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**EDITORIAL****The Godzilla El Niño of 2026 – should I be worried?**

A hot news these days is how the effect of El Niño of 2026 is going to be unusually strong, and is expected to bring about drought and famine in many parts of the world. Historically too, climatologists claim that famine, political upheavals and massive migrations coincided with El Niño. The National Oceanic and Atmospheric Administration (NOAA) predict that El Niño conditions are likely to strengthen over the rest of 2026 (NOAA Climate Prediction Center, 2026). Many forecasts suggest it could be one of the strongest ever El Niño. Coming on top of decades of human-caused warming, 2027 may be the hottest year on record, with disruption to weather, food supplies and economies (World Meteorological Organization [WMO], 2026).

El Niño means Little Boy in Spanish. Fishermen in Peru, South America, first noticed periods of unusually warm waters in the Pacific Ocean in the 1600s. The full name they used was El Niño de Navidad, because El Niño typically peaks around December (Chris Dolce, 2023). It is also interesting to note that the fishermen observed a significant reduction in their anchovy yield, whenever this happened.

Sri Lanka is currently experiencing unusually elevated temperatures, and weather experts increasingly point to El Niño conditions as a key driver. Seeing many unexpected deaths and unusual illnesses these days, as a lay person in climatology I started wondering whether indeed El Niño has started its toll in Sri Lanka.

The first time I heard of El Niño was in 1993, when my father, who was a plant pathologist at the Tea Research Institute of Sri Lanka, said he was attending a conference on the expected El Niño heat wave, the following year. He seemed quite enthusiastic about it but unfortunately, he did not live to attend this event. My recent search revealed, that it was during this era, that El Niño was starting to get serious attention. This particular El Niño of 1994, spanning ten months from June 1994, held considerable significance. It took place amidst an extended El Niño phase from 1991 to 1995 (Seth Mberego, 2021).

The El Niño southern oscillation or ENSO, happens when the sea surface temperature around the equator, rises by more than 0.5°C from its usual warmth in the western coast of the Pacific Ocean, bringing with it a cascade of

events including slower movement of nutrient rich deep waters to the ocean's surface, slowing of the trade winds, and increase in the atmospheric temperature in many parts of the world. The reduction in the nutrient levels near the surface of the ocean leads to a fall in planktons which form the first rung in the food chain of the sea. This would lead to death of corals (bleaching) and decrease in the population of all life forms of the ocean. (McGowan, H., & Theobald, A., 2017). This phenomenon takes place in a cycle of two to seven years. In January 2026, the rise in temperature in west Pacific, namely in Tonga was seen between 3o and 4° C, which is well above the normal rise, predicting a strong ENSO.

Let us look at the other side of this phenomenon, and then other factors which affect the seasons of our island. While it is true, El Niño may bring about drought and famine to certain parts of the world, it would also bring about heavy downpour of rains and cooler seasons in others. For example, places like California which experienced devastating wild fires in 2025, may have heavy showers replenishing their reservoirs.

Further, in the case of Sri Lanka and the other countries in the region, the temperature fluctuation in the Indian Ocean, known as the Indian Ocean Dipole (IOD) also influences their seasons. A positive IOD, where the African coast temperatures are high, a neutral dipole and a negative IOD, where the Australian side is warmer. A positive dipole means we get more rain from the monsoon and a negative one, less. As of now, the IOD remains neutral!

The rulers of the ancient times in Sri Lanka were well aware of the complexity and the unpredictable ways of nature, that they built hundreds of reservoirs to irrigate the land. Leaders of these times too should wisely manage our water sources, in case the Godzilla El Niño, which has already started, does show its true nature and the Indian Dipole turns negative. However, experts opine that Sri Lanka's surrounding seas and central highlands provide some resilience, maintaining moisture levels and reducing the likelihood of catastrophic nationwide famine (Henry Gamage, 2026).

The oceans in the globe are not individual bodies of water, but a single large body, with masses of land intervening.

There are continuous currents running through them, carrying and dispersing the energy received from the sun. The oceans do play a major role in maintaining the temperatures of the land masses; but the atmosphere and winds, land, and the cosmic forces like gravity, electromagnetism and nuclear forces, also determine the intensity of the seasons and natural catastrophes we experience. Just as we physicians look at the intricacy of the human body which is fearfully and wonderfully made, let us also look in awe, the wonderful mysteries of the earth and its governing forces!

Angela Arulpragasam Anthony

Chief Editor

Batticaloa Medical Association

July 2026

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Original Article

Capacity Building for Digital Transformation: Adoption of a Document Management System at a Resource-Limited Primary Medical Care Unit – An Audit

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Abstract:

The Primary Medical Care Unit (PMCU) Chenaikudiyiruppu, a resource-limited institution in Kalmunai, Sri Lanka, relied heavily on inefficient paper-based documentation for administrative and clinical communication, despite the availability of 'AAVANAM', an online document management system. This system remained significantly underutilized, impeding efficiency in essential processes like supply procurement and report submission. This study aimed to evaluate the impact of a staff capacity-building program on the adoption and effective utilization of 'AAVANAM' to improve operational efficiency.

