A Case Study on the Critical Analysis of Challenges in Congenital Hypothyroidism Screening in selected hospitals of Southern Province, Sri Lanka

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Abstract- Congenital hypothyroidism (CH) represents a significant public health concern due to its potential to cause preventable mental retardation. Early detection through screening programs is crucial, as it allows prompt initiation of treatment before irreversible damage occurs. In Sri Lanka, the Ministry of Health has implemented a nationwide screening program using TSH assay methods (Radioimmunoassay – RIA or Enzyme-Linked Immunosorbent Assay – ELISA) to identify infants at risk. This study focuses on evaluating the challenges encountered in the CH screening program at Teaching Hospital Mahamodara (THM) and District General Hospital – Matara, with the objective of improving service delivery.

The research identified several critical issues hindering the effectiveness of the screening program. These include inadequate parent education regarding the importance of screening, deficiencies in documentation practices, and inaccuracies during sample collection procedures, and delays in the dispatch of samples to laboratories. Among these challenges, particular attention was given to the inaccuracies observed during sample collection, analyzed further using an affinity diagram to identify contributing factors.

Key recommendations emerging from the study include the implementation of comprehensive island-wide awareness programs to educate parents and healthcare providers, sustained training initiatives to enhance skills and knowledge among healthcare staff, appointment of a national focal point for program oversight, strengthening supervision mechanisms, and establishing regular monitoring and evaluation processes at the national level.

By addressing these challenges and implementing the recommended strategies, the study aims to optimize the CH screening program in Sri Lanka. This enhancement will ensure more accurate and timely identification of infants with congenital hypothyroidism, facilitating early intervention and improving long-term health outcomes for affected children.

Index Terms- Congenital Hypothyroidism, Effectiveness, Newborn, Public Health, Screening

I. Introduction

Congenital hypothyroidism (CH) poses a significant health challenge, characterized by deficient thyroid hormone levels that can lead to severe mental retardation and growth impairment if left untreated. The condition, while potentially devastating, is effectively manageable with early detection and prompt initiation of treatment. Delayed diagnosis or missed screening opportunities can result in unnecessary health, economic, and social burdens for affected families. The Ministry of Health emphasizes that timely treatment, which is simple, cost-effective, and efficient, allows infants to develop normally and lead productive lives within society, provided treatment is commenced within the first two weeks of life. Consequently, newborn screening programs for CH are recognized globally for their effectiveness and high cost-benefit ratio.

Research underscores the importance of screening newborns for CH since symptoms are often absent at birth, making early detection crucial in preventing developmental delays and lifelong intellectual disabilities (Screening for Congenital Hypothyroidism, 2022). In Sri Lanka, the Ministry of Health has instituted a comprehensive newborn screening program for CH using Thyroid Stimulating Hormone (TSH) assay methods such as Radioimmunoassay (RIA) or Enzyme-Linked Immunosorbent Assay (ELISA). This initiative aims to detect CH early and initiate treatment before critical developmental milestones are compromised.

The implementation of this screening program involves two key national focal points: the Nuclear Medicine Unit at the Faculty of Medicine, University of Ruhuna, and the Medical Research Institute in Colombo. These institutions are responsible for analyzing heel prick blood samples collected from newborns and reporting results promptly to facilitate timely intervention.

This study specifically focuses on evaluating the logistical challenges within the CH screening program at Teaching Hospital Mahamodara and District General Hospital Matara in Sri Lanka. These hospitals serve as crucial healthcare institutions within their respective regions, providing essential maternal and neonatal care services. The study examines the first two

components of the screening program: education of health professionals and parents, and the screening process itself, addressing logistical feasibility and time constraints.

District General Hospital Matara functions as the primary healthcare facility in the Matara district, accommodating a large patient population with comprehensive medical services and specialist care. Teaching Hospital Mahamodara, on the other hand, serves as the principal maternity referral center in the Southern province, playing a pivotal role in maternal and neonatal healthcare and medical education.

This research also highlights the importance of ongoing parent education initiatives at antenatal clinics and through home visits by Public Health Midwives (PHMs). Effective parent education is critical in ensuring understanding and participation in newborn screening programs, thereby enhancing overall program effectiveness and compliance.

In conclusion, addressing the challenges identified in this study is essential for optimizing the effectiveness of CH screening programs in Sri Lanka. By improving education, streamlining screening processes, and ensuring timely sample handling and medical management, these initiatives can significantly contribute to better health outcomes for newborns at risk of CH.

Objective

The objective of this case study is to identify the key problems associated with screening for congenital hypothyroidism at Teaching Hospital Mahamodara (THM) and District General Hospital Matara in Sri Lanka.

II. METHODOLOGY

This study employs a mixed-methods approach to comprehensively explore the challenges in the screening program for congenital hypothyroidism at Teaching Hospital Mahamodara and District General Hospital Matara.

1. Direct Observation

Direct observation involves firsthand observation of the screening process, sample collection, handling, and dispatch procedures at both hospitals. This method allows researchers to document actual practices and identify operational challenges in real-time.

2. Key Informant Interviews (KII)

Key informant interviews will be conducted with healthcare professionals directly involved in the CH screening program, including pediatricians, nurses, laboratory technicians, and hospital administrators. These interviews aim to gather insights into perceived barriers, logistical issues, and suggestions for improvement.

3. Focus Group Discussion

Focus group discussions will be conducted with multidisciplinary teams involved in newborn care at both hospitals. Participants may include obstetricians, neonatologists, midwives, and public health officials. These discussions will facilitate a deeper exploration of systemic challenges, teamwork dynamics, and collaborative strategies to enhance screening effectiveness.

4. Review of Secondary Data

Secondary data review will involve analyzing existing records, reports, and documentation related to the CH screening program. This includes reviewing screening protocols, laboratory reports, patient records, and any previous evaluations or audits conducted by hospital or health authorities.

By employing these methodological approaches, this study aims to provide a comprehensive assessment of the operational issues affecting the CH screening program at Teaching Hospital Mahamodara and District General Hospital Matara. The findings will inform recommendations for improving screening protocols, enhancing staff training, optimizing resource allocation, and ultimately improving health outcomes for newborns at risk of congenital hypothyroidism in Sri Lanka.

Objective: The primary objective of this case study is to identify these key challenges and propose targeted recommendations to enhance the effectiveness of CH screening services at THM and DGH-Matara. Recommendations will focus on addressing the most critical problem identified, aiming to strengthen service delivery and improve health outcomes for newborns at risk of congenital hypothyroidism in these settings.

III. PROBLEM IDENTIFICATION

The analysis of the congenital hypothyroidism (CH) screening program at Teaching Hospital Mahamodara (THM) and District General Hospital Matara (DGH-Matara) has identified several critical problems affecting the effectiveness of sample collection procedures. Through a structured prioritization process using the Nominal Group Technique, the following key issues have been identified and prioritized based on feasibility, hospital-level addressability, frequency, and severity:

Inadequate Parent Education on CH Screening Program:

Insufficient parental understanding and awareness regarding the importance and procedures of CH screening contribute to missed opportunities for informed consent and participation in the screening program.

Improper Methods Used in Documentation of Newborn Screening Investigation Request Forms:

Documentation inaccuracies during admission to the postnatal ward, including errors in personal details from birth records, compromise the accuracy and reliability of screening data.

Inappropriate Maintenance of Specimen Register:

Deficiencies in the maintenance of specimen registers hinder effective tracking and follow-up of screened infants, potentially leading to delays or errors in diagnosis and treatment.

Inaccurate Measures Taken During Sample Collection:

Significant issues were observed in adherence to universal precautions, proper techniques for heel prick procedures, and correct handling of blood samples on filter papers, compromising the integrity and reliability of screening results.

Delayed Dispatch of Samples to the Laboratory/Office from Wards:

Delays in transporting dried blood spot specimens to the laboratory for analysis impact the timeliness and effectiveness of diagnostic outcomes and subsequent treatment initiation.

Medical Errors - Incorrect Identification of the Patient:

Errors in patient identification during sample collection can lead to mislabeling and mismanagement of specimens, resulting in potential misdiagnosis and treatment errors.

IV. PROBLEM PRIORITIZATION

Based on the Nominal Group Technique process, the most critical problem identified **is "inaccurate measures taken during sample collection"**. This includes various gaps such as early sample collection, inadequate adherence to universal precautions, improper use of lancets or needles, improper blood collection techniques on filter papers, and failure to follow recommended practices for sample handling.

Reasons for Inaccurate Measures:

An affinity diagram analysis revealed several reasons contributing to the inaccurate measures during sample collection, including overcrowding in postnatal wards leading to premature sample collection, lack of adherence to universal precautions due to resource constraints or oversight, and procedural inconsistencies across different wards in both hospitals.

Addressing these identified issues through targeted interventions and quality improvement initiatives is crucial to enhancing the effectiveness and reliability of the CH screening program at THM and DGH-Matara. By improving training, implementing standardized protocols, and ensuring adequate resources and oversight, these hospitals can mitigate these challenges and improve health outcomes for newborns at risk of congenital hypothyroidism.

Inadequacy of Training and Awareness Programs

The assessment highlighted significant gaps in training and awareness among nursing staff regarding the congenital hypothyroidism (CH) screening program:

1. Lack of Formal Training:

Nursing officers and ward sisters have not received any formal training on CH screening in the past eight years. The screening has been conducted routinely in the ward without specific training sessions. There has been no provision of physical or online training programs dedicated to the CH screening protocol.

2. Unfamiliarity with Circulars:

Many nursing officers were unaware of the circulars issued by the Family Health Bureau (FHB) pertaining to CH screening. Some wards did not possess these circulars, and those that did were not easily accessible to the nursing staff. Consequently, there is a lack of understanding regarding the objectives and guidelines of the CH screening program.

3. Absence of Study Materials and Videos:

Nursing officers were not provided with printed study materials or educational videos related to CH screening. The absence of such resources hinders their ability to familiarize themselves with the screening procedures and best practices.

4. Qualitative Feedback:

Qualitative assessments indicated willingness among nursing staff to receive training and enhance their knowledge about the CH screening program. They expressed a desire to improve the quality of service delivery through increased awareness and training initiatives.

Addressing these gaps in training and awareness is essential to improve the effectiveness and adherence to CH screening protocols at Teaching Hospital Mahamodara and District General Hospital Matara. Implementing structured training programs, providing accessible guidelines, and distributing educational materials can enhance the competency and confidence of nursing staff, ultimately optimizing health outcomes for newborns undergoing CH screening.

IV. CONCLUSION AND RECOMMENDATIONS

Based on the conclusions drawn from various studies and the identified gaps in the screening program for congenital hypothyroidism (CH), the following recommendations are proposed to enhance program effectiveness and improve sample collection accuracy:

1. Capacity Building Programs for Nursing Officers:

Organize comprehensive capacity building programs aimed at enhancing the knowledge, attitudes, and practices of nursing officers involved in CH screening. These programs should focus on updated protocols, proper sample collection techniques, and adherence to universal precautions to mitigate inaccuracies.

2. Regular Training and Refresher Courses:

Implement regular training sessions and refresher courses for nursing officers to ensure continuous professional development and adherence to CH screening guidelines. These courses should be mandatory and incorporate practical demonstrations to reinforce learning.

3. Utilization of Educational Resources:

Provide accessible and updated educational resources, including manuals, guidelines, and videos, to support nursing officers in understanding and implementing CH screening protocols effectively. Ensure these resources are readily available and regularly updated.

4. Monitoring and Supervision Enhancement:

Strengthen monitoring and supervision mechanisms at institutional levels to oversee CH screening activities. Conduct regular audits and performance reviews to identify and address any gaps or deficiencies in sample collection practices promptly.

5. Integration of Feedback Mechanisms:

Introduce structured feedback mechanisms, including surveys and evaluations from healthcare providers and parents, to assess the quality and effectiveness of CH screening services. Utilize feedback to implement targeted improvements and enhance patient-centered care.

6. Policy Advocacy and Implementation:

Advocate for the development and implementation of clear policies and guidelines at the national level to standardize CH screening practices across healthcare institutions. Ensure policies emphasize the importance of accurate sample collection and provide adequate support for training and resources.

7. Collaborative Learning and Knowledge Sharing:

Foster collaborative learning among healthcare providers through forums, workshops, and conferences focused on CH screening. Encourage knowledge sharing of best practices, success stories, and challenges to promote continuous improvement and innovation in screening methodologies.

8. Research and Innovation Support:

Support research initiatives aimed at evaluating and improving CH screening technologies, methodologies, and outcomes. Encourage innovation in sample collection techniques and diagnostic tools to enhance the accuracy and efficiency of screening processes.

By implementing these recommendations, Sri Lanka can strengthen its CH screening program, improve the accuracy of sample collection, and ultimately enhance health outcomes for newborns by timely detecting and treating congenital hypothyroidism. These efforts are crucial for achieving sustainable improvements in child health and reducing the long-term societal and economic impacts associated with untreated CH.

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