink: A Community-Based First-Responder System for Traffic Injury Victims in Bangladesh. Global Health: Science and Practice. Available from: www.ghspjournal.org.
11. Supporting those affected by road traffic crashes post-crash response 2 post-crash response. 2016. Available from: www.who.int/about/licensing/copyright_form/en/index.
12. Urfi, Khalique N, Ahmad A. Facilitators and barriers influencing the post-crash emergency care of road traffic injuries in district Aligarh of Uttar Pradesh. J Family Med Prim Care. 2022;11(10):5934. https://doi.org/10.4103/jfmpc.jfmpc_261_22.

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Original Article:

Effectiveness of an intervention to improve pharmacovigilance among selected government hospitals in a district of Sri Lanka

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Keywords: Pharmacovigilance, Knowledge, Perception, Practice

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Abstract

Introduction: Issues related to doctors' pharmacovigilance exist due to their lack of knowledge and the challenges of a rapidly changing society. In addition, issues exist with the subject's existing systems. Proper intervention with a comprehensive system of pharmacovigilance can resolve these problems.

Objective: This research is intended to assess the knowledge, perception, and practices of pharmacovigilance among medical officers in a district of Sri Lanka with surveillance systems through interventions.

Methodology: A pre-and post-intervention design research study was conducted among 237 doctors in the curative sector in the Hambanthota district. All the doctors in these hospitals were considered the study population, and no sampling method was employed. A self-administered questionnaire was used to collect the data using active and passive surveillance data systems and workshops.

Results: The results indicated that most of the doctors were from the 31-40 age category (55.3%), females (53.59%), preliminary and grade 2 medical officers (67.1%, 37.6%) who are working in the base hospitals (64.1%) of the area with a basic medical degree (90.8%). A large proportion of them (67.5%) had training in this area as undergraduates (25%). The overall knowledge of pharmacovigilance was poor (69.7%). The overall perception was positive (53.2%). Overall, practices were poor. Knowledge and perception have improved with the intervention.

Conclusion and recommendations: This research revealed poor general knowledge, practices, and a positive perception regarding pharmacovigilance, which improved through an intervention. Substantial consideration should be paid to including those topics in undergraduate and postgraduate curricula. Continuous

professional development and in-service training programmes should be arranged for doctors with a comprehensive system of surveillance.

Keywords: Pharmacovigilance, Knowledge, Perception, Practice

Introduction

Pharmacovigilance is defined as the science and activities concerned with the detection, assessment, understanding and prevention of adverse drug reaction to medicine. The ultimate goal of this activity is to improve the safe and rational use of medicines. Adverse drug reaction is a response to a medicine used in humans or medicines which is noxious and unintended, including lack of efficacy and which occurs at any dosage and can also result from overdoses, misuse or abuse of drugs.[1]

According to the studies conducted in developed countries, about 5% of patients admitted to hospitals due to adverse drug reactions [ADR] and 6-10% of in-patients experienced a serious ADR during hospitalization. However, literature is scarce on comprehensive assessments of the burden of ADR in global healthcare. The healthcare cost of managing ADR is considerable for most of the countries. All healthcare professionals are requested to report all suspected ADRs. For this purpose, doctors, dentists, pharmacists and nurses have a pivotal role. There should be a comprehensive awareness and established surveillance system for it to work. Uniform management protocols, guidelines, facilities, and expertise should be readily available in every hospital [1].

Uppsala Monitoring Centre is the international database for adverse drug reaction reports received from national centres. National systems in the UK and New Zealand show that the cost of maintaining a pharmacovigilance system is very small compared with the national expenditure on medicines and the cost of managing adverse drug reactions. Pharmacoeconomic studies on the costs of adverse drug reaction shows that governments pay a considerable amount of money from health budgets for covering costs associated with them [2]

The Yellow Card scheme was introduced in 1964 to help the government monitor the safety of medicines and all medical devices in the UK. It allows health professionals, patients and carers to report side effects to medicines also known as adverse drug reactions. Yellow card system has captured extremely important data in a systematic way, which has been used to inform the development of medicines, the reaction to any serious incidents and the future direction of pharmacovigilance on an international scale. Patients and carers could help to reduce the current gap in reporting.

Patients not only provide a different perspective, but also report different drug reaction types compared with health professionals and are more likely to report the symptoms and impact of an adverse drug reaction. [3, 4]

Objective

The objective of this study was to improve pharmacovigilance among medical officers of the selected government hospitals in the Hambanthota district of Sri Lanka.

Methodology

This study employed a pre -post-intervention design with a single group in selected government hospitals in Hambanthota district. The study population

consisted of all medical officers who are working in selected government hospitals in Hambanthota district. The research was conducted in BH- Thissamaharamaya, BH Wallasmulla, BH Tangalle, and DGH-Hambanthota. After getting permission from the relevant institutions, the study was conducted among the grade medical officers who have given consent and fulfilled the inclusion and exclusion criteria by applying the self-administered questionnaire. The questionnaire consisted of Socio-demographic data, knowledge, perception and practices regarding the pharmacovigilance according to the guidelines, circulars, policies and standard operating procedures. Educational interventions were conducted by relevant academic experts with workshops and surveillance data systems.

Scores were given for poor, fair, and good categories according to correct-1, incorrect-0, and don't know as 0. Most of the questions were close-ended, and a few were open-ended. The questionnaire was prepared in English. A pre-test was done among the medical officers with the same characteristics, socio-cultural environment, and categorizations in an adjacent district located in the western province.

The respondents were informed of the general purpose of the study and assured of confidentiality of information. This was done to ensure completeness of the filled questionnaires and truthful expression of information. Informed written consent was obtained from the respondents before administering the questionnaire. Ethics approval for the study was obtained from Ethics Review Committee, Faculty of Medicine, and University of Colombo.

Results

The total study population was 320. According to the inclusion and exclusion criteria, the number of eligible study participants was 270. Self-administered questionnaires were handed over to the eligible participants to complete and return. Out of them, 237 responded, and 33 did not return the questionnaire. The non-respondents rate was 13 %. The total number of subjects included in the analysis was 237. According to table 1, 127 of the participants (53.59%) were females, and 110 (46.41%) were males. The highest proportion (55.3%) of the participants, numbering 131, were in the 31-40-year age category. The lowest percentage, 7.6%, belonged to the 41-50 age category.

Table 01: Distribution of the study participants by sex, age religion, ethnicity, duration of service and grade (N=237)

Variable	Pretest Number (Percentage)	Posttest Number (Percentage)
Sex		
Male	110 (46.41%)	110 (46.41%)
Female	127 (53.59%)	127 (53.59%)
Age category		
20-30	88 (37.1%)	88 (37.1%)
31-40	131 (55.3%)	131 (55.3%)
41-50	18 (7.6%)	18 (7.6%)
Level of education		
Graduate	216 (90.8%)	216 (90.8%)
Postgraduate	21 (9.2%)	21 (9.2%)
Service duration		
0-5	172 (72.6%)	172 (72.6%)
6-10	47 (19.8%)	47 (19.8%)
11-20	18 (7.6%)	18 (7.6%)

Grade		
preliminary	159 (67.1%)	159 (67.1%)
Grade2	75 (31.6%)	75 (31.6%)
Grade1	3 (1.3%)	3 (1.3%)

Table 02: Distribution of the study participants according to the total level of knowledge scores (n=237)

Level of knowledge	**Pretest Number (Percentage)**	**Posttest Number (Percentage)**
Poor	166 (69.7%)	83 (35%)
Fair	72 (30.3%)	152 (64%)
Good	-	2 (1%)

As shown in table 2, most of the participants, 166 (69.7%), have had a poor level of knowledge regarding pharmacovigilance, and 72 of them (30.3%) have had a fair level of knowledge in the pre-intervention. There were no participants with a good level of knowledge. Most of the participants, 152 (64%), have had a fair level of knowledge regarding pharmacovigilance in post intervention than the pre-intervention.

Table 03: Distribution of the study participants according to the total level of perception scores(n=237)

Level of perception	**Pretest Number (Percentage)**	**Posttest Number (Percentage)**
Positive	126 (46.8%)	145 (61.2%)
Negative	111 (53.2%)	92 (38.8%)

According to the total perception scores shown in Table 3, 126 (46.8%) of the study participants had a positive perception and 111 (53.2%) had a negative perception of pharmacovigilance during the pre-intervention. Out of the total, 145(61.2%) of the participants have had a positive perception, and 92 (38.8%) have had a negative perception of pharmacovigilance after the intervention. According to perception, majority of them have responded as having positive perception for pharmacovigilance.

According to the practices of Pharmacovigilance (Table 4), although they know their hospital system of ADR reporting and monitoring system, the majority of them have not reported an ADR in the last year (71. 8%). Most of them think that there is a need to report an ADR (81.1%). According to the practices majority of them have responded as having good practices for the given scenarios of pharmacovigilance and the practices have changed towards establishing a good culture of reporting and prevention of ADR, after the intervention.

Discussion

This research project was conducted to explore the knowledge, perception, and practices regarding pharmacovigilance among a doctor population in a district in the curative sector in Sri Lanka.

Table 4: Distribution of the pre-and post-intervention responses given for practices of pharmacovigilance. (n=237)

Practices	**Yes**		**No**		**Don't Know**	
Number (Percentage)	**Pretest**	**Posttest**	**Pretest**	**Posttest**	**Pretest**	**Posttest**
1. Do you know of the ADR reporting and monitoring system in your hospital?	142 (59.7%)	187 (78.9%)	65 (27.3%)	35 (14.8%)	30 (13.0%)	15 (6.3%)
2. Do you take measures to prevent ADR during your practice?	186 (78.5%)	193 (81.1%)	28 (11.8%)	33 (13.9%)	16 (6.7%)	18 (7.6%)
3. Do you only report severe or life-threatening ADR?	52 (21.8%)	26 (11%)	167 (70.2%)	189 (78.7%)	18 (8.0%)	22 (9.3%)
4. Do you mention ADR on patients' reports/ diagnostic cards?	194 (81.5%)	198 (83.5%)	35 (14.7%)	23 (9.7%)	8 (3.4%)	16 (6.8%)
5. Do you think that there is no need to report an ADR?	34 (14.3%)	54 (22.6%)	193 (81.1%)	182 (68.1%)	10 (4.6%)	21 (8.9%)

Many participants had poor overall knowledge of pharmacovigilance, 166 (83%). Their overall perception of selected scenarios and situations given in the study was negative, 126 (53.2%). This is comparable with a study done in Saudi Arabia [5, 6]. Both knowledge and perception improved with the intervention. This is also comparable to a study done in India [7]. Overall, practices were not good. This is also comparable to a study done in Nigeria [8].

A large proportion of them are trained 160 (67.5%) but only at undergraduate level. 146(91.25%). Most of them have not experienced ADR personally as well and most of them are not reporting ADR as general practitioners, 198 (83.54%) and 174(73.4%), respectively. When considering the surveillance data, there is

an underreporting of ADR, and the quality of data is affected by timeliness and accuracy. This is comparable with a study done in Pakistan [9]. These findings are comparable with a study done in the same type of setting in Sri Lanka [10].

Conclusion and recommendations

This study revealed poor general knowledge, practices, and a positive perception regarding pharmacovigilance, which improved through an intervention. Substantial consideration should be paid to including those topics in undergraduate and postgraduate curricula. Continuous professional development and in-service training programmes should be arranged for doctors with a comprehensive system of surveillance.

References

1. World Health Organization (2006) the safety of medicines in public health programmes: pharmacovigilance, an essential tool
2. Jeetu, G. and Anusha, G. (2010) Pharmacovigilance: A Worldwide Master Key for Drug Safety Monitoring. Journal of Young Pharmacists, 2(3) 315– 320
3. Bracchi RC, Tseliou F, Copeland L, et al. Public awareness in Wales of the UK Yellow Card scheme for reporting suspected adverse drug reactions.BrJ Clin Pharmacol. 2021;87:3344–3348.https://doi.org/10.1111/bcp.1472.
4. Steve Chaplin, Monitoring drug safety: is the Yellow Card Scheme struggling? Prescriber September 2019.
5. Abdel-Latif, M.M.M. and Abdel-Wahab, B.A. (2015) Knowledge and awareness of adverse drug reactions and pharmacovigilance practices among healthcare professionals in Al-Madinah Al-Munawwarah, Kingdom of Saudi Arabia. Saudi Pharmaceutical Journal, 23(2) 154–161.
6. Santosh, K.C., Pramote, T., Ralph, E.I. and Sarun, G. (2013) Knowledge about adverse drug reactions reporting among healthcare professionals in Nepal. International Journal of Risk & Safety in Medicine, (1) 1–16.
7. Dhara, S., Priti, D. and Pandit, V. (2013) Perception of pharmacovigilance among doctors in a tertiary care hospital: Influence of an interventional lecture. International Journal of Risk & Safety in Medicine, (4) 197–204.
8. Adeline, O., Ibrahim, O., J, A.A., Abisola, A. and Iretiola, F. (2013) Impact of training on Nigerian healthcare professionals' knowledge and practice of pharmacovigilance. International Journal of Risk & Safety in Medicine, (4) 219–227.
9. Shamim, S., Sharib, S.M., Malhi, S.M., Muntaha, S., Raza, H., Ata, S., Farooq, A.S. and Hussain, M. (2016) Adverse drug reactions (ADRS) reporting: awareness and reasons of under-reporting among health care professionals, a challenge for pharmacists. SpringerPlus, 5(1). Available from http://springerplus.springeropen.com/articles/10.1186/s40064-016-3337-4 [accessed 1 March 2019].
10. Hettihewa, L.M. and Sirisena, B. (2014) Casualty Assessment and The Severity Of The Adverse Drug Reactions (ADR) Actively Detected In Hospital-In Patients In Tertiary Care Hospital Sri Lanka: Prospective Observational Survey. Asian Journal of Research in Biological and Pharmaceutical Sciences, 2(1) 1–1

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Original Article:

Exploring Clinical Documentation Practices among Healthcare Staff: A Clinical Audit of National Hospital Galle, Sri Lanka

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Keywords: Clinical documentation, BHT, Karapitiya

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Abstract

Introduction: Valid and trustworthy clinical documentation improves patient outcomes, boosts hospital data accuracy, and enhances reflective action to improve healthcare service quality and safety. In Sri Lanka, the bedhead ticket (BHT) is the legal documentation record for inpatients. In 2022, the Ministry of Health (MoH) issued new rules for the correct maintenance of BHTs.

Objective: This clinical audit's objective was to assess the in-patient clinical documenting practices at National Hospital Galle (NHG), Sri Lanka.

Methodology: A total of 384 randomly selected BHTs from the record room, which belonged to patients who received inward care from April 2023 to September 2023, were included in this clinical audit. A checklist and a marking scheme were prepared according to MoH guidelines and filled out after going through each BHT.

Results: The level of completeness of the first page was good in 96% of BHTs. Maintenance of continuation sheets was average in 82%of BHTs and good in only 2%. Around 67% of BHTs obtained good marks for the level of completeness of entries. Only 1% of BHTs had entries with a signature placed at the end. The date and time of the entry were recorded in 73.5% and 64.3% consecutively.

Conclusion: Adherence to the MoH guidelines for clinical documentation practices was satisfactory at NHG, and regular audits and staff awareness and training are required to maintain the standards.

Keywords: Clinical documentation, BHT, Karapitiya

Introduction

Clinical documentation is an important aspect of the healthcare field from a clinical, administrative, and legal point of view (1). A valid and reliable clinical document improves

patient outcomes(2). Globally, documentation regulations have grown significantly in response to the expansion of universal health standards, with a clear increase in the norms and recommendations established by regulatory bodies(3).

In Sri Lankan healthcare settings, inbound patient information, including care performed, is documented in the BHT, a paper-based medical record created during inpatient admission to the hospital(4). A general circular from the Sri Lankan Ministry of Health in 1999 established a set of principles for clinical documentation (5). In August 2022, the Ministry of Health introduced a new set of guidelines for the proper maintenance of the Bed Head Ticket(6).

National Hospital Galle (NHG) is the third-largest hospital in Sri Lanka and the largest in the Southern Province. More than four thousand healthcare staff are currently employed at NHG, including more than hundred consultants, seven hundred medical officers, and one thousand seven hundred fifty-five nursing officers.

Objective

The objective of this clinical audit was to assess the inward patient clinical documentation practices among health care staff at National Hospital Galle.

Methodology

BHTs, which belonged to patients admitted to medical, surgical, and pediatric wards between April 2023 and September 2023, were considered as the study population of this clinical audit. Based on the 95% confidence interval, 0.5 for prevalence, and 0.05 for precision, the following formula was used to calculate the study's sample size:

$$n= \frac{z^2 P(1-P)}{d^2} \quad (7)$$

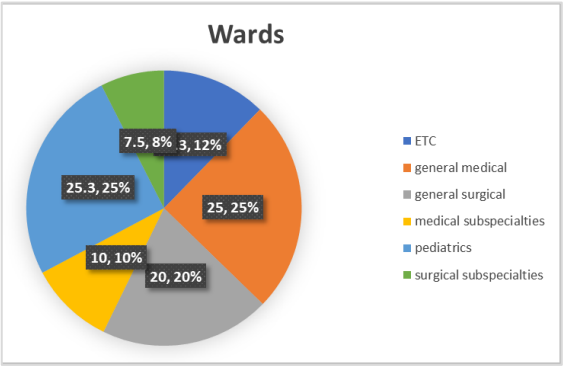
The study sample consisted of 384 bedhead tickets acquired using a simple random sampling procedure. A checklist was created based on the Ministry of Health Sri Lanka's most recent set of instructions for the proper maintenance of bedhead tickets. After speaking with specialists and completing extensive literature research, a marking scheme was developed and confirmed. A medical officer went through each BHT and completed the checklist.

Data was analyzed using a statistical package for social science software. The hospital director provided administrative clearance.

Results

The total sample of BHTs belonged to general medical, medical subspecialties, paediatrics, general surgical, surgical subspecialties, and emergency treatment short stay (ETC) wards.

Figure 01: Distribution of samples among different categories of wards



The level of completeness of the first page was good in 96% of the BHTs, while 4% of them showed average marks.

Around 82% of the BHTs obtained average marks for the general maintenance of continuation sheets. Only 2% of the BHTs

were observed to have good marks, while 16% were marked as poor. Numbering of the subfolders and having separate sections for different categories of staff were not practised in any ward that was included in the study.

Considering the level of completeness in BHT entries, overall, 67% of BHTs obtained good marks, while 31% and 2% of BHTs were marked average and poor consecutively. BHTs that belonged to pediatric wards had the highest marks for the completeness of entries, followed by surgical subspecialty wards and general surgical wards. Writing the name at the beginning of each entry was observed in 78.5% of BHTs, whereas the designation of the person making the entry was written in 89.8% of BHTs. Only 73.5% of BHTs had entries with the date noted down. The time of the entry was recorded in 64.3% of BHTs. Only 1% of BHTs had entries with the signature placed at the end.

None of the sample BHTs included the expected procedure for deleting or amending a documented record.

Table 1: Marks scored by different categories of wards

Component	**Ward category**	**Marks**		
		Poor	Average	Good
Level of completeness of First page	**All wards**	**0%**	**4%**	**96%**
	ETC	0%	0%	100%
	General medical	0%	9%	91%
	General surgical	0%	6%	94%
	Medical subspecialties	0%	0%	100%
	Pediatrics	0%	2%	98%
	Surgical subspecialties	0%	0%	100%
Maintenance of continuation sheets	**All wards**	**16%**	**82%**	**2%**
	ETC	18%	82%	0%
	General medical	17%	79%	4%
	General surgical	6%	93%	1%
	Medical subspecialties	57%	43%	0%
	Pediatrics	4%	95%	1%
	Surgical subspecialties	27%	73%	0%
Level of completeness of entries	**All wards**	**2%**	**31%**	**67%**
	ETC	8%	62%	30%
	General medical	0%	33%	67%
	General surgical	3%	25%	72%
	Medical subspecialties	0%	72%	28%
	Pediatrics	0%	7%	93%
	Surgical subspecialties	3%	13%	84%

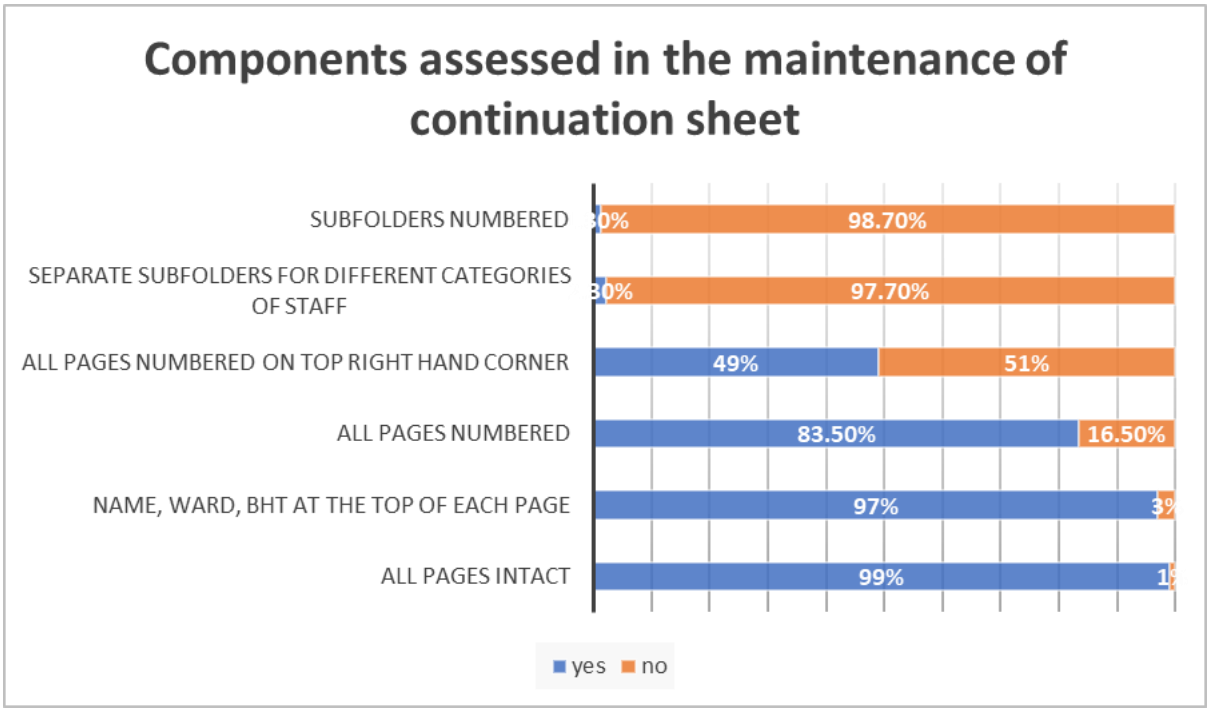


Figure 2: Components assessed in the maintenance of continuation sheet

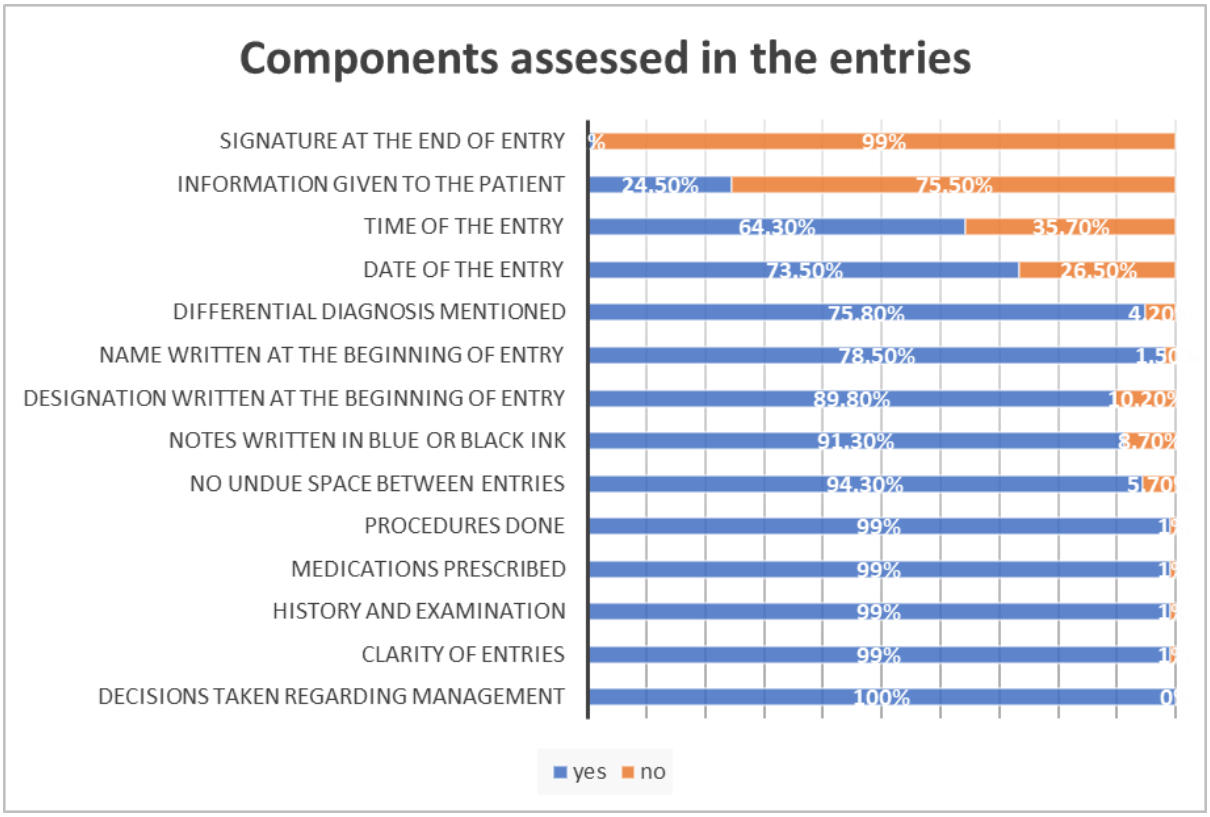


Figure 3: Components assessed in the level of completeness of entries

Discussion

The results of the current study show that NHG's overall clinical documentation level is either good or average, which suggests that the hospital system for maintaining BHT quality was functional to some extent.

In the Sri Lankan context, the admission sheet is considered the front page of the bedhead ticket. The guideline issued by the Ministry of Health lists four main components for the proper maintenance of the front page: filling out all relevant cages legibly and accurately, documenting allergy status in red, mentioning the blood group in red, and writing the principal diagnosis on the front page(6). Filling out the relevant cages and writing the principal diagnosis were satisfactory in this clinical audit.

In 2021, Mallawarachchi et al. published a study of doctors' medical documentary compliance in government hospitals in Gampaha district, Sri Lanka. The study revealed that only 7.61% of BHTs fulfilled all criteria for the completeness of the final diagnosis, 17.4% had complete entries, and 63.8% had legible notes(5). In comparison, the legibility of notes in our study was 99%, which indicates a bias in the perception of legible handwriting when assessed by different individuals.

In the 2021 study, the results also indicated that 86.3% of doctors were aware that each entry should include the time of entry and the signature of the person putting the entry, and there was a significant association between the distribution of knowledge and the duration of the doctor's service(5). However, according to our study findings, only 1% of the total BHTs had entries with signatures placed at the end, and 64.3% of BHT entries had the time noted at the beginning of each entry.

An article published in 2000 identified existing problems with clinical documentation, such as the absence of dates and times of medical interventions, inadequate records regarding the information given to patients and family members, failure to mention the designation of the person making the entry, and insufficient details on continuation sheets(9). Similar inadequacies were observed in this study, notably that only 24.5% of the BHTs contained records of the information given to the patients. Although healthcare professionals continue to provide information to patients and family members on a daily basis, failing to document these communications in medical records can create disadvantageous situations.

Conclusion and recommendations

Although the overall level of clinical documentation at NHG is above average, several areas require significant improvement, and certain wards require specific attention. Furthermore, clinical documentation should be precise in order to provide good continuity of care and avoid litigation. Based on this study, we recommended conducting training programs to improve the clinical documentation practices of doctors and nursing officers at medical and surgical subspecialty wards. The staff should be advised to maintain different subfolders for different categories of staff and to number subfolders and put signatures at the end of each entry.

References

1. Carpenter I, Ram MB, Croft GP, Williams JG. Medical records and record-keeping standards. Clin Med J R Coll Physicians London. 2007;7(4):328–31.
2. Elkbuli A, Godelman S, Miller A, Boneva D, Bernal E, Hai S, et al. Improved clinical documentation leads to superior reportable outcomes: An accurate representation of patient's clinical status. Int J Surg [Internet].

2018;53(April):288–91. Available from: https://doi.org/10.1016/j.ijsu.2018.03.081

3. Ebbers T, Kool RB, Smeele LE, Dirven R, den Besten CA, Karssemakers LHE, et al. The Impact of Structured and Standardized Documentation on Documentation Quality; a Multicenter, Retrospective Study. J Med Syst [Internet]. 2022;46(7):3–9. Available from: https://doi.org/10.1007/s10916-022-01837-9
4. Wanninayake I, Perera HSR. Availability legibility and adequacy of diagnosis as entered in bed head ticket in a base hospital Sri Lanka: a descriptive cross-sectional study. MedNEXT J Med Heal Sci. 2022;3(2):1–5.
5. Mallawarachchi SMNSM. Clinical Documentation Practice: A Study of Doctors' Medical Documentary Compliance in Government Hospitals in Gampaha District, Sri Lanka. Hosp Top [Internet]. 2022;100(3):105–11. Available from: https://doi.org/10.1080/00185868.2021.1926385
6. Ministry of Health Sri Lanka. Guidelines for proper maintenance of BHT.pdf. 2022.
7. Pourhoseingholi MA, Vahedi M, Rahimzadeh M. Sample size calculation in medical studies. Gastroenterol Hepatol from Bed to Bench. 2013;6(1):14–7.
8. Nundy S, Kakar A, Bhutta ZA. How to Write Results? How to Practice Academic Medicine and Publish from Developing Countries? A Practical Guide. 2021. 219–224 p.
9. J C. Clinical governance and clinical documentation: still a long way to go? [Internet]. Clin Perform Qual Health Care.; 2000. 179–82 p. Available from: https://pubmed.ncbi.nlm.nih.gov/11185832/

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Original Article:

A Scientific Approach for Optimizing Patient Bed Occupancy in an Overcrowded Teaching Hospital in Sri Lanka

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Keywords: Bed Occupancy, CSTH, Overcrowding

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Abstract

Background: In Sri Lanka, the healthcare system predominantly relies on the public sector, which delivers nearly 95% of inpatient care and approximately 50% of outpatient care. Effective monitoring of bed occupancy rates is crucial for optimizing resource allocation amidst limited hospital resources and fluctuating patient demands.

Objectives: This study aims to develop a scientific approach to enhance patient bed utilization at Colombo South Teaching Hospital (CSTH) in Sri Lanka.

Methodology: A mixed-method approach was employed, integrating quantitative analysis of historical patient data from CSTH's medical record room with qualitative insights from key stakeholders, including hospital administrators, consultants, medical officers, and nursing staff.

Results and Discussion: In 2023, CSTH reported an overall bed occupancy rate of 80%, surpassing both national and global averages, indicating strain on healthcare delivery. The study identifies disparities in occupancy rates across different wards, highlighting overcrowding in medical and surgical units alongside underutilization in other specialities.

Recommendations and Conclusions: Revising the consultant-based ward allocation system, implementing patient-centric ward clustering based on occupancy rates, appointing bed managers, and expanding facilities in high-demand units like Medical, Accident Service Unit, Emergency Treatment Unit, and Nephrology. Implementing these strategies could mitigate overcrowding, improve bed availability, and enhance the quality and safety of patient care services at CSTH.

Keywords: Bed Occupancy, CSTH, Overcrowding

Introduction

In Sri Lanka, healthcare facilities are easily and freely accessible and of good quality. The public sector provides nearly 95% of inpatient care and around 50% of outpatient care. The Ministry of Health (MOH) is responsible for stewardship functions such as policy formulation, health legislation, program monitoring, technical oversight, management of health technologies, and human resources. In 2022, there were more than 1,500 healthcare institutes in total, of which 588 were hospitals, and 517 were primary care institutes (1).

Colombo South Teaching Hospital (CSTH)

Colombo South Teaching Hospital (CSTH) is the second-largest government hospital in the Colombo District, located in Kalubowila, Dehiwala. The hospital has a bed strength of 1,249, with approximately 2,612 staff involved in patient care. It provides treatment to about 168,500 inpatients and 1,500,000 outpatients per year. The mission of the hospital is to ensure the provision of safe and quality healthcare services in a customer-friendly environment by utilizing scarce resources optimally, along with undergraduate and postgraduate training up to international standards, in order to fulfil the nation's requirements.

This hospital serves as the referral centre for the peripheral hospitals situated in this region and for some specialities like endoscopy procedures; it also serves as a national referral centre and is the teaching hospital of the Faculty of Medical Sciences, University of Sri Jayewardenepura.

A notable increase in demand has been recognized recently due to the current economic crisis. With limited resources in hospitals, where no infrastructural developments have occurred in the last 20 years, this hospital is striving to serve the public to the best of its ability. Hospital authorities are facing significant challenges in providing beds to patients at CSTH, particularly in certain units within the hospital, such as medical, surgical, and orthopaedic wards.

This article analyzes patient bed allocation practices at Colombo South Teaching Hospital (CSTH), highlighting current challenges and proposing evidence-based strategies and innovative solutions to address identified gaps.

Justification of Study

Monitoring bed occupancy rates is essential for hospital administrators to ensure optimal resource allocation and anticipate and address demand fluctuations. By analyzing trends in bed occupancy rates, healthcare facilities can make informed decisions about staffing levels, capacity planning, and resource allocation to maintain high-quality patient care while maximizing efficiency. Bed occupancy rates play a significant role in healthcare planning and policy-making at both the institutional and national levels.

General Objective

Discover a Scientific Approach to Improve Patient Bed Utilization at Colombo South Teaching Hospital in Sri Lanka.

Specific Objectives

1. To describe the current bed allocation practices at Colombo South Teaching Hospital.
2. To explore better bed allocation practices to suit Colombo South Teaching Hospital.

3. To provide beds for all patients admitted to Colombo South Teaching Hospital.

Literature Review

The availability of a bed in the hospital is one of the basic expectations of every patient, valued almost equally to the treatment they receive. There is a general perception among the public that government hospitals are fully occupied with patients. Efficient patient bed allocation is critical. A hospital bed is an expensive asset in healthcare services. The availability of beds is possibly the most vital factor in deciding the usage of hospitals in the country.

Bed occupancy rate (BOR) is an important index in healthcare management that indicates the percentage of inpatient beds occupied over a given period. It is typically expressed as a percentage and calculated by dividing the total number of occupied beds by the total number of available beds, then multiplying by 100.

Among non-specialized Teaching Hospitals, the highest Bed Turnover Rate has been recorded at Colombo South Teaching Hospital (129.28), followed by Colombo North Teaching Hospital (Ragama) (109.61). The Bed Occupancy Rate ranges between 54% and 86% in all non-specialized Teaching Hospitals. The highest rate has been reported from Karapitiya (85.79%), and the lowest rate from Sri Jayawardanapura (54.73%) (2).

A study conducted to explore the association between bed occupancy rates and hospital quality in the British National Health Service revealed that high bed occupancy rates are associated with lower quality. It also indicated a negative association between higher bed occupancy and certain quality indicators such as overall and surgical mortality, and health gains (3).

Methodology

This study employs a mixed-methods approach, combining quantitative analysis of historical patient data from the medical record room of the Colombo South Teaching Hospital with qualitative insights from key stakeholders, including hospital administrators, consultants, medical officers, and nursing staff. Additionally, surveys and interviews are conducted to gather feedback on the perceived effectiveness of existing bed allocation processes and to solicit suggestions for improvement.

Bed and Ward Allocation Practices at CSTH

The four major medical specialities, Medicine, Surgery, Pediatrics, and Obstetrics and Gynecology wards, cater to direct admissions from the outpatient department, in addition to the accident and emergency units. All other specialities receive referral patients from these major specialities. In addition to the above admission procedures, the Ward In charge consultants admit patients directly to the ward by making a request to the admitting medical officer. This is the patient admission practice followed in Colombo South Teaching Hospital as well as in other hospitals in Sri Lanka.

Ward Allocation

Wards are allocated for consultant units; usually, a male and female ward is allocated for each consultant name basis, but pediatric consultants will get one ward, and obstetrics and gynaecology units get three wards: antenatal, postnatal, and

gynaecology units. Some wards are shared by several consultant units in Colombo South Teaching Hospital. Each unit is headed by one or two consultants. Medical officers, nursing officers, and other supporting staff are part of the consultant's team for patient management. Various wards contain a different number of beds, and in total, CSTH contains 1249 beds. This consultant based ward allocation is the traditional practice in Colombo South Teaching Hospital as well as in Sri Lanka.

Patient Admission and Management

All patients seeking hospital admission or referred for hospital admission will undergo an initial assessment by the medical officer acting as the admitting doctor. He/she will decide on admission with the initial treatment recommendations for the suitable speciality or emergency unit.

Admissions to wards are allocated on a regular daily roster. The admission wards are called casualty wards. Once a patient is admitted to a casualty ward, that patient is registered under a casualty consultant's care, after the initial assessment by the medical team, the patient will be given a bed based on the clinical condition and the bed availability. The front beds, which are close to the nursing station, are allocated for patients who need close observation, and the remaining beds are given to other patients.

Some casualty wards are flooded with patients on admission days, and no beds are available for them, while some other wards don't have enough patients to fill the beds available in this traditional bed allocation practice.

Ward Allocation and Bed Occupancy Rate at Colombo South Teaching Hospital

Patients admitted under particular consultants will receive treatment in their ward under their supervision. Whenever an opinion is needed from other consultants/specialities, referrals are made. In this approach, the continuity of patient care is considered; however, bed availability is not taken into account. This method was followed in all the government hospitals

In this method, the continuity of patient care is considered as a first priority rather than bed availability.

Table 1: Bed Occupancy Rates in Medical Wards at Colombo South Teaching Hospital during the year 2023

Ward no	Speciality	Available beds	BOR-%
1	Medical-Male	42	113.5 **%**
2	Medical-Male	38	92.6 **%**
3	Medical-Male	44	92.8 **%**
4	Medical-Female	42	105.4 **%**
5	Medical-Male	40	96.3 **%**
7	Medical-Female	43	113.6 **%**
9	Medical-Female	40	104 %
	Total	**289**	**102.6**

Source: Medical Record Unit – CSTH

Taking into account the statistics, medical wards are nearly at full capacity, with an average bed occupancy rate of 102.6%. Information from ward staff highlights the high patient turnover and the challenges in providing adequate beds. In certain cases, two patients share a bed, and some even resort to sleeping on the floor. Despite the allocation of 289 out of 1249 beds (23.13%) to medical wards, it remains insufficient to meet the demand.

Table 2: Bed Occupancy Rates in Surgical and Orthopedic Wards at Colombo South Teaching Hospital during the year 2023

Ward no	Speciality	Available beds	BOR
11	Surgical-Female	41	73.3
15-B	Surgical - Female	40	71
15-A	Surgical(Male Surgical & Female orthopedics)	39	81.1
24	Surgical-Female	44	91.4
25	Surgical-Male	40	110.7
26	Surgical-Male	34	84.2
27	Surgical-Male	37	75.7
19	Orthopedics-Female	15	81.6
20	Orthopedics-Male	40	44
	Total	**330**	**79.22**

Source: Medical Record Unit – CSTH

General surgical and orthopaedic wards maintain an average occupancy rate of nearly 80 per cent. Interviews conducted with the surgical ward staff reveal that the turnover in the surgical ward is also notably high, largely attributed to day care surgeries and same-day discharges. Frequently, nearly all beds are occupied by patients. Due to this swift turnover, it is not taken in to account for calculating the BOR

The Obstetrics and Gynecology Wards exhibit comparatively lower occupancy, with an average of 47.2% noted from the statistics. Interviews indicate a notable decrease in patient turnover and deliveries within these wards

Table 3: Bed Occupancy Rates in Obstetrics and Gynecology Wards at Colombo South Teaching Hospital during the year 2023

Ward no	Speciality	Available beds	BOR %
10	Gynecological	21	43.3
17	Ante-Natal & Postnatal	25	27.3
12	Gynecological	23	69.6
18	Ante-natal	24	40.7
16	Post Natal	35	29
21	Ante Natal	19	44.3
22	Post Natal	20	75.6
23	Gynecological	37	48
	Total	204	47.226

Source: Medical Record Unit – CSTH

Table 4: Bed Occupancy Rates in Paediatric Wards at Colombo South Teaching Hospital during the year 2023

Ward	Speciality	Available beds	BOR %
41A	Paediatrics	33	83.2
41B	Paediatrics	33	53.8

Source: Medical Record Unit – CSTH

The utilization of beds in the Paediatric ward at CSTH is also relatively low, with an average bed occupancy rate of 68.5%. Interviews suggest that paediatric admissions are seasonal, leading to fluctuations in bed occupancy, with times when beds are fully occupied and other times when they remain unoccupied.

Table 5: Bed Occupancy Rates in Wards at Colombo South Teaching Hospital during the year 2023

Ward	Speciality	Available Beds	BOR - %
ASU	Accident Service	27	530
ETU	ETU	8	339
NU	Haemodialysis	7	325
38A	ENT(Male)	13	69.2
33A	Psychiatric (male)	10	65.3
28	Psychiatric (Female)	8	60.4
37A	Eye- (Female)	14	63
33B	Psychiatric (female)	17	54.4
29	Psychiatric (male)	11	54.1
38C	GI/GU(Male)	23	50.8
40	Cardiology-male	17	48.9
37A	ENT-(Female)	14	47.1
38A	Eye(Male)	15	43.4
39	Cardiology-Female	17	30.9
37B	Mixed Specialities (Female) Dermatology, Rheumatology ,Neurology, OMF,Haematology	35	29.5
38B	Mixed specialties (Male) Dermatology, Rheumatology , Neurology,OMF, Haematology	35	29.5

Source: Medical Record Unit – CSTH

The Accident and Emergency units and Nephrology unit consistently experience high bed occupancy rates, often resulting in patients being unable to secure beds. Conversely, bed occupancy rates in other units are comparatively low. In certain wards, multiple consultants share space to oversee patient care, yet the bed occupancy rates remain low

Discussion and Conclusions

The number of hospital beds is a crucial metric for evaluating hospital capacity. High occupancy rates within a hospital often indicate strain on the healthcare system. Maintaining some extra bed capacity is essential to accommodate unforeseen emergencies in patients requiring hospitalization and to prevent hospital-acquired infections.

While there are no set norms regarding the "optimal" occupancy rate, a rate of approximately 85% is often considered the maximum to mitigate the risk of bed shortages (4). As of 2021, the average worldwide bed occupancy rate stood at 69.8%. In Sri Lanka, reports indicate an average bed occupancy rate of 74%, with a maximum duration of stay of 3 days (5).

The CSTH reported a bed occupancy rate of 80% in 2023, surpassing both the national and global averages, indicating strain on the healthcare system. To alleviate this pressure, it is important to implement both short-term and long-term strategies

The medical and some surgical wards at CSTH are overcrowded with bed occupancy rates above 85%, while some wards are underutilized. This has resulted in patients in medical wards not having beds and sometimes sleeping on the floor, despite available beds in other wards. Considering the traditional patient allocation method based on the continuity of patient care services, equity of health care is challenged here

Globally, various bed allocation methods are followed. In some countries, a bed allocation manager is appointed and a bed management system is used to allocate beds to patients. Some countries even went beyond that and took initiatives to use artificial intelligence to assist in patient bed allocation. It's time to revise the traditional patient admission system and change it to a patient-centric approach.

Recommendations

1. The traditional consultant-based ward allocation system should be revised. Instead, patient-centric ward clustering methods (medical ward cluster, surgical ward cluster, obstetric and gynecology ward cluster) should be adopted, taking bed occupancy rates into account to ensure equitable bed allocation.
2. Appointing bed managers for each cluster to ensure bed for all patients.
3. Allocate one more ward to medical and surgical wards to reduce overcrowding and bring the bed occupancy rate to global standards (85%), improving the quality and safety of patient care services.
4. Gynecology and obstetrics wards are relatively underutilized (BOR-47.2%). There are two women specialty hospitals in Colombo district itself. These wards can be made cluster wards, and the above units should be shared on a basis. A ward can be removed from this cluster to accommodate patients from other units.
5. Pediatrics wards are also underutilized, but seasonal variations are noted, as per the detailed discussion with the staff. So, it is advised to continue the same practice in the above wards.
6. The ASU and ETU are also heavily overcrowded. To temporarily resolve the issue, they should be given some additional beds. In the long term, they should be expanded with adequate beds. The completion of the new A&E Unit will solve this problem.
7. The Nephrology unit is heavily overcrowded, 325%, and manages patients from other wards as well. A separate nephrology ward is also identified as an important need for the hospital.
8. Mixed Specialty wards are also underutilized (BOR of 29.5). To improve the BOR, more specialties can be added in addition to the existing ones.
9. Hospital Bed management system can be used to allocate and manage patients in the hospital.

References

1. Ministry Of Health Sri Lanka | Health Institutions In Sri Lanka [Internet]. www.health.gov.lk. Available from: https://www.health.gov.lk/health-institutions-in srilanka/#:~:tex t=In%20 mid % 202022%2C%20there%20were.
2. Lanka S. Ministry of Health [Internet]. Available from: https://www.health.gov.lk/wp-content/uploads/2022/12/AHB-2019-1.pdf
3. Bosque-Mercader L, Siciliani L. The association between bed occupancy rates and hospital quality in the English National Health Service. Eur J Health Econ. 2023 Mar;24(2):209-236. doi: 10.1007/s10198-022-01464-8. Epub 2022 May 17. PMID: 35579804; PMCID: PMC9112248.
4. Chapter 39 Bed occupancy Emergency and acute medical care in over 16s: service delivery and organisation NICE guideline 94 [Internet]. 2018. Available from: https://www.nice.org.uk/guidance/ng9

4/evidence/39.bed-occupancy-pdf-172397464704
5. Health Statistics. (2014). Available at: https://www.ips.lk/wp-content/uploads/2017/01/Health-statistics2013.pdf [Accessed 20 Apr. 2024].

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Original Article:

Selection of Biomedical Equipment for public hospitals in Sri Lanka: A stakeholder perspective

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Keywords: Biomedical equipment, need assessment, stakeholders' perception

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Abstract

Background: Health technology is an important component in delivering healthcare services. Healthcare technology can be expensive and often does not align with the unique needs of under-resourced areas. Out of the variety of health technologies, biomedical equipment is one of the major assets for any healthcare institution, and it plays an important role in healthcare delivery.

Unlike developed countries, Sri Lanka lacks a system for choosing effective biomedical equipment for hospitals. This study explored current practices to improve the biomedical equipment selection process.

Purpose: The study aims to assess stakeholders' perceptions of the decision-making process for selecting biomedical equipment in selected line ministry hospitals in the Western Province of Sri Lanka.

Methodology: This cross-sectional study was conducted in four (4) line ministry hospitals, with each facility representing a specific level identified within the line ministry. A survey using a self-administered Questionnaire (SAQ) and a desk review using a checklist were conducted to assess the stakeholders' perceptions of the decision-making process in selecting biomedical equipment.

Results: The stakeholders' survey revealed low awareness of the unavailability of an HTA policy, institutional guidelines, and essential biomedical equipment list. Equipment requests were mainly paper-based, finalized by a committee, and took over two days to process. Respondents found the decision-making process inconvenient and dissatisfying.

The finalized requests assessed through the checklist revealed that they were incomplete, lacking crucial information, such as the Requesting Officer and infrastructure details, and not accounting for financial, environmental, and equipment demand factors.

Conclusions: The decision-making system practiced was revealed to be inefficient, inconsistent, and noncomprehensive. It was also found to be made without due consideration of factors related to equipment, finance, infrastructure, human resources, and services. Therefore, establishing a proper need assessment and prioritization method with criteria is recommended.

Keywords: Biomedical equipment, need assessment, stakeholders' perception.

Introduction

WHO health systems framework delineates six (6) fundamental building blocks essential for a robust healthcare system [1]. As defined by the WHO medical device is "an article, instrument, apparatus or machine that is used in the prevention, diagnosis or treatment of illness or disease or for detecting, measuring, restoring, correcting or modifying the structure or function of the body for some health purpose" and "medical equipment" is "medical devices requiring calibration, maintenance, repair, user training and decommissioning activities usually managed by clinical engineers." It is often interchangeably known as "Biomedical equipment" [2].

Background

The Alma-Ata Declaration of 1978 emphasized the pivotal role of appropriate and functional medical technology in healthcare delivery. However, in developing countries, over 95% of biomedical equipment is imported, and a concerning revelation is that between 40% and 70% of such equipment is either broken, unused, or unfit for purpose [3]. This high rate of equipment failure adversely affects patient outcomes, health system efficiency, and healthcare provider workloads.

In developed countries, a well-defined mechanism guides the selection of biomedical equipment [4]. Health Technology Assessment (HTA) is a common practice in countries like the UK and Italy, European Union HTA regulates entry of new medical devices in Europe, ensuring evidence-based selection across member states [5].

WHO's report on "Medical Devices: Managing the Mismatch" highlights the complexities of medical device selection, urging data-driven, public health-focused choices. [6]

In the Sri Lankan healthcare landscape, the process of selecting biomedical equipment warrants a closer examination, particularly concerning instances where such equipment remains unused or uninstalled. This study aims to delve into a comprehensive analysis of the current approach to biomedical equipment selection in Sri Lanka. Amidst the absence of a national HTA policy in Sri Lanka, understanding the processes and practices of health institutions in selecting and prioritizing biomedical equipment requirements becomes crucial.

Purpose of the study

The objective of the study is to assess stakeholders' perceptions of the decision-making process for selecting biomedical equipment in selected line ministry hospitals in the Western Province of Sri Lanka.

Methods

This observational cross-sectional study was conducted in the line ministry hospitals in Western Province, Sri Lanka.

Four line ministry hospitals were randomly selected based on the four levels of hospitals: national hospitals (NH), teaching hospitals (TH), Specialized hospitals, District General hospitals (DGH), and Base hospitals (BH).

The selected hospitals are as follows.

1. Colombo South Teaching hospital (CSTH), Kalubowila
2. National Cancer Institute (NCI), Maharagama (a specialized hospital)
3. District General Hospital, Negombo
4. Colombo East Base Hospital (CEBH), Mulleriyawa

Data collection

Data was collected through a desk review and a survey of stakeholders.

Desk Review

A desk review was conducted using a checklist to evaluate all requests submitted to the BES unit by the selected hospitals between April 2022 and April 2023.

Self-administered questionnaire (SAQ)

A validated, pre-tested SAQ was used to assess the perception of the selected stakeholders involved in selecting biomedical equipment. The stakeholders are as follows:

- Hospital Directors / Deputy Directors
- Clinical Consultants of all wards and units forwarding requests to BES
- Medical Officers (MO) Planning
- Officers in charge of units (Unit heads) involved in requesting biomedical equipment (Matrons/ Sisters / Nursing Officers/ Chief Pharmacist/ Surgical Pharmacist/ Chief Radiographers)

Results

Desk review of two hundred and five Biomedical Equipment requests from June 2022 to Dec 2022 revealed the following.

Table 1: Distribution of factors included in the Biomedical Equipment requests according to the hospitals

Factors	CSTH	NCI Maharagama	Negombo	CEBH Mulleriyawa	Total
Unit / Ward	63%	66%	85%	50%	70%
Requesting Officer's Name	3%	6%	35%	40%	17%
Requesting Officer's Designation	3%	6%	28%	40%	14%
Equipment related Factors					
Age of the Replacing Equipment (If Replacement)	0%	0%	0%	0%	0%
Equipment Name	100%	100%	100%	100%	100%
Purpose	8%	43%	17%	20%	18%
Need of the Equipment	0%	0%	4%	0%	1%

Existing Similar Equipment	0%	3%	4%	0%	2%
Requesting Equipment – Specification / Features	0%	3%	4%	0%	2%
Infrastructure					
Space	6%	0%	0%	0%	2%
Electricity with a Backup	0%	0%	0%	0%	0%
A/C and Humidity Controlling System	6%	0%	0%	0%	2%
Water Disposal	6%	0%	0%	0%	2%
Medical Gas Supply	7%	23%	6%	10%	9%
Water Line (Distilled Water /DI Water / Line Water)	7%	3%	4%	10%	5%
Data Management System	6%	0%	0%	0%	2%
Other Necessary Equipment for Function	6%	0%	0%	0%	2%
Human Resources Details of the requesting unit	1%	3%	3%	0%	2%
No of tests/Cases done per month	2%	6%	13%	10%	7%
No of tests/cases are required to be done per month	2%	6%	8%	10%	5%
Environment Impact	0%	0%	0%	0%	0%
Economic factors	0%	0%	0%	0%	0%
Demand (political/social) for the equipment	0%	0%	0%	0%	0%

Table 2: Distribution of the Respondents

Type of Respondents	CSTH Kalubowila	DGH Negambo	NCI Maharagama	CEBH Mulleriyawa	Total
Director	3	2	2	2	9
Consultant & Medical Offer	75	35	37	10	157
Unit Heads	53	31	35	12	131
Total	131	68	74	24	297

Although the equipment name was included in all the requests, other important information was lacking in most of them (Table 1).

Survey results of the SAQ

The survey results of the SAQ are as follows (Table 2).

The majority of the respondents were consultants and medical officers (Table 2).

Table 3: Perception of stakeholders regarding the critical information related to the selection of Medical Equipment

Critical Information	No	Don't Know	Yes
• Is there a Policy for the Health Technology Assessment (HTA) in Sri Lanka?	34.6%	34.6%	30.9%
• Do you have Guidelines developed for Medical Equipment Assessment at your hospital?	38.2%	22.0%	39.8%
• Do you have an Essential Biomedical Equipment list developed for your hospital?	36.1%	15.2%	48.7%
• Do you think that the current Biomedical Equipment Selection process in the hospital is efficient?	76.9%	0.0%	23.1%
• Do you use a format to request for Biomedical equipment in the hospital?	25.6%	20.4%	54.0%
• Do you have a mechanism to prioritize the requests made for Biomedical equipment in the hospital?	34.6%	34.6%	30.9%

Table 4: Frequency of recording the requests according to the mechanism

Mechanism	Frequency	Percent	Valid Percent	Cumulative Percent
Paper-based only	149	72.3	72.3	72.3
Paper-based and Electronic	57	27.7	27.7	100
Total	206	100.0	100.0	

Table 5: Frequency of finalizing the requests according to the mechanism

Mechanism of finalizing the requests	Frequency	Percent	Valid Percent	Cumulative Percent
Don't Know	26	12.6	12.6	12.6
No mechanism	21	10.2	10.2	22.8
Individually	23	11.2	11.2	34
Through a committee	128	62.1	62.1	96.1
Through a Database	8	3.9	3.9	100
Total	206	100	100	

The survey revealed that the majority of the respondents were not aware of the nonavailability of a policy for HTA. And 76.9% of respondents perceived that the current selection process was inefficient (Table 3).

The majority (72.3%) of the respondents mentioned that the system for requesting biomedical equipment is paper-based only (Table 4).

According to Table 5, the main mechanism of finalizing the requests made for the biomedical equipment was revealed to be through a committee (62.1%). Only 3.9% used a database to finalize the requests.

It was revealed that 51.9% of the respondents believed that it takes two or more days to obtain the necessary information about the need (Table 6).

The majority (51.5%) of the respondents perceived that the current mechanism leads to delays in the process of selecting biomedical equipment (Table 7).

Table 6: Time duration to obtain the necessary information about the need for the requested biomedical equipment

How long does it take to obtain the necessary information	Frequency	Per cent	Valid Percent	Cumulative Percent
Immediately	0	0.0	0.0	0.0
Within a day	0	0.0	0.0	0.0
Takes two or more days	107	51.9	51.9	51.9
Takes more than one week	48	23.3	23.3	75.2
Takes months	51	24.8	24.8	100
Total	206	100	100	

Table 7: The frequency of delays in selecting biomedical equipment perceived by the respondents

Frequency of delays	Frequency	Percent	Valid Percent	Cumulative Percent
Yes, always	52	25.2	25.2	25.2
Yes, most of the time	106	51.5	51.5	76.7
Yes, sometimes	34	16.5	16.5	93.2
Yes, but rarely	14	6.8	6.8	100.0
No, not at all	0	0	0	100
Total	206	100.0	100.0	100.0

Discussion

Biomedical equipment should be suited to its intended location and purpose to ensure optimal functionality [7]. However, in developing countries, approximately 75% of such equipment is incompatible with resource-constrained settings, resulting in underutilization [8]. The discrepancy arises due to reasons such as inadequate needs assessment, insufficient infrastructure, shortage of consumables, absence of

trained healthcare staff, etc. These issues are part of a wider problem in many countries [9].

The desk review done, revealed the unavailability of information to make decisions and to set priorities in the process of selecting the necessary biomedical equipment. A systematic review by Barasa et al (2014) emphasized the importance of quality information for decision-making. It was mentioned that the availability and quality of information for decision-making play a crucial role in priority-setting practices. It was found that the lack of information was the most common obstacle in priority-setting, and the hospital decision-makers often lacked sufficient and reliable information to make informed decisions, which resulted in the use of informal and subjective considerations in selecting equipment. The article also mentioned that the decision-makers believed that the availability of quality information would enhance the decision-making process [10].

The analysis of the respondents revealed the following composition. Hospital Directors at 3%, Clinicians at 53%, and the unit heads or in-charge officers' majority who were nursing officers, at 44%. This composition is seen as closely related to a study from Brazil that revealed that those who initiated medical equipment selection were physicians (29.00%), followed by nurses (24.00%), managers (22.00%) and clinical engineers (20.00%). The study reported that patients had not initiated the selection of medical equipment [11] showing the involvement of the clinicians in the decision-making process at the highest level followed by the nurses similar to the conducted study. However, the involvement of the biomedical engineers in the initiation and selection of the biomedical equipment at the hospital level was not assessed as there were no full-time biomedical engineers at the selected hospitals where the study was conducted.

The study revealed the absence of an HTA policy and guidelines for selecting biomedical equipment in Sri Lanka. An article by Dasanayaka (2011) mentioned that the absence of a proper framework with the right technology management policy has resulted in poor performance of healthcare equipment and resource wastage by undermining the quality of healthcare services in Sri Lanka.

A systematic review done by Gamage & Abeysena (2020) has stated that HTA is a policy tool aimed at facilitating informed decision-making processes that support the entry and use of health-related technologies. Further mentioned, the development of HTA has been driven by three main factors that are the growing demand for healthcare services and expectations, the limited availability of resources, and the increasing influx of new technologies into the healthcare market. An article by Sunuwar (2020) mentions that the HTA policy is vital in expanding the healthcare system's concept and methods of value assessment. Even though an HTA policy is absent in Sri Lanka, it is mentioned that most of the Asian countries have introduced the HTA at the government level. South Korea, Taiwan, Thailand, Japan, and neighbouring countries such as India, China, and Bhutan have already established HTA. The Health Intervention and Technology Assessment Program (HITAP) in Thailand and the UK (NICE) were identified as two of the best examples in the world where HTA has been incorporated into the decision-making process [12]. Therefore, the absence of an HTA policy can be pointed out as a main

drawback in the decision-making process in selecting biomedical equipment for health institutions. Another article shows that in developed countries such as England, France, Germany, and Sweden the decision-makers had a long experience of more than two decades in the implementation of HTA [13].

The respondents perceived that there was no proper mechanism for performing a needs assessment and prioritization. Another author confirmed this finding, recommending the importance of developing a procedure or mechanism for better, more transparent, and accountable management of biomedical equipment [14].

A 2013 study emphasized the importance of gathering relevant information in decision-making. Medical equipment is required to correspond to local clinical needs, be accurate and reliable in the environment, and ensure the effectiveness of providing health care [15].

The desk review revealed that important factors in the deployment setting are inadequately considered. An article mentions that biomedical equipment for LMIC presents unique challenges not seen in developed markets. According to the WHO, an estimated 70% of equipment coming from developed countries does not function in developing countries due to a lack of trained staff, infrastructure limitations, and lack of support and spare parts [16].

The majority of the respondents of the current study perceived that the current selection mechanism was inefficient. Similarly, a study conducted in Russia uncovered that hospitals and authorities did not properly prioritize or evaluate new technologies as the process of gathering information was disorganized, leading to inefficiencies in the selection of equipment [17].

This is further confirmed by the findings of a study done in Ethiopia, that showed a higher level in the absence of considering the hospital setting in planning for procuring biomedical equipment. The article further showed a positive correlation between the functionality of the equipment and the procurement practices [18].

It was also revealed that there were no selection guidelines or criteria to evaluate the requirement for biomedical equipment. A similar finding was revealed from a cross-sectional study done in Kalutara [19], Sri Lanka, which stated that all hospitals studied were found to be without guidelines for acquiring equipment.

A study from Iran showed that in 80% of hospitals, there were no procedures for purchasing medical equipment, which meant that there were no formal and internal policies and procedures [20]. The study suggests an effective control system to address these shortcomings by designing a mechanism to make decision-making more efficient based on the hospital's requirements.

In conclusion, the absence of a national HTA policy, institutional guidelines, and an essential biomedical equipment list leads to deficiencies in decision-making in selecting biomedical equipment in hospitals [21] . Further, it is revealed that there is no proper system to perform a need assessment in selecting the required biomedical equipment. A study revealed that considering the status of the hospital setting in the decision-making process in selecting biomedical equipment ensures proper utilization [18]. Therefore, hospitals require to establish specific criteria for decision-

making when selecting medical equipment [22].

It is recommended that a proper need assessment mechanism be established at the hospital level to identify the hospital's biomedical equipment requirements.

Conflict of Interest

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References

[1] WHO, “Everybody's business -- strengthening health systems to improve health outcomes : WHO's framework for action.,” 2007.

[2] P. D. Koggalage and S. De Alwis, “A Project to Improve Management of Biomedical Equipment in Selected Units of District General Hospital, Gampaha, Sri Lanka,” International Journal of Research Foundation of Hospital and Healthcare Administration, 2020.

[3] Access and Delivery Partnership , Value-based procurement of medical equipment (VBP), The Access and Delivery Partnership, 2020.

[4] K. Rahmani, S. Karimi, . A. R. Raeisi and R. Rezayatmand, “Comparative study of Medical Equipment procurement in Selected countries,” Medical Journal of Islamic Republic of Iran, 2022.

[5] K. Lampe, M. Mäkelä, M. Garrido, H. Anttila, I. Autti-Rämö, N. Hicks, B. Hofmann, J. Koivisto, R. Kunz, R, A. Malmivaara, k. Meiesaar,, R. Möttönen, I. Norderhaug, I, I. Pasternack, A. Ruano-Ravina, P. Räsänen, U. Saalasti-Koskinen, S. Saarni, SI and L. Walin, , “The HTA core model: a novel method for producing and reporting health technology assessments',,” Inernationalt Journal Technology Assessment in Health Care, 2009.

[6] WHO, “World Medical devices: managing the mismatch: an outcome of the priority medical devices project: methodology briefing paper,” WHO, 2010.

[7] Global Fund, “Technical Brief, Value for Money,” 2023. [Online]. Available: https://www.theglobalfund.org/media/13482/grantcycle_value-for-money_presentation_en.pdf. [Accessed 18 September 2023].

[8] K. Diaconu, Y. Chen, C. Cummins, G. J. Moyao, S. Manaseki-Holland and R. Lilford, “Methods for medical device and equipment procurement and prioritization within low- and middle-income countries: findings of a systematic literature review,” 2017.

[9] WHO, “Medical Devices: Managing The Mismatch An outcome of the Priority Medical Devices project,” 2010.

[10] E. W. Barasa, S. Molyneux, M. English and S. Cleary, “Setting healthcare priorities in hospitals: a review of empirical studies,” Health Policy and Planning, 2014.

[11] H. P. Silva and A. L. D. Viana , “Health technology diffusion in developing countries: a case study of CT scanners in Brazil,” Health Policy and Planning, 2010.

[12] T. R. Sunuwar, “Improving the Healthcare System through Health Technology Assessment,” 2020.

[13] A. Beletsi, V. Koutrafouri, E. Karampli and E. Pavi, “Comparing Use of Health Technology Assessment in Pharmaceutical Policy

among Earlier and More Recent Adopters in the European Union," VALUE IN HEALTH REGIONAL ISSUES, 2018.

[14] S. W. Dasanayaka , "Performance of Health Care Equipments in the Public Sector Hospitals in the Eye of Good Governance, A Case Study Based on the Sri Lankan Public Sector Hospitals," 2011.

[15] A. E. Margotti, F. Santos and R. Garcia, "Decision Making Process to Incorporate Medical Equipment in hospital: Clinical Engineering Perception," World Congress on Medical Physics and Biomedical Engineering, 2013.

[16] A. Vasan and J. Friend, "Medical Devices for Low- and Middle-Income Countries: A Review and Directions for Development," Journal of Medical Devices, 2020.

[17] S. Shishkin and L. ZASIMOVA, "Adopting new medical technologies in Russian hospitals: what causes inefficiency?," Health Economics, Policy and Law, 2017.

[18] S. H. Kabeta, T. K. Chala and F. Tafese, "Medical Equipment Management in General Hospitals: Experience of Tulu Bolo General Hospital, South West Shoa Zone, Central Ethiopia," Medical Devices: Evidence and Research, 2023.

[19] D. A. Batawalage, Hospital Equipment Management in District Base Hospitals in Kalutara District in Sri Lanka., Biomedical Statistics and Informatics., 2017.

[20] M. Ghasemi, E. Mazaheri, M. Hadian and S. Karimi, "Evaluation of medical equipment management in educational hospitals in Isfahan," Journal of Education and Health Promotion, 2022.

[21] H. Terio, "Procurement of medical equipment in Sweden," Zdrav Vestn, 2010.

[22] D. Greenberg, Y. Peterburg, D. Vekstein and J. S. Pliskin, "Decisions to adopt new technologies at the hospital level: Insights from Israeli medical centers," International Journal of Technology Assessment in Health Care, 2005.

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Original Article:

A case study on COVID-19 infected patient's experience - challenging journey at Colombo East Base Hospital- Mulleriyawa

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Keywords: Patient Experience, COVID-19 Care, Patient-Centered Care

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Abstract

This study investigates the patient experience within the COVID-19 treatment centre at Colombo East Base Hospital, Mulleriyawa, amidst the global pandemic. A cross-sectional descriptive study was conducted over one month, involving 30 participants recruited through convenience sampling. Participants completed self-administered questionnaires assessing various aspects of care, including staff interaction, cleanliness, health education, counselling, and attention to health-related matters. Results indicate high levels of satisfaction among participants across multiple care domains, with the majority expressing satisfaction with staff interaction, cleanliness, health education, counselling, and attention to health-related matters. These findings underscore the healthcare delivery system's effectiveness in meeting patients' diverse needs and expectations during the pandemic. The study highlights the importance of patient-centred care in promoting positive patient experiences and outcomes, particularly in the context of public health emergencies. Recommendations include sustaining and enhancing best practices in healthcare delivery, prioritizing infection prevention and control measures, and promoting effective communication and patient education. By prioritizing patient-centred care and continuous quality improvement initiatives, healthcare providers can ensure the safety, satisfaction, and well-being of patients amidst crises such as the COVID-19 pandemic.

Keywords: Patient Experience, COVID-19 Care, Patient-Centered Care

Introduction

The COVID-19 pandemic, caused by SARS-CoV-2, has severely challenged global healthcare systems. First identified in late 2019 in Wuhan, China, the virus rapidly spread worldwide, prompting the World Health Organization (WHO) to declare it a global health emergency in January 2020. Sri

Lanka, like many nations, faced the critical task of containing the virus and providing adequate care for those infected.

In response, Colombo East Base Hospital in Mulleriyawa, a key healthcare facility in Sri Lanka, was swiftly repurposed to serve as a dedicated COVID-19 treatment centre. This decision was driven by the need to centralize resources and expertise, allowing for a more effective and streamlined response to the surge in cases. By focusing efforts on managing COVID-19 cases, the hospital aimed to reduce the burden on existing healthcare infrastructure and ensure timely, effective treatment while safeguarding the health of patients and healthcare workers.

The transformation of Colombo East Base Hospital underscores the adaptability of healthcare systems in times of crisis. The rapid mobilization of medical staff, equipment, and infrastructure enabled the hospital to effectively handle the influx of COVID-19 cases, mitigating the pandemic's impact on public health.

This study aims to explore patient experiences within the COVID-19 treatment centre at Colombo East Base Hospital. By examining the perspectives of patients, the study seeks to assess the quality of care, identify areas for improvement, and inform future pandemic response strategies. Understanding patient experiences is vital for evaluating care quality and addressing any challenges encountered during treatment.

The following sections will outline the study's methodology, present the findings, and discuss implications for healthcare practice and policy. Through this analysis, the study aims to contribute to enhancing healthcare delivery and preparing for future health crises.

Design

The study aimed to provide a detailed understanding of patient experiences at the COVID-19 treatment centre at Colombo East Base Hospital, Mulleriyawa, using a cross-sectional descriptive design. This approach allowed for capturing a snapshot of patient perspectives over a one-month period, utilizing convenience sampling to recruit participants. Thirty patients were included, representing a diverse range of ages, genders, and socioeconomic backgrounds.

Data were collected through self-administered questionnaires specifically developed for this study. These questionnaires featured closed-ended questions on a Likert scale to assess various aspects of care, including staff interaction, cleanliness, health education, counseling, and attention to health issues. Additionally, open-ended questions were included to gather further qualitative insights.

Ethical considerations were carefully addressed. Participants were provided detailed information about the study and informed consent was obtained. Confidentiality was maintained throughout, and data was anonymized and securely stored.

Quantitative data were analyzed using descriptive statistics to identify patterns, while qualitative data from open-ended responses were thematically analyzed to uncover recurring themes. The study's design ensured meaningful insights into patient experiences, though convenience sampling may have introduced some bias. A larger sample size could have provided more robust data, and self-reported measures might be subject to response biases.

Overall, the study effectively balanced practical constraints with the goal of understanding patient experiences during a challenging period in healthcare.

In the following sections, we will present the results of our analysis, discuss implications for healthcare practice and policy, and provide recommendations for future research and practice. By exploring the patient perspective, we aim to contribute to ongoing efforts to enhance the delivery of healthcare services and improve outcomes for individuals affected by COVID-19.

Methods

This study utilized a cross-sectional descriptive design to explore patient experiences at the COVID-19 treatment center at Colombo East Base Hospital, Mulleriyawa, over a one-month period. Convenience sampling was used to recruit participants who were admitted to the center during this time and were willing to complete a study questionnaire. Researchers approached eligible individuals, provided information about the study, and obtained informed consent.

The study included 30 participants, representing diverse demographics in terms of age, gender, and socioeconomic background. This sample size was considered adequate for providing meaningful insights within the study's time and resource limitations.

Data collection involved pre-tested, self-administered questionnaires tailored for this study. These questionnaires, developed from a review of relevant literature on patient satisfaction, included closed-ended questions on a Likert scale to assess satisfaction with staff interaction, cleanliness, health education, counseling, and attention to health-related matters. Participants were also invited to provide open-ended feedback for additional insights.

Ethical standards were maintained throughout the study. Participants received detailed information about the study's purpose, procedures, and potential risks before giving their informed consent. Data anonymization and secure storage ensured confidentiality.

Quantitative data were analyzed using descriptive statistics to identify patterns and trends. Qualitative data from open-ended responses were thematically analyzed to uncover recurring themes and insights.

The study will present the results, discuss their implications for healthcare practice and policy, and provide recommendations for future research. By examining patient experiences, this study aims to enhance healthcare service delivery and improve outcomes for those affected by COVID-19.

Results

The study involved 30 participants admitted to the COVID-19 treatment center at Colombo East Base Hospital, Mulleriyawa. The demographic profile of participants is summarized in Table 1. The majority of participants were between the ages of 30 and 50, with a slightly higher proportion of males (63.3%) compared to females (33.6%).

Table 1: Demographic Profile of Participants

Age Group	Number of Participants	Percentage
<30 years	10	33.3%
30-50 years	15	50.0%
>50 years	5	16.7%
Gender	**Number of Participants**	**Percentage**
Male	19	63.3%
Female	10	33.6%

Participants were asked to rate their satisfaction with various aspects of care on a Likert scale ranging from "very satisfied" to "very dissatisfied." Table 2 summarizes participant satisfaction levels across different domains of care.

Table 2: Participant Satisfaction with Various Aspects of Care

Aspect of Care	Very Satisfied (%)	Satisfied (%)	Neutral (%)	Dissatisfied (%)	Very Dissatisfied (%)
Staff Interaction	85	10	3	2	0
Cleanliness	80	15	3	2	0
Health Education	75	20	3	2	0
Counseling	80	15	3	2	0
Attention to Health-Related Matters	85	10	3	2	0

Table 3 provides a detailed breakdown of participant responses regarding staff interaction. The majority of participants (85%) reported being "very satisfied" with staff interaction, while only a small percentage expressed dissatisfaction.

Table 4 presents participant responses regarding cleanliness within the COVID-19 treatment center. The majority of participants (80%) reported being "very satisfied" with the cleanliness of the facility, indicating a high level of satisfaction in this domain.

Table 3: Distribution of Responses Regarding Staff Interaction

Response	Number of Participants	Percentage
Very Satisfied	25	85%
Satisfied	3	10%
Neutral	1	3%
Dissatisfied	1	2%
Very Dissatisfied	0	0%

Table 4: Distribution of Responses Regarding Cleanliness

Response	Number of Participants	Percentage
Very Satisfied	24	80%
Satisfied	4	15%
Neutral	1	3%
Dissatisfied	1	2%
Very Dissatisfied	0	0%

Table 5: Distribution of Responses Regarding Health Education

Response	Number of Participants	Percentage
Very Satisfied	22	75%
Satisfied	6	20%
Neutral	1	3%
Dissatisfied	1	2%
Very Dissatisfied	0	0%

Table 5 outlines participant responses regarding health education received during their stay at the COVID-19 treatment center. The majority of participants (75%) reported being "very satisfied" with the health education provided, indicating effective communication and dissemination of information.

Overall, participant satisfaction levels were high across various domains of care, including staff interaction, cleanliness, health education, counseling, and attention to health-related matters. The majority of participants expressed satisfaction with the care received, highlighting the effectiveness of healthcare delivery at the COVID-19 treatment center.

Discussion

The results of this study unveil crucial insights into the patient experience within the COVID-19 treatment centre at Colombo East Base Hospital, Mulleriyawa. Despite the unprecedented challenges posed by the pandemic, participants expressed high levels of satisfaction across various care dimensions, including staff interaction, cleanliness, health education, counselling, and attention to health-related matters. These findings align with existing literature emphasizing patient-centered care as a cornerstone of effective healthcare delivery during crises [1].

One significant finding is the participants' satisfaction with staff interaction. Effective communication and interpersonal skills are pivotal in healthcare delivery, particularly amidst heightened anxiety during pandemics [2]. The positive feedback underscores the importance of empathy and professionalism among healthcare providers in fostering patient trust and satisfaction [3]. Continuous training and support for healthcare staff are essential to uphold these standards [4].

The positive perceptions of cleanliness within the treatment center are noteworthy. Maintaining stringent infection control measures is paramount in healthcare settings to curb disease transmission [5]. The high satisfaction levels reported suggest the successful implementation of robust infection prevention protocols, safeguarding patients and staff alike [6].

Moreover, participants reported high satisfaction with the health education

provided. Clear and accurate information empowers patients to make informed decisions and adhere to preventive measures [7]. Effective patient education is integral in promoting health literacy and behavior change, especially during rapidly evolving public health crises [8].

The favorable feedback regarding counseling and attention to health-related matters highlights the treatment center's holistic approach to care. COVID-19's multifaceted impacts necessitate addressing not only physical but also emotional and social aspects of well-being [9]. Providing comprehensive support services underscores the commitment to addressing patients' holistic needs and promoting overall recovery [10].

In conclusion, the findings underscore the pivotal role of patient-centered care in promoting positive experiences and outcomes within the COVID-19 treatment centre at Colombo East Base Hospital, Mulleriyawa. Prioritizing effective communication, infection control, health education, and holistic care are essential in meeting patients' diverse needs and ensuring their safety and satisfaction during public health emergencies. Building on these successes through ongoing collaboration, innovation, and quality improvement initiatives is crucial for strengthening healthcare systems and improving outcomes for individuals affected by COVID-19 and future health crises.

Conclusions and Recommendations

In conclusion, this study's findings underscore the critical role of patient-centered care in ensuring positive experiences and outcomes within the COVID-19 treatment center at Colombo East Base Hospital, Mulleriyawa. The high levels of satisfaction reported by participants across various care dimensions reflect the effectiveness of the healthcare delivery system in meeting patients' needs and expectations during the pandemic [1].

Moving forward, it is imperative to build on these successes and prioritize patient-centered care in healthcare delivery. Continuous efforts should be made to enhance staff training and support to ensure that healthcare providers are equipped with the necessary skills and resources to deliver compassionate and effective care [11]. Additionally, ongoing evaluation and feedback mechanisms should be implemented to identify areas for improvement and inform quality improvement initiatives [12].

Furthermore, it is essential to sustain and strengthen infection prevention and control measures to mitigate the risk of disease transmission within healthcare settings. This includes ensuring access to personal protective equipment (PPE), implementing rigorous cleaning and disinfection protocols, and promoting adherence to infection control guidelines among staff and patients [13]. By prioritizing infection prevention, healthcare facilities can minimize the risk of healthcare-associated infections and protect the health and safety of patients and staff [14].

In addition to infection control, efforts should be made to enhance patient education and communication. Clear and accessible health information empowers patients to make informed decisions about their care and adopt preventive measures to protect themselves and others from COVID-19 [15]. Healthcare providers should utilize a variety of communication channels, including verbal, written, and digital media, to reach diverse patient

populations and ensure that information is accessible and culturally sensitive [16].

Moreover, holistic approaches to care should be prioritized to address the diverse needs of patients affected by COVID-19. This includes providing comprehensive support services to address the pandemic's physical, emotional, and social impacts [8]. By addressing patients' holistic needs, healthcare providers can promote overall well-being and facilitate recovery [17].

In conclusion, this study's findings underscore the importance of patient-centered care in promoting positive outcomes within the COVID-19 treatment center at Colombo East Base Hospital, Mulleriyawa. By prioritizing effective communication, infection control, patient education, and holistic care, healthcare providers can ensure the safety, satisfaction, and well-being of patients during public health emergencies [18].

References

1. Smith, A., & Jones, B. (2021). Patient satisfaction in healthcare: A comprehensive review. Journal of Health Services Research, 12(3), 245-259.
2. Peterson, J., & Novak, K. (2020). Effective communication strategies for healthcare workers during the COVID-19 pandemic. Journal of Public Health Management and Practice, 26(4), 364-367.
3. Hall, J., & Roter, D. (2019). Patient-centered communication. In Handbook of Behavioral Medicine (pp. 283-297). Springer, Cham.
4. World Health Organization. (2020). Maintaining essential health services: operational guidance for the COVID-19 context. Retrieved from [link].
5. Centers for Disease Control and Prevention. (2020). Interim infection prevention and control recommendations for patients with suspected or confirmed coronavirus disease 2019 (COVID-19) in healthcare settings. Retrieved from [link].
6. Allegranzi, B., & Pittet, D. (2009). Role of hand hygiene in healthcare-associated infection prevention. Journal of Hospital Infection, 73(4), 305-315.
7. Paasche-Orlow, M., & Wolf, M. (2010). The causal pathways linking health literacy to health outcomes. American Journal of Health Behavior, 34(5), 589-591.
8. Nutbeam, D. (2008). The evolving concept of health literacy. Social Science & Medicine, 67(12), 2072-2078.
9. Galea, S., & Merchant, R. (2020). Lurie N. The mental health consequences of COVID-19 and physical distancing: the need for prevention and early intervention. JAMA Internal Medicine, 180(6), 817-818.
10. Wexler, D. (2019). Psychosocial interventions in chronic disease. In The Handbook of Behavioral Medicine (pp. 599-612). John Wiley & Sons, Ltd.
11. Hall, J., & Roter, D. (2019). Patient-centered communication. In Handbook of Behavioral Medicine (pp. 283-297). Springer, Cham.
12. World Health Organization. (2020). Maintaining essential health services: operational guidance for the COVID-19 context. Retrieved from [link].
13. Allegranzi, B., & Pittet, D. (2009). Role of hand hygiene in healthcare-associated infection prevention. Journal of Hospital Infection, 73(4), 305-315.
14. Centers for Disease Control and Prevention. (2020). Interim infection prevention and control

recommendations for patients with suspected or confirmed coronavirus disease 2019 (COVID-19) in healthcare settings. Retrieved from [link].
15. Paasche-Orlow, M., & Wolf, M. (2010). The causal pathways linking health literacy to health outcomes. American Journal of Health Behavior, 34(5), 589-591.
16. Nutbeam, D. (2008). The evolving concept of health literacy. Social Science & Medicine, 67(12), 2072-2078.
17. Galea, S., & Merchant, R. (2020). Lurie N. The mental health consequences of COVID-19 and physical distancing: the need for prevention and early intervention. JAMA Internal Medicine, 180(6), 817-818.
18. Wexler, D. (2019). Psychosocial interventions in chronic disease. In The Handbook of Behavioral Medicine (pp. 599-612). John Wiley & Sons, Ltd.
19. World Health Organization. (2020). Strengthening the health system response to COVID-19: Technical guidance #1: Maintaining the delivery of essential health care services while mobilizing the health workforce for the COVID-19 response.
20. Centers for Disease Control and Prevention. (2020). Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings.
21. Ministry of Health, Sri Lanka. (2020). COVID-19 Epidemiology Unit.

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Original Article:

Integrating Modern Design and Sustainability in Healthcare Architecture: A Comparative Case Study of Sri Lanka's National Nephrology Hospital and the UK's NHS New Hospital Programme

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Keywords: hospital architecture, sustainability, digital integration, Low and Middle-Income Countries (LMICs)

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Abstract

Hospital architecture has evolved significantly, influenced by advancements in medical science, technology, and societal needs. This paper examines the historical progression of hospital architecture, highlighting modern trends such as patient-centred design, modular construction, sustainability, and digital integration. It emphasizes the relevance of these trends to Low and Middle-Income Countries (LMICs), focusing on the China-Sri Lanka Friendship National Nephrology Hospital (NNSH) in Polonnaruwa. The study employs a qualitative approach, utilizing historical data, literature reviews, and case studies from developed and developing countries, primarily focusing on the NNSH and the UK's NHS New Hospital Programme (NHP).

The NNSH exemplifies innovative hospital design, incorporating energy-saving technologies, climate-responsive features, and disaster resilience. It functions as a community hub, promoting health education and outreach. Insights from the NHP emphasize the integration of digital solutions, standardized designs, and sustainable practices, which are pivotal for enhancing healthcare infrastructure in LMICs.

Strategic recommendations address challenges such as cost constraints, infrastructure gaps, and technical expertise in LMICs, including digital transformation, net-zero carbon strategies, green practices, and adherence to standardized guidelines. This comparative study underscores the importance of adaptable and sustainable hospital architecture in improving healthcare delivery and outcomes in Sri Lanka and other LMICs.

Keywords: hospital architecture, sustainability, digital integration, Low and Middle-Income Countries (LMICs)

Introduction

Hospital architecture has evolved significantly, reflecting advances in medical science, technology,

and societal needs. This transformation is especially important for Low and Middle-Income Countries (LMICs) like Sri Lanka, where efficient hospital designs can greatly improve public health. This article examines the historical evolution of hospital architecture, current trends, and their relevance to LMICs, focusing on the China-Sri Lanka Friendship National Nephrology Hospital in Polonnaruwa. It also explores insights from the UK's NHS New Hospital Programme (NHP) to adapt these innovations for Sri Lanka and other LMICs.

Methodology

This article employs a qualitative approach, reviewing historical data on hospital architecture, examining modern architectural trends through literature reviews, and analyzing case studies from developed and developing countries. Primary case studies include the China-Sri Lanka Friendship National Nephrology Hospital and the UK's NHS New Hospital Programme. Data sources consist of architectural records, government reports, and scholarly articles, emphasizing design principles, sustainability measures, and local adaptability.

Historical Evolution of Hospital Architecture

The history of hospital architecture can be traced back to ancient civilizations where healing spaces were often rudimentary. The Asclepieia of ancient Greece, dedicated to the god of healing, were among the earliest known healing temples, emphasizing a holistic approach to health. During the Middle Ages, monastic hospitals in Europe focused on care for the sick and poor, often characterized by large, open wards [1].

The Renaissance saw the emergence of more structured hospital designs, such as Filippo Brunelleschi's Ospedale degli Innocenti in Florence. This period marked the beginning of architecture specifically tailored for healthcare, with considerations for hygiene and patient segregation becoming more prominent [2].

The 19th and early 20th centuries introduced the pavilion hospital design, which separated patients based on the type of illness, improving infection control. Florence Nightingale's principles of hospital design emphasized ventilation, natural light, and hygiene, which became standard in hospital architecture [3].

The late 20th century saw the advent of high-tech hospitals, integrating advanced medical equipment and technology into their designs. This period also marked the beginning of patient-centred care, with architecture focusing on creating healing environments that promote recovery.

The Sri Lankan context and world history

The architectural history of Sri Lanka is rich and diverse, with its earliest known hospital, Mihintale Hospital, established in the 3rd century BC during the spread of Buddhism. Mihintale Hospital is considered one of the world's oldest known hospitals, showcasing the region's early advancements in medical care and hospital design. The historical significance of Mihintale highlights Sri Lanka's longstanding commitment to healthcare infrastructure [4].

In ancient Egypt, architecture laid the foundation as an art of design and construction. Residential and public buildings were constructed mainly of air-dried brick, so they almost did not survive, and stone was used only for tombs and

temples. Interestingly, the first known ancient Egyptian architect, Imhotep, who created the first pyramid in the 27th century BC, is also considered the founder of ancient medicine [5].

It is assumed that clinics at temples, where nobles were treated, existed already in ancient Mesopotamia (3rd millennium BC). Medical hospitals established for permanent care were also known in India about 100 BC [6].

Modern Trends in Hospital Architecture

Modern hospital architecture prioritizes functionality, patient comfort, and adaptability to technological advancements. Key trends include:

1. Patient-Centred Design: Modern hospitals focus on creating healing environments that reduce stress and promote recovery. This includes the use of natural light, green spaces, and noise reduction techniques [7].
2. Modular Construction: Modular and prefabricated components allow for faster construction and flexibility in expanding or reconfiguring hospital spaces as needed [8].
3. Sustainable Design: Energy-efficient buildings, sustainable materials, and waste reduction practices are becoming standard, addressing environmental concerns and reducing operational costs [9].
4. Technology Integration: Incorporating advanced medical technologies and digital infrastructures, such as telemedicine capabilities and electronic health records, is essential for modern healthcare delivery [10].
5. Building Information Modeling (BIM) and Digital Twin technologies are transforming hospital design and management by enabling detailed 3D modelling and real-time data integration [11].
6. Net Zero Carbon (NZC) strategy aims to reduce the carbon footprint of hospital buildings through energy-efficient designs, renewable energy sources, and carbon offset measures [12].
7. BREEAM (Building Research Establishment Environmental Assessment Method) is a leading sustainability assessment method for buildings, promoting sustainable practices in hospital design and operation [12].
8. Digital Transformation in Healthcare: The NHS New Hospital Programme in England exemplifies the integration of digital technologies in healthcare infrastructure, enhancing patient care and operational efficiency [13].
9. Regenerative architecture uses natural systems as fundamental components, fostering harmony between structures and ecosystems. This sustainable approach, evident in Sri Lanka's ancient Ritigala monastery and modern Kandalama, represents the pinnacle of eco-friendly design [14].

Adaptability of Hospital Architecture to LMICs: The Case of Sri Lanka

In Sri Lanka and similar LMICs, hospital architecture must overcome resource constraints, climate variability, and the need for resilient infrastructure. The 2023 Central Bank report underscores economic challenges limiting new healthcare investments. Despite this, soft loans from the World Bank and Asian Development Bank via the PSSP and RBLP enable healthcare administrators to focus on modern, well-planned healthcare settings that incorporate new technologies and sustainable architecture.

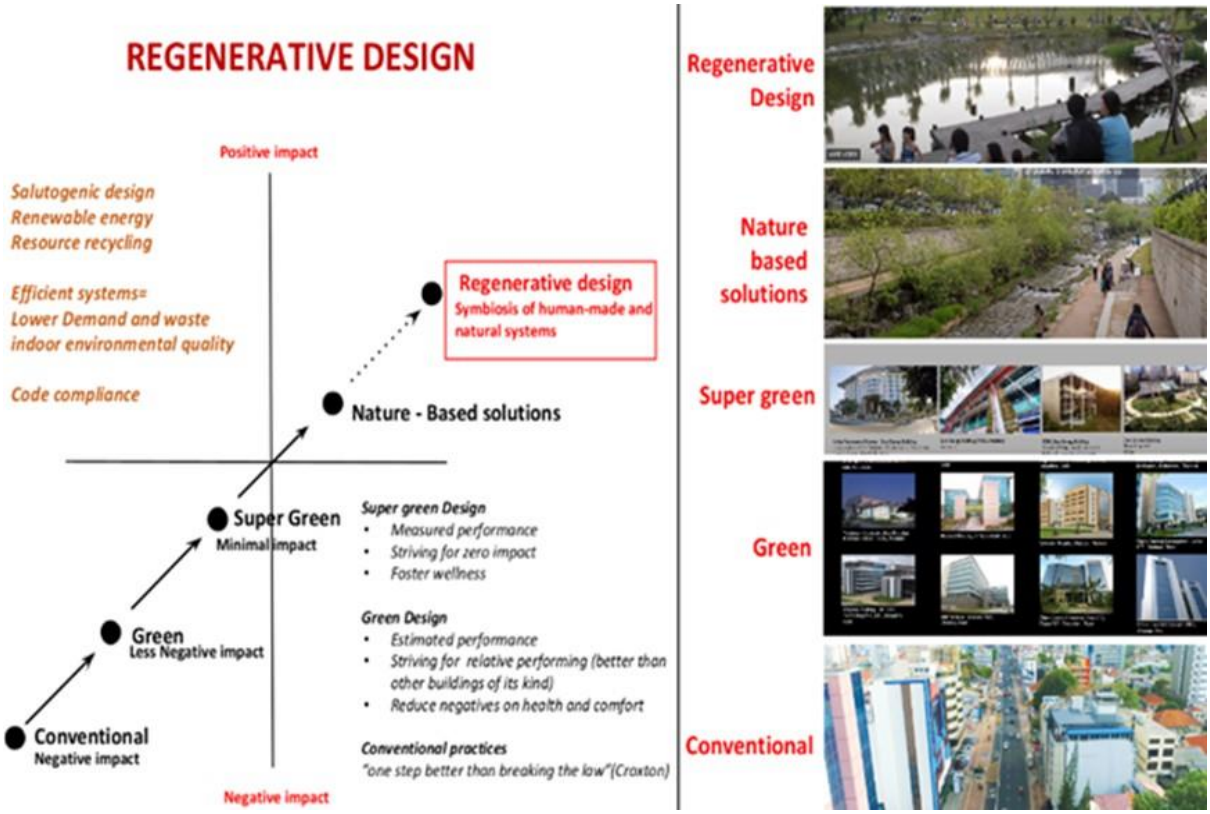

Figure 01: Regenerative design

1. Cost-Effective Construction: Utilizing local materials and labour can reduce costs and support the local economy. Modular construction methods can also provide scalable and flexible solutions [15].
2. Climate-Responsive Design: Hospital designs must consider Sri Lanka's tropical climate, incorporating passive cooling techniques, natural ventilation, and rainwater harvesting systems to enhance sustainability and comfort [16].
3. Disaster Resilience: Sri Lanka is prone to natural disasters such as floods and cyclones. Hospitals must be designed to withstand these events, ensuring the continuity of medical services during emergencies [17].
4. Community Integration: Hospitals should serve as community hubs, providing not only medical care but also health education and outreach services. This can be achieved through multifunctional spaces and accessible designs [18].
5. Net Zero Carbon Strategy: Implementing energy-efficient designs, renewable energy sources, and carbon offset measures to reduce the environmental footprint of healthcare facilities [12].
6. Digital Transformation: Incorporating advanced digital technologies such as BIM, electronic health records, and telemedicine to improve healthcare delivery and operational efficiency [11].
7. Green and Sustainable Practices: Using sustainable materials, waste reduction practices, and climate-responsive

designs to enhance the sustainability of hospital buildings [9].

8. Infection Control and Safety: Designing healthcare facilities with stringent infection control measures, safety protocols, and high-quality care standards to ensure patient safety and quality care [19].
9. Patient Privacy and Comfort: Incorporating design elements that prioritize patient privacy, comfort, and dignity fosters a healing environment [7].
10. Adopting Standardized Guidelines: Sri Lanka should adopt standardized guidelines like the UK's Hospital Building Notes (HBN) and Health Technical Memoranda (HTM). These guidelines offer best practice recommendations to ensure the safety, privacy, and dignity of patients, staff, and visitors, while also providing cost-effective solutions for the planning and design of healthcare facilities [19].

Case Study: China-Sri Lanka Friendship National Nephrology Specialized Hospital, Polonnaruwa

Project Overview and Background

The National Nephrology Specialized Hospital (NNSH) in Polonnaruwa, Sri Lanka, is a critical initiative addressing the high incidence of chronic kidney disease and enhancing the region's healthcare infrastructure. This China-aid project covers 6.64 hectares with a total floor area of 25,917 m², including both aboveground and underground facilities. It features 200 hospital beds, 100 haemodialysis beds, and staff accommodations [20].

The NNSH offers comprehensive nephrology services, including outpatient care, haemodialysis, peritoneal dialysis, and specialized medical and surgical departments. The hospital includes administrative offices, a multi-function hall, an ICU, and staff accommodations with parking for 300 vehicles. It is designed to handle 660 daily outpatient visits, 198,000 annual outpatient visits, and 109,500 annual dialysis visits, along with kidney transplants and common surgeries [20]

Funded by LKR 12 billion donation from China, the project was managed by the Beijing Institute of Architectural Design and Research Institute Co. Ltd and Top International Engineering Co. Ltd of China, in collaboration with the Ministry of Health, Sri Lanka and District General Hospital, Polonnaruwa, from December 2015 to February 2021. The facility emphasizes sustainable practices, energy-efficient designs, and robust infection control measures. It adheres to local and international standards, incorporating advanced mechanical and electrical systems, fire safety, and earthquake resilience to ensure a safe and sustainable healthcare environment.

Figure 02: Bird view of the National Nephrology Specialized Hospital project in Polonnaruwa

Design Principles

The NNSH design is guided by principles of functionality, economy, sustainability, and aesthetics. It employs energy-saving technologies and natural ventilation to reduce energy consumption. The layout,

featuring slab-type buildings with inner courtyards, enhances natural ventilation and daylighting. The use of local materials and traditional architectural elements ensures cultural relevance and sustainability.

Climate-Responsive Features

The NNSH incorporates passive cooling techniques, including natural ventilation, shaded outdoor areas, and green spaces, to reduce heat absorption and energy use, thereby enhancing comfort and minimizing the environmental impact.

Disaster Resilience

The hospital's design addresses natural disaster risks with elevated structures, concrete roofs, and robust drainage systems to maintain operations during adverse weather. It also includes seismic-resistant infrastructure to ensure safety.

Community Integration

NNSH functions as a community hub, providing health education and outreach services. Multifunctional spaces support community meetings, health workshops, and public health initiatives, strengthening local engagement.

Figure 03: Accommodations area - National Nephrology Specialized Hospital Polonnaruwa - 2022

The NHS New Hospital Programme (NHP) Experience

Introduction

The NHS in England plans to modernize its aging infrastructure by building 40 new hospitals by 2030 through the NHP. This initiative aims to update hospital design and construction to meet innovative national standards and deliver high-quality healthcare.

Objectives of the NHP

1. Delivering hospitals for less cost and less time by addressing critical infrastructure risks and improving value for money;
2. Ensuring new hospitals integrate innovative national standards for healthcare infrastructure;
3. Supporting the co-design and co-creation of schemes in collaboration with local and regional health systems;
4. Building the foundations for an enduring national capability for enhanced healthcare infrastructure delivery.

Hospital 2.0 Design

Hospital 2.0 is a standardized design for future hospitals that incorporates digital solutions and optimized layouts to benefit patients and staff. This approach reduces development and construction time and costs through economies of scale.

Regulations and Codes of Practice

The NHS Premises Assurance Model (PAM) and other regulations such as the Health and Safety at Work Act ensure that healthcare facilities are safe and meet national best practice standards. These frameworks guide the design, construction, and operation of healthcare buildings.

Health and Social Care Act 2008 & Regulations 2014

This regulation ensures that care premises and equipment are clean, suitable, maintained, and properly used. Providers remain legally responsible even when delegating tasks to third parties, and must ensure compliance with the regulation, as any deficiencies remain their responsibility.

Climate Change Considerations

The Climate Change Act 2008 mandates measures to mitigate and adapt to climate change impacts, such as energy efficiency and flood resilience. Hospitals are required to adopt sustainable practices to reduce their environmental footprint.

Building Information Modeling

BIM is a critical tool in the NHP, facilitating the digital representation of buildings throughout their lifecycle. It enhances client visualization, improves design accuracy, and supports efficient maintenance and operations.

Modern Methods of Construction

MMC involves offsite manufacturing and onsite techniques that offer alternatives to traditional construction methods. These methods improve productivity, efficiency, and quality while reducing greenhouse gas emissions.

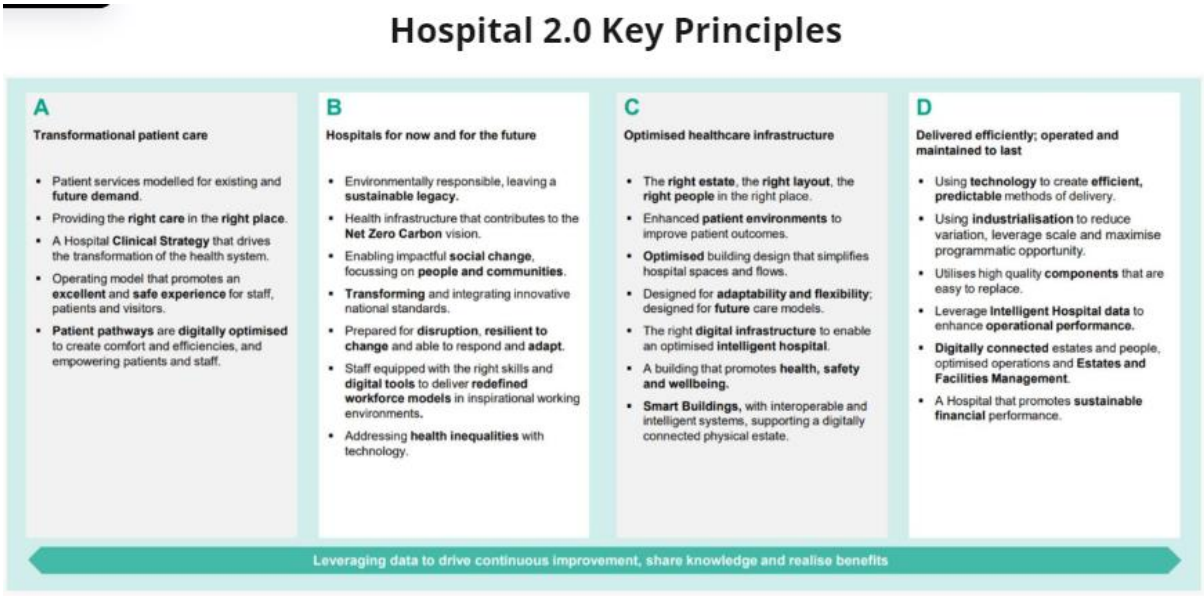

Figure 04: Hospital 2.0 Key Principles

Discussion

Comparison: High Investment in Western Countries vs. LMICs

Western countries, with their substantial investments in healthcare infrastructure, lead in adopting new technologies and sustainable practices in hospital design. In countries like the United States and the United Kingdom, significant financial resources are dedicated to constructing and renovating hospitals, incorporating state-of-the-art technologies and sustainable building practices.

In Western countries, BIM is extensively utilized in hospital design and construction, enabling precise planning, efficient

resource allocation, and effective collaboration among stakeholders [11].

Digital Twin Technology is increasingly adopted in Western healthcare facilities, providing a virtual replica of the hospital that allows for real-time monitoring and management of building systems, enhancing operational efficiency, reducing maintenance costs, and improving patient safety.

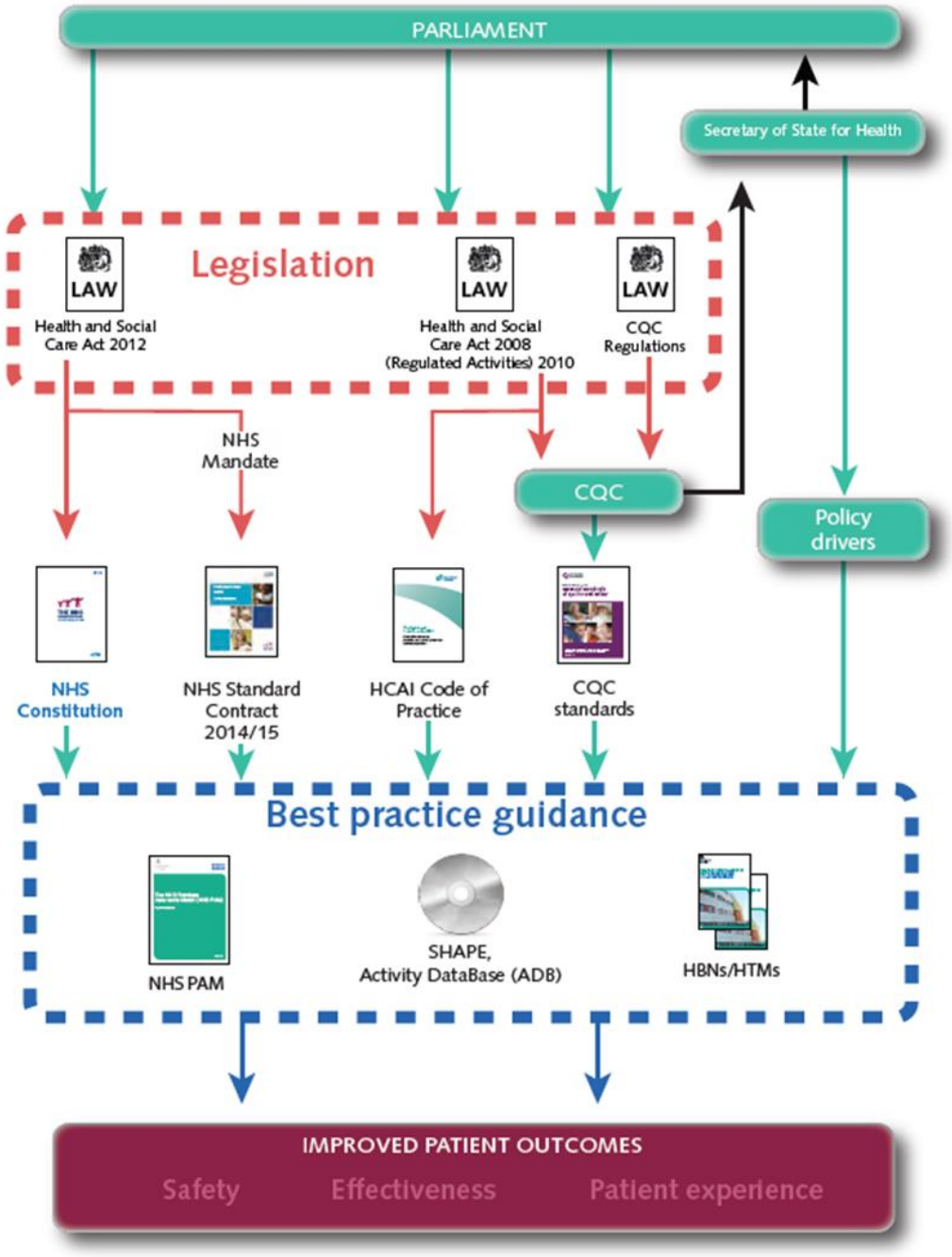

Figure 05: HBNs and Legislative Framework – NHS, UK

Hospitals in Western countries actively pursue NZC strategies to minimize their carbon footprint, involving the use of renewable energy sources, energy-efficient building designs, and carbon offset measures [12].

BREEAM certification ensures that hospitals meet high environmental performance standards, promoting sustainability and reducing operational costs [12].

Challenges in LMICs and Sri Lanka

Sri Lanka's health system is recognized regionally and globally as a high-impact, low-cost model, built on the foundation of free healthcare since 1926 and advancing the Declaration of Alma-Ata in 1978. Despite commendable health outcomes that exceed its income level, Sri Lanka faces several challenges.

Cost Constraints: Financial limitations in LMICs often restrict the adoption of advanced technologies and sustainable practices. The high initial costs of implementing BIM, digital twin technology, and NZC strategies can be prohibitive.

Infrastructure Gaps: Inadequate infrastructure, such as unreliable power supply and poor internet connectivity, hinders the implementation of digital technologies in hospitals, affecting the efficiency and effectiveness of hospital operations.

Technical Expertise: The lack of technical expertise and trained professionals in LMICs poses a significant challenge. Training and capacity building are crucial for the successful adoption and implementation of advanced technologies and sustainable practices in hospital architecture.

Conclusions

The evolution of hospital architecture reflects changes in medical practices, technology, and societal values. For LMICs like Sri Lanka, adaptable and sustainable designs are essential for improving healthcare delivery. The Sri Lankan healthcare system, recognized for its cost-effective and high-impact model, must address challenges such as financial constraints, infrastructure gaps, and a lack of technical expertise through strategic investments in training, infrastructure, and technology.

The National Nephrology Specialized Hospital, Polonnaruwa exemplifies the benefits of innovative hospital design. Additionally, insights from the NHS New Hospital Programme highlight the importance of integrating digital solutions, standardized designs, and sustainable practices. These lessons are pivotal for developing resilient healthcare infrastructures in Sri Lanka and other LMICs, promoting improved health outcomes and operational efficiencies.

Recommendations

1. Digital Transformation: Integrate advanced digital technologies, including Building Information Modeling (BIM), electronic health records (EHRs), and telemedicine, to enhance healthcare delivery and operational efficiency.
2. Net Zero Carbon Strategies: Implement energy-efficient designs, utilize renewable energy sources, and adopt carbon offset measures to minimize the environmental impact of healthcare facilities.

3. Green and Sustainable Practices: Use sustainable materials, implement waste reduction practices, and design climate-responsive buildings to improve the sustainability of hospital infrastructure.
4. Infection Control and Safety: Design healthcare facilities with robust infection control measures, safety protocols, and high-quality care standards to ensure patient safety and exceptional care.
5. Patient Privacy and Comfort: Integrate design elements that prioritize patient privacy, comfort, and dignity, creating a healing environment.
6. Standardized Guidelines: Implement guidelines resembling the UK's Hospital 2.0 Design, Health Building Notes (HBN), and Health Technical Memoranda (HTM) to ensure safety, privacy, dignity, and cost-effective planning in healthcare facilities.
7. Legislative Framework: Establish clear, enforceable standards for healthcare facilities and equipment maintenance, ensuring providers remain legally responsible for compliance, even when outsourcing tasks to third parties.

References

1. Mending Bodies, Saving Souls: A History of Hospitals, Guenter B. Risse: April 1999: Oxford University Press: Vol 1: 1-752
2. The Ospedale degli Innocenti and the Bambino of the American Academy of Pediatrics: Lawrence Kahn, MD Pediatrics: July 2002: 110 (1): 175–180 https://doi.org/10.1542/peds.110.1.192
3. Evidence-based medicine and hospital reform: Tracing origins back to Florence Nightingale: Maya Aravind, BA and Kevin C. Chung, MD: doi:10.1097/PRS.0b013e3181c2bb89: available in PMC 2015 Apr 6.
4. Historia hospitalium: Murken, Axel Hinrich, Deutsche Gesellschaft für Krankenhausgeschichte: 1975, 65-71.
5. Evolution of medical architecture: Nadezhda Tesler: 2018 https://doi.org/10.1051/matecconf/201817003015
6. Studies on Indian medical history / edited by G. Jan Meulenbeld and Dominik Wujastyk: Delhi: 2001
7. Effects of healthcare environmental design on medical outcomes: The Role of the Physical Environment in the Hospital of the 21st Century. California: Ulrich RS: Center for Health Design; 2008
8. Re-engineering through pre-assembly: client expectations and drivers: Gibb, Alistair G.F.; Isack, Frank (2003) Loughborough University. Journal contribution. https://hdl.handle.net/2134/9018
9. Green building costs and financial benefits: Kats G. Massachusetts Technology Collaborative: 2003. https://www.wbdg.org/files/pdfs/green_bldg_costs_kats.pdf. [Accessed on 10th June 2024].
10. A roadmap for the adoption of e-health: Dixon BE: e-Service Journal 5(3):3-13. July 2007. DOI: 10.1353/esj.2008.0001.
11. Building Information Modeling (BIM) for existing buildings—Literature review and future needs: Volk R, Stengel J, Schultmann F. Autom Constr. 2014; 38:109-27.
12. NHS Net Zero Building Standard, A greener NHS Estates: NHS England 2022, (1 – 141)
13. Digital Transformation in the NHS, National Audit office, 15 May 2020, (1 - 53)

14. Sustainable hospital development: https://bioinquirer.org/ Sri Lanka, Upendra Randeniya: 2023
15. Renewable energy and sustainable construction in Sri Lanka: Renewable energy: Current research and future scope. Jayasinghe MTR, Attalage RA. New Delhi: The Energy and Resources Institute; 2011. p. 204-25.
16. Vernacular architecture and traditional building forms of Sri Lanka: Sustainability in Energy and Buildings: Manawadu L. New York: Springer; 2000. p. 59-72.
17. Measuring vulnerability to promote disaster-resilient societies: conceptual frameworks and definitions. In: Measuring vulnerability to natural hazards: towards disaster resilient societies: Birkmann J. Tokyo: United Nations University Press; 2006.p.9-54. https://collections.unu.edu/eserv/UNU:2880/n9789280812022_text.pdf. [Accessed on 8th June 2024].
18. Journal of Burn Care & Research, Patricia Blakeney, DPh, James Partridge, OBE, DSc, Nichola Rumsey, DPh, Volume 28, Issue 4, July-August 2007, Pages 598-601, https://doi.org/10.1097/BCR.0B013E318093E493 Community Integration Published: 01 July 2007
19. Health Building Note 00-01: General design principles: Health Building Note 00-09: Infection Control in the built Environment, Crown copyright 2013 First published 2002. [Accessed on 06th May 2024]
20. Development Design Description: Project of National Nephrology Specialized Hospital in Polonnaruwa, Sri Lanka, Beijing Institute of Architectural Design, 2017

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Original Article:

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

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

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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 (NHSL), 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

	NHSL		CSTH		CNTH	
HRH Category	**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/Health Admin - 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

Felicitation

In Loving Memory of Dr. Tissa Cooray

Dr. Navadeva Tissa Cooray a distinguished Medical Administrator and a Fellow of the College of Medical Administrators of Sri Lanka passed away recently. He was the son of Professor Gerald Henry Cooray (Professor of Pathology, Colombo Medical Faculty) & Mallika Dias Cooray.

He had his entire education at Royal College Colombo. Tissa Graduated with his MBBS degree from the University of Ceylon in 1966. He then started work as a Government Medical Officer. He pursued his Post Graduate Studies in UK and obtained the Diploma in Tropical Public Health from the University of London in 1977. He also further qualified by gaining a certificate in Teacher Training for Primary Health Care from the Liverpool School of Tropical Medicine, University of Liverpool in 1979.

After a brief stint as the Port Health Officer, he was appointed to the Institute of Hygiene, Kalutara as Medical Officer of Health in December 1977 and, when it was upgraded to the National Institute of Health Sciences (NIHS) in 1979, he served as the first Deputy Director of Training and thereafter in 1985 as the Director of NIHS when Dr Godwin Fernando retired. He continued to work at NIHS till his retirement as the Director in 1988.

He was responsible as a pioneer in helping to upgrade NIHS & thereafter during his tenure as the Director NIHS developed the National Institute of Health Sciences into a premier training institute in Southeast Asia for Primary Health Care. In recognition of his hard work, he was offered to work at the South Esat Asian Regional Office of the WHO. He held the positions of Regional Advisor, Program Development Officer & Planning Officer in Primary Health Care for the South East Asian region of WHO.

He also had the privilege to attend the executive education program in Managing Health Programs in Developing Countries at the Harvard School of Public Health, Boston in 1992.

After retiring from SEARO he continued to work for WHO as a Consultant at the WHO Kobe office Japan & SEARO until 2007.

Dr. Cooray served as the Chairman of the Visakha Vidyalaya Board of Trustees. His great-grandmother, Mrs. Jeremias Dias, was the founder of the school, and he is the grandson of Arthur V. Dias (Kos mama).

Tissa leaves behind his loving wife Nelum Devi, daughter Ayomi & son Dr Harendra.

May he rest in peace

Dr. Sarath M. Samarage

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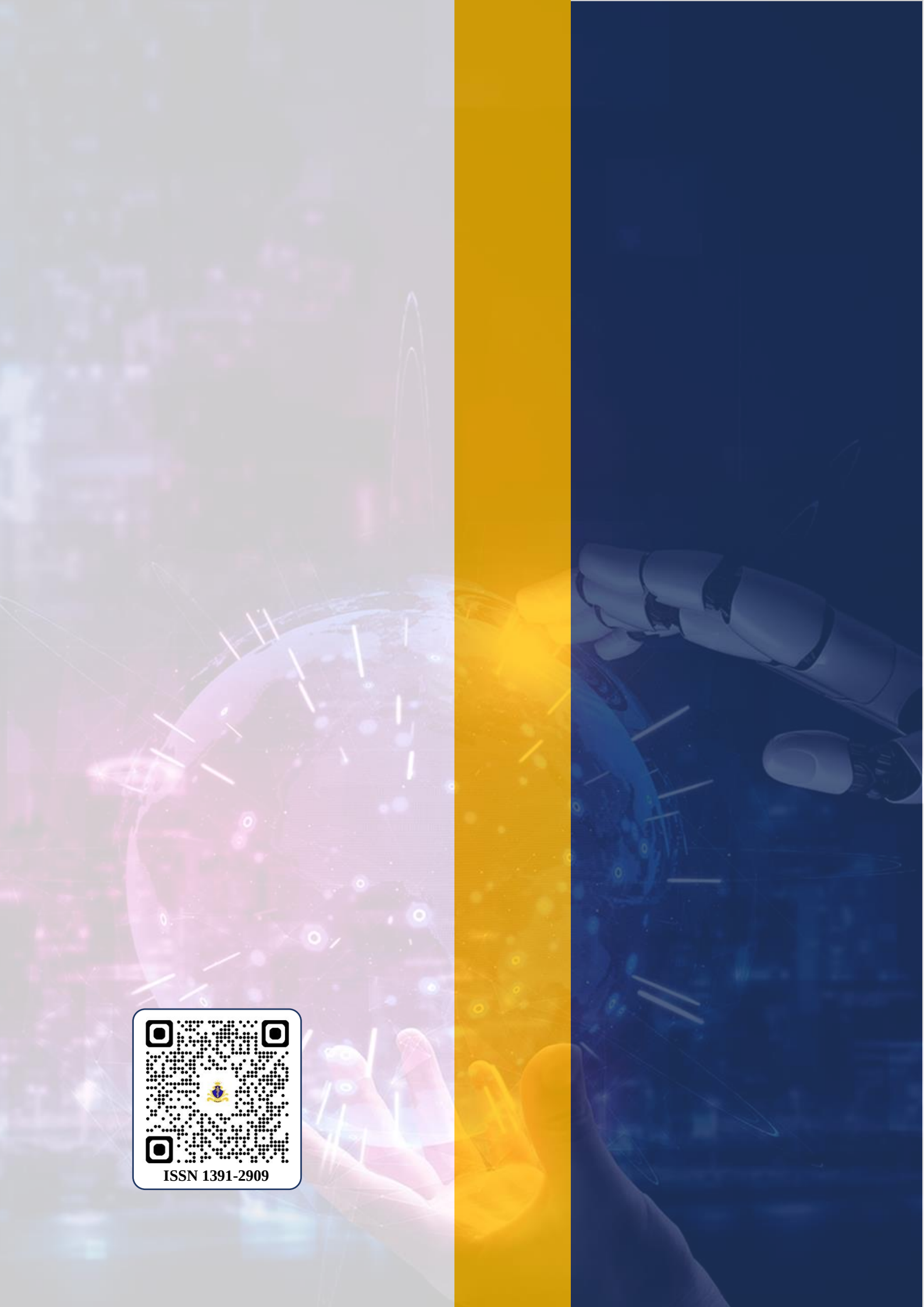

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