A pre- and post-intervention audit study was conducted over six months (May–October 2024) at the PMCU. Baseline data on AAVANAM utilization (5%) and paper-based communication (100%) were collected. The intervention was a comprehensive, targeted capacity-building program focusing on the practical use of AAVANAM for various document-sharing needs (e.g., requests, orders, reports). Post-intervention, system usage logs and staff surveys were used to measure the change in AAVANAM utilization and reduction in paper-based communication, alongside changes in request processing times and inter-institutional communication.

The targeted capacity-building program resulted in a significant increase in digital system adoption. Post-intervention data showed an increase in AAVANAM utilization to 94% from 5% and an 80% reduction in paper-based communication (from 100%). This increased adoption was associated with a 60% reduction in request processing times and an improvement in communication with other health institutions.

The implementation of a targeted staff capacity-building program successfully promoted the adoption of the existing AAVANAM system in a resource-limited setting. The significant shift from paper-based to digital communication demonstrates the critical role of addressing human factors, particularly through comprehensive training, in realizing the benefits of digital health solutions to enhance efficiency and streamline administrative processes in primary medical care.

Keywords: Digital Transformation, Document Management System, AAVANAM, Capacity Building, Staff Training, Resource-Limited Setting, Primary Medical Care Unit

Background

Effective communication is the cornerstone of efficient healthcare delivery, ensuring timely and accurate information exchange between healthcare providers, administrative staff, and different levels of the health system. In resource-limited settings, however, reliance on traditional, often inefficient, communication methods can lead to significant bottlenecks, delays in

essential processes, and increased potential for errors (Venkateswaran et al., 2022). The Primary Medical Care Unit (PMCU) in Chenaikudiyiruppu operating under the Regional Directorate of Health Services (RDHS) Kalmunai, Sri Lanka, is characterized by its limited resources, specifically a minimal staff complement comprising only one medical officer, one development officer, one dispenser and three health assistants. This institution experienced such challenges,

primarily stemming from its dependence on paper-based documentation for various administrative and clinical requests. These inefficiencies could impede the timely procurement of necessary supplies, the processing of patient-related documents, and the submission of crucial reports to higher administrative bodies.

Recognizing the transformative potential of digital technologies in streamlining healthcare operations, the RDHS Kalmunai had previously introduced AAVANAM, an online document management system (Fig 1). This system was intended to facilitate the digital sharing and management of documents, thereby reducing the reliance on paper-based communication. However, despite its availability, AAVANAM remained significantly underutilized by the staff at PMCU Chenaikudiyiruppu. This underutilization indicated a gap between the technological solution and its practical adoption, suggesting underlying factors hindering its effective integration into the routine workflows of the healthcare unit. Understanding and addressing these factors is crucial for realizing the intended benefits of the digital system in improving communication efficiency and overall operational effectiveness within the resource-constrained environment of the PMCU.

Justification

The persistent reliance on paper-based communication within PMCU Chenaikudiyiruppu, despite the availability of a digital alternative, presented several challenges. Paper-based systems are often characterized by slow processing times, increased risks of data loss or damage, difficulties in tracking document flow, and significant administrative overhead associated with printing, filing, and retrieval (Krishnan et al., 2010). These inefficiencies can directly impact the timely delivery of healthcare services by delaying access to necessary resources and information.

The underutilization of AAVANAM represented a missed opportunity to mitigate these challenges and enhance the operational efficiency of the PMCU. Investing in strategies to promote the adoption of existing digital infrastructure is particularly relevant in resource-limited settings, where maximizing the utility of available resources is paramount. By effectively leveraging AAVANAM, the PMCU could potentially streamline its communication processes, reduce administrative burdens on healthcare staff, and improve the overall responsiveness of the healthcare unit. Furthermore, successful adoption could serve as a model for other similar healthcare facilities within the region facing comparable communication challenges. Therefore, an intervention focused on enhancing staff capacity to utilize AAVANAM was deemed necessary and justifiable

to unlock its potential benefits and contribute to a more efficient and effective healthcare delivery system at the primary care level.

Literature Review

The integration of digital health interventions, such as online document management systems, has been increasingly recognized for its potential to strengthen health systems, particularly in low- and middle-income countries (LMICs) (Venkateswaran et al., 2022). Studies have demonstrated that digital tools can improve data quality, enhance service delivery, and facilitate better information exchange within healthcare systems (Krishnan et al., 2010). However, the successful implementation and sustained use of these technologies often depend on factors beyond mere availability, including user training, perceived usefulness, and integration into existing workflows.

Evaluations of Health Management Information Systems (HMIS) in resource-limited settings, such as the study by Krishnan et al. (2010) in rural India, have highlighted the significant time savings and improvements in data quality achieved through computerization. Their findings emphasized that while initial capital costs exist, the long-term benefits, particularly in terms of reduced workload for healthcare workers and enhanced monitoring capabilities for program managers, can be substantial. However, this study also underscored the importance of adequate technical support and user training for the successful adoption and maintenance of such systems.

Furthermore, research on the implementation of digital maternal and child health registries (eRegistries) in LMICs, as explored by Venkateswaran et al. (2022), has shown that while these systems can reduce time spent on health information management, the actual time saved and the impact on client care are contingent upon effective implementation strategies. Their study in Palestine emphasized the need to address potential challenges such as increased workloads if digital systems are not properly integrated and staff are not adequately trained.

The design and implementation of systems like SIMAKLIK in Indonesia (Fatikah & Santoso, 2023) for primary care clinic accreditation further illustrate the application of web-based platforms to streamline administrative processes within healthcare facilities. The success of SIMAKLIK, as indicated by its high System Usability Scale (SUS) score, highlights the importance of user-centered design and functionality tailored to the specific needs of healthcare professionals.

Collectively, the existing literature underscores the potential of digital solutions to enhance efficiency

and communication in healthcare. However, it also emphasizes that the successful adoption and sustained use of these systems are not guaranteed and require targeted interventions, particularly in the realm of user training and capacity building. The current project at PMCU Chenaikudiyiruppu aligns with this body of research by focusing on addressing the underutilization of an existing digital system through a dedicated staff training program, aiming to realize its potential benefits in a resource-limited primary care setting.

Objective

To evaluate the impact of a staff capacity-building program on the adoption and effective utilization of the AAVANAM online document management system at PMCU Chenaikudiyiruppu.

Methods

This is a pre- and post-intervention audit study design and conducted during a period of six months (from May 2024 to October 2024) at the PMCU Chenaikudiyiruppu.

Prior to the intervention, an initial audit was conducted to understand the existing communication workflows, the extent of paper-based document sharing, and the current level of AAVANAM utilization among staff. This baseline data provided a benchmark against which the impact of the intervention could be measured.

The intervention consisted of a comprehensive capacity-building program specifically tailored to the needs of the PMCU staff. The training modules focused on the practical aspects of using AAVANAM for various document sharing needs (Fig 2, Fig 3 and Fig 4), including:

- Submitting administrative and clinical request letters to RDHS and other institutions.
- Processing and tracking stationery orders.
- Managing drug orders and medical supply requests.
- Handling medical returns and related documentation.
- Generating and sharing routine reports.

The training sessions included hands-on exercises, demonstrations of the system's functionalities, and opportunities for staff to address specific challenges and concerns related to its use. The training was conducted by personnel familiar with the AAVANAM system and the specific operational context of the PMCU. The duration and frequency of the training sessions were determined based on the staff availability and the complexity of the system's features.

Following the completion of the capacity-building program, a post-intervention audit was conducted,

mirroring the methods used in the baseline assessment. Data on AAVANAM utilization (e.g., frequency of document sharing through the system, types of documents shared) and the extent of paper-based communication for the aforementioned processes were collected.

The primary outcome measures were:

1. The percentage increase in document sharing through AAVANAM online system with Kalmunai RDHS and other institutions.
2. The percentage decrease in paper-based communication for the identified document sharing processes.

Data were collected through system usage available logs, staff surveys, and potentially observational data of communication workflows.

Results

The baseline assessment revealed a low level of AAVANAM utilization at PMCU Chenaikudiyiruppu, with the majority of administrative and clinical communication relying on paper-based documents. Following the implementation of the targeted capacity-building program for staff, significant changes were observed in the communication practices of the PMCU.

Post-intervention metrics revealed a significant increase in AAVANAM utilization from 10 out of 200 expected usages (5%) to 188 out of 200 (94%), representing a gain of 178 additional digital document sharings. Paper-based communication was reduced from 200 sheets (100%) to 40 sheets (20%), eliminating 160 A4 sheets per quarter. Request processing time decreased from an average of 10 working days to approximately 4 working days, a 60% reduction. Inter-institutional communication improved markedly, with formal replies and confirmations received increasing from 40 out of 200 requests (20%) to 180 out of 200 requests (90%), an improvement of 140 additional responses (Fig 5).

The observed increase in "AAVANAM" utilization and the corresponding decrease in paper-based communication directly contributed to a noticeable improvement in the efficiency of request processing. Staff feedback indicated reduced delays in the submission and receipt of documents, as well as a decrease in the administrative burden associated with managing physical paperwork.

Discussion

The findings of this study demonstrate the significant positive impact of a targeted staff capacity-building program on the adoption and effective utilization of an existing online document management system, AAVANAM within a resource-limited primary

medical care unit. This highlights the potential of such interventions to overcome barriers to digital health adoption, even in environments with limited resources.

These results align with the broader literature on digital health interventions, which suggests that while technology offers significant benefits, its successful integration hinges on addressing the human factors, particularly user training and support (Venkateswaran et al., 2022; Krishnan et al., 2010). The underutilization of AAVANAM prior to the training program likely stemmed from a lack of awareness, insufficient skills, or a lack of confidence among staff in using the system effectively. The capacity-building program directly addressed these issues, empowering staff to leverage the functionalities of AAVANAM for their routine communication needs.

The positive outcomes observed in this project resonate with the findings of Krishnan et al. (2010) in their evaluation of a computerized HMIS in rural India. They also noted that user training was a crucial factor in the successful adoption and perceived usefulness of the digital system. While their study focused on a broader HMIS encompassing data entry and reporting, the underlying principle of empowering healthcare workers through training to utilize digital tools effectively remains consistent. The time savings and improved efficiency reported by Krishnan et al. (2010) in the context of HMIS are mirrored in the reduced processing times and administrative burden observed at PMCU Chenaikudiyiruppu following the increased adoption of AAVANAM.

Furthermore, the experience at PMCU Chenaikudiyiruppu contrasts with some of the challenges highlighted by Venkateswaran et al. (2022) in their study on eRegistry implementation. They cautioned that simply introducing a digital system without adequate training and integration into workflows could potentially increase workload. In the current project, the focus on capacity building likely facilitated a smoother transition to digital document management, resulting in a reduction, rather than an increase, in workload associated with communication processes.

The success of AAVANAM adoption, facilitated by targeted training, also echoes the principles behind the user-centered design and positive usability outcomes reported for systems like SIMAKLIK (Fatikah & Santoso, 2023). While SIMAKLIK was designed for accreditation-related document management, both systems underscore the importance of providing healthcare professionals with digital tools that are intuitive and directly address their specific needs and workflows.

Conclusion

The implementation of a targeted staff capacity-building

program at PMCU Chenaikudiyiruppu effectively promoted the adoption and utilization of the existing AAVANAM online document management system. The significant increase in digital document sharing and the substantial reduction in paper-based communication demonstrate the potential of such interventions to enhance communication efficiency and streamline administrative processes in resource-limited primary medical care units. This project underscores the critical role of addressing human factors, particularly through comprehensive training, in realizing the intended benefits of digital health solutions and fostering a more efficient and responsive healthcare delivery system.

Limitations

The heavy workload on the minimal staff, especially the medical officer who has both clinical and administrative duties, might limit the time available for training and consistent use of the new system.

Limited IT infrastructure and technical support characteristic of resource-limited settings could pose ongoing barriers to full system utilization, despite successful initial training.

The evaluation was conducted in a single centre. This limits the generalizability of findings to other healthcare settings with different organizational structures, resource levels, or staff characteristics.

The study primarily relied on quantitative measures (system utilization, paper reduction). It did not fully capture qualitative aspects such as communication quality, staff satisfaction, or perceived impact on patient care outcomes.

We did not conduct a formal cost-benefit analysis of the capacity-building program and the increased system utilization.

While paper reduction suggests cost savings, a detailed economic evaluation is needed for stronger justification of similar interventions.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Extend similar capacity-building initiatives to other primary medical care units within the Kalmunai RDHS
2. Ensure the sustained utilization of AAVANAM, ongoing support and monitoring mechanisms should be established.
3. Future researches to incorporate qualitative data collection methods to gain a deeper understanding of

the impact of AAVANAM on communication quality, staff experiences, and potential benefits for patient care.

4. A formal cost-benefit analysis of the AAVANAM implementation and the associated capacity-building program should be conducted to provide a comprehensive economic justification for such digital health interventions.
5. Regular feedback should be solicited from AAVANAM users to identify areas for system enhancement and to ensure that the platform continues to meet their evolving needs.

By implementing these recommendations, the Kalmunai RDHS can further leverage the potential of digital health solutions like AAVANAM to enhance communication efficiency, streamline healthcare operations, and ultimately improve the delivery of quality primary medical care within its network of healthcare facilities.



Fig - 1

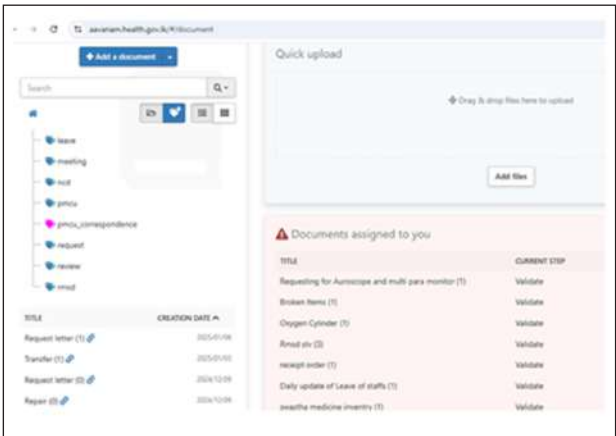


Fig - 2

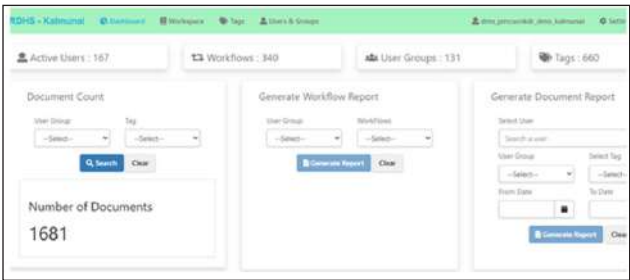


Fig - 3



Fig - 4

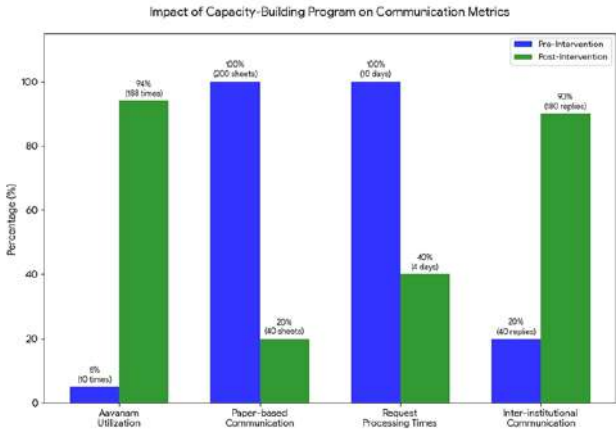


Fig - 5

Declarations

There are no conflicts of interest. All the authors declare that they have no competing interests. We acknowledge the staff of PMCU Chenaikudiyruppu and HIMU Unit RDHS Kalmunai.. Administrative clearance obtained from RDHS Kalmunai. No grants were received to conduct this study. Correspondence: Silmy MBM, <sonofkmj@gmail.com>

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Original Article

Bridging the Nutrition Gap through Optimizing Food Voucher Delivery: A Best Practice from MOH Navithanveli – A Case Study

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Abstract:

Maternal malnutrition and anemia pose significant public health challenges in Sri Lanka, contributing to adverse maternal and fetal outcomes. The national Poshana Malla food voucher program, designed to address these nutritional deficits, faced critical implementation challenges in MOH (Medical officer of health) Navithanveli, including logistical issues, unauthorized purchases, and inequitable access. This study details evaluating the effectiveness of a redesigned, clinic-centered food voucher distribution system implemented in response to these challenges.

The intervention involved contracting tender-selected shops to supply pre-inspected, nutrient-dense food packs directly to antenatal clinics, coupled with rigorous Public Health Inspector (PHI) oversight and comprehensive community engagement.

Results demonstrate substantial improvements: travel time for 92% of mothers was reduced, unauthorized purchases decreased from 42% to 3%, and the proportion of mothers consuming ≥ 4 food groups daily rose from 45% to 85%. Overall voucher redemption rates increased from 65% to 89%, and maternal satisfaction improved by 40%.

These findings underscore that a decentralized, well-monitored, and community-responsive delivery model can effectively enhance the efficacy of social protection programs, offering a valuable blueprint for strengthening maternal nutrition interventions in similar resource-constrained settings.

Keywords: Poshana malla, food vouchers, maternal nutrition, decentralized delivery, MOH Navithanveli

Introduction

Maintaining good nutrition and a healthy diet during pregnancy is critical for the health of both the mother and the unborn child. Adequate maternal nutrition is a fundamental determinant of positive pregnancy outcomes, influencing fetal development and long-term health trajectories for the offspring (1). Globally, micronutrient deficiencies are widespread with iron deficiency affecting an estimated 40% of pregnancies and South-East Asia reporting the highest prevalence at 49% (2). In Sri Lanka, the challenge is compounded by a “double burden” of maternal malnutrition, characterized by both persistent undernutrition and a rising prevalence of overweight and obesity.(3) For instance, data from 2012 to 2016 showed a decrease in low body-mass index (BMI <18.5 kg/m²) among pregnant women in their first trimester from 23.8% to 18.8%, while overweight (BMI ≥ 25 kg/m²) concurrently

increased significantly from 16.2% to 23.7%.(3) Anemia remains a substantial concern, affecting nearly a third of pregnant women in the country, with a first-trimester prevalence of 18.4%.(4) These nutritional challenges contribute significantly to maternal mortality, morbidity, and adverse birth outcomes, including low birth weight.(1) Socio-economic disparities profoundly influence maternal nutritional status, with lower income groups exhibiting reduced total energy intake and widespread micronutrient deficiencies.(1)

Background

The Poshana Malla program, spearheaded by Sri Lanka's Ministry of Women, Child Affairs and Social Empowerment, is a vital initiative designed to bolster maternal and fetal health by addressing the nutritional needs of pregnant and lactating mothers (5). This program

provides a monthly food voucher valued at Rs. 4,500 for a period of ten months, covering the crucial last six months of pregnancy and the initial four months of breastfeeding (6). Eligibility for these benefits is primarily determined by a family's monthly income falling below a calculated expenditure threshold, though mothers may also qualify if the medical officer of health (MOH) recommends it due to specific health conditions such as a low Body Mass Index (BMI less than 18.5 Kg/m²), anemia, multiple pregnancies, or other nutritional deficiencies. The program is managed by Divisional Secretaries through early childhood development officers (ECDO), with Public Health Midwives playing a key role in issuing applications to eligible mothers at maternity clinics. Beneficiaries can redeem their vouchers at designated shops that are intended to be geographically accessible and are required to maintain sufficient stocks of Ministry-recommended nutrient-dense foods. Strict guidelines ensure that food items are issued only during the voucher's valid month, reinforcing the program's commitment to timely and appropriate nutritional support (7).

Justification

Despite its commendable objectives, the initial implementation of Poshana Malla in MOH Navithanveli during 2023/2024, encountered significant operational challenges. In MOH Navithanveli, logistical challenges and unauthorized purchases necessitated a redesigned delivery system across 20 Grama Niladhari (GN) divisions and 8 Public Health Midwife (PHM) areas. An initial audit identified several key issues. Awareness gaps were prevalent, with over 30% of mothers unaware of approved food items or redemption protocols, and misconceptions about voucher validity periods leading to underutilization. Access barriers were substantial, as 40% of designated shops were located more than 5 kilometers from beneficiaries' residences, creating significant transportation challenges. Furthermore, stockouts of fortified items, such as iron-rich cereals, occurred in 25% of shops. Non-compliance was also a concern, with 15% of Shops accepting vouchers for non-approved items (e.g., sugary snacks) and unauthorized shops participating in redemption, violating guidelines. Additionally, 20% of recipients reported complaints about expired or substandard food items, highlighting quality concerns. These challenges underscored the need for a robust intervention to ensure the program's intended impact.

Objective

To evaluate the effectiveness of a redesigned, clinic-centered food voucher distribution system in MOH Navithanveli, Sri Lanka, in improving timely access to quality nutrition, reducing unauthorized purchases, and enhancing dietary diversity among pregnant mothers.

Methodology

Study Design: This study utilized a pre- and post-intervention audit design. The pre-intervention data was collected retrospectively, while the post-intervention data collection was conducted prospectively following the implementation of the redesigned system.

Study Setting: Medical Officer of Health (MOH) area of Navithanveli. This area comprises a population of 25,000, 20 Grama Niladhari (GN) divisions and 8 Public Health Midwife (PHM) areas.

Study Period: From October 2023 to March 2024.

Study Population: The study population included pregnant and lactating mothers registered for antenatal care within the MOH Navithanveli area who were eligible for the Poshana Malla program.

Sample Size: The audit included 500 records of voucher distribution.

Data Collection: We took a two-pronged approach to gather information. First, to understand the situation before our intervention, we looked back at existing records to see how vouchers were used. After implementing our changes, we started collecting new data. This involved checking updated records and talking directly to people: both the mothers who received vouchers and the shop owners. We focused on finding out how aware people were of the program, how easily they could access it, and any challenges they faced. Our Public Health Inspectors (PHIs) also played a crucial role, inspecting shops and food packs every week. To gauge our progress, we meticulously tracked things like travel time and any unauthorized purchases, helping us see exactly where we made improvements.

Data Collection Tools: To get all this information, we relied on several key tools. For the shop and food pack inspections, PHIs used standardized checklists. When reviewing existing records, we used specific data extraction forms. For our conversations with mothers and shop owners, we had structured questionnaires and interview guides. Finally, the logbooks kept by PHIs—which tracked clinic deliveries—also gave us valuable insights.

Description of the Redesigned Clinic-Centered Distribution System

To systematically address the identified challenges, a redesigned, clinic-centered distribution system was implemented. Key components of this revised approach included:

- **Decentralized Distribution:** Six tender-selected shops were contracted to directly supply 16 antenatal clinics with pre-inspected food packs. Each clinic

served approximately 50 pregnant mothers, a strategic move that significantly reduced the travel burden on beneficiaries .

- **Standardized Food Packs:** Public Health Inspectors (PHIs) played a crucial role in verifying the contents of these food packs against a predefined list of 18 approved, nutrient-dense foods (e.g., fortified rice, eggs, lentils) prior to distribution. This restriction aimed to simplify compliance for both Shops and beneficiaries, while ensuring the nutritional adequacy of the provisions .
- **Enhanced Oversight:** PHIs conducted weekly inspections of shop storage facilities, assessed the quality of food packs, and monitored clinic deliveries using standardized checklists. Participating shops received comprehensive training on stocking approved items and adhering to clinic delivery protocols.
- **Transparent Tendering:** The selection of shops was based on competitive bidding; a process designed to improve service quality and expand program coverage.

Results

The implementation of the redesigned clinic-centered distribution system in MOH Navithanveli yielded significant positive outcomes across multiple key indicators. (Table 1)

Impact on Program Access and Compliance

The redesigned system demonstrably improved access for beneficiaries, with travel time reduced for a remarkable 92% of mothers . This directly addressed one of the major access barriers identified in the initial audit, where difficulties in reaching designated shops were prevalent . Furthermore, the integrity of the program was substantially enhanced, as unauthorized purchases plummeted from 42% pre-intervention to a mere 3% post-intervention. This sharp decline indicates a significant improvement in adherence to program guidelines. Shop non-compliance, which initially stood at 15% due to the acceptance of vouchers for non-approved items, also decreased notably to 5% after the introduction of stricter enforcement and monitoring mechanisms.

Changes in Maternal Dietary Intake

A profound improvement in dietary diversity was observed among the beneficiaries. The proportion of mothers consuming ≥ 4 food groups daily post-intervention rose significantly to 85%, a marked increase from 45% before the intervention . This suggests that the provision of approved, nutrient-dense food packs through the redesigned system directly translated into improved dietary practices among pregnant women.

Overall Program Outcomes

The overall uptake and utilization of the program by eligible mothers improved considerably, with voucher redemption rates increasing substantially from 65% to 89% within six months of the intervention.

Table 1: Key Program Indicators and Outcomes Pre- and Post-Intervention in MOH Navithanveli

Indicator	Pre-Intervention (Baseline)	Post-Intervention (Outcome)
Travel time reduction for mothers	Implied as significant barrier All 500 mothers (100%)	460 (92%) mothers experienced reduced travel time
Unauthorized purchases (number audited vouchers)	210 (42%)	15 (3%)
Mothers consuming ≥ 4 food groups daily	225 (45%)	425 (85%)
Voucher redemption rates	325 (65%)	445 (89%)
Shop non-compliance	75 (15%)	25 (5%)

Discussion

Interpretation of Key Findings in Relation to the Study Objective

The study provides compelling evidence that a targeted redesign of the Poshana Malla food voucher program can dramatically enhance its effectiveness. The primary objective of ensuring proper nutrition at the right time through quality food by optimizing delivery was largely achieved. The substantial reduction in travel time for beneficiaries, the significant decrease in unauthorized purchases, and the marked increase in dietary diversity and voucher redemption rates collectively underscore the success of the clinic-centered, PHI-supervised model. These outcomes demonstrate that addressing systemic and logistical barriers directly translates into improved program uptake and nutritional outcomes.

Comparison with Existing Literature on Food Voucher Programs and Maternal Nutrition Interventions

The findings from MOH Navithanveli align consistently with evidence from other food voucher programs implemented in many countries. Such initiatives have been shown to improve dietary quality and enhance access to healthy foods, particularly when financial barriers are alleviated.(7) For instance, the Healthy Start vouchers in the UK enabled women to afford more fruits, vegetables, and milk, thereby reinforcing healthy eating motivations.(7) However, some studies also highlight that beneficiaries might prioritize financial savings over dietary improvements, emphasizing the need for robust program design and targeted education.(8) The Poshana Malla intervention's success in significantly increasing food group consumption (from 45% to 85%) suggests that the program effectively guided beneficiaries towards nutritional goals, possibly due to the pre-inspected food packs and the restricted list of approved items.

A crucial factor contributing to the program's success is Sri Lanka's robust existing maternal and child health (MCH) program. The country boasts high antenatal care (ANC) registration rates, with over 95% of pregnant women registered before 12 weeks, and an average of 6.5 field clinic visits per pregnant woman in 2018. (3) This well-established infrastructure, including the extensive network of public health midwives (PHMs), provided a strong and reliable platform for integrating the redesigned voucher distribution. The clinic-centered approach effectively embedded the voucher distribution within existing, trusted healthcare touchpoints. This demonstrates that public health interventions are often most effective when they are integrated into and strengthen existing, well-functioning health systems, rather than operating in isolation.

Strengths and Success Factors of the Intervention

Several critical factors contributed to the success of the redesigned Poshana Malla program:

- **Clinic Proximity and Decentralized Distribution:** By shifting distribution to antenatal clinics, closer to beneficiaries, significant logistical barriers were minimized, and travel time was reduced for 92% of mothers . This directly addressed the initial access issues and transportation challenges.
- **Standardized Food Packs and Limited Choices:** Restricting purchases to a curated list of 18 approved, nutrient-dense items simplified compliance for both beneficiaries and Shops, ensuring the nutritional adequacy of the provisions . This measure was instrumental in combating the issue of unauthorized purchases.
- **Real-Time Oversight and PHI-led Inspections:** The continuous monitoring by Public Health Inspectors (PHIs) through weekly inspections enhanced accountability among Shops and ensured consistent food quality and adherence to guidelines. (9) This proactive and hands-on approach was critical in reducing non-compliance.
- **Transparent Tendering:** The adoption of competitive bidding for shop selection improved service quality and expanded program coverage, ensuring reliable supply chains and better Shop performance .
- **Local-Language Engagement:** Conducting community workshops in Tamil and distributing illustrated pamphlets in local languages significantly improved mothers' understanding of program guidelines and requirements. This direct communication strategy effectively addressed the initial awareness gaps.
- **Shop Accountability:** The introduction of surprise inspections and the imposition of penalties, such as the suspension of one non-compliant Shop, proved highly effective in ensuring Shop adherence to program guidelines.
- **Community Feedback Integration:** Establishing a beneficiary committee to review food pack contents and launching a dedicated Tamil-language hotline for reporting issues fostered trust and allowed for responsive program adjustments, including the incorporation of culturally preferred items like millet flour.
- **Multi-Stakeholder Collaboration:** Effective coordination with local authorities for transportation support and the active involvement of healthcare workers (PHIs, PHMs) were pivotal in addressing

practical barriers and ensuring comprehensive program delivery.

Challenges Encountered and Mitigation Strategies

The initial audit clearly highlighted significant challenges related to beneficiary awareness, equitable access to shops, Shop non-compliance, and concerns about food quality. The redesigned system was specifically engineered to directly address these issues. Awareness gaps were mitigated through targeted educational campaigns and the provision of local-language materials. Access barriers were effectively addressed by implementing clinic-centered distribution, expanding the Shop network, and securing local authority-supported transportation. Instances of non-compliance were substantially reduced through stricter monitoring, the application of penalties, and the implementation of restricted item lists. Finally, concerns regarding food quality were alleviated through PHI pre-inspection of food packs and continuous audits of participating shops.

Conclusion

The study demonstrates that a strategically redesigned, clinic-centered distribution model, when coupled with stringent oversight and proactive community engagement, can effectively overcome significant implementation challenges. The substantial improvements observed in beneficiary access, program compliance, and maternal dietary diversity underscore the immense potential of such targeted interventions to strengthen maternal nutrition outcomes in resource-constrained settings. This model provides valuable, actionable insights for enhancing the efficacy, reach, and impact of social protection programs aimed at improving public health, particularly in contexts grappling with the complex burden of malnutrition.

Acknowledgements

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Original Article

Thenahaposha: The Feasibility of a Locally Produced Supplementary Nutrition Flour to Combat Child Undernutrition During Sri Lanka's Economic Crisis

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Abstract:

Sri Lanka's national supplementary nutrition program, Thriposha, which targets pregnant women, lactating mothers, and children under five years of age, was severely disrupted following the COVID-19 pandemic and the subsequent economic crisis. These disruptions disproportionately affected vulnerable populations in conflict-affected and economically disadvantaged regions such as Batticaloa District.

In response to escalating rates of undernutrition, the Regional Directorate of Health Services (RDHS) Batticaloa implemented a locally driven nutrition intervention. A multidisciplinary team developed Thenahaposha, a community-produced supplementary nutrition flour formulated using locally available raw materials. The product was manufactured at a rehabilitation center and distributed monthly (1 kg per beneficiary) to nutritionally vulnerable pregnant women and children identified through Medical Officer of Health records. A pilot study conducted in September 2022 followed 73 undernourished (low weight for height) children under five years of age. Anthropometric measurements were recorded at baseline and at 3, 6, and 12 months and analyzed using SPSS version 24.

Of the cohort, 64.4% improved from mild malnutrition to moderate acute malnutrition (MAM), 28.8% from severe acute malnutrition (SAM) to moderate acute malnutrition and 6.8% achieved normal nutritional status after one year. The intervention was associated with significant improvements in weight-for-age and height-for-age indicators.

Thenahaposha demonstrates the feasibility and effectiveness of a decentralized, community-based nutritional response during national program disruption and offers a replicable model for similar socio-economic and public health crises.

Keywords: Locally produced nutrition supplement, malnutrition, undernourished children, pregnant and lactating women

Background

Adequate nutrition during pregnancy and early childhood is critical for optimal growth, immune function, and neurodevelopment. The first 1,000 days of life represent a sensitive period during which nutritional deficits can result in irreversible impairments in cognitive development, educational attainment, and adult productivity [1–3]. Despite Sri Lanka's strong health indicators relative to regional peers, chronic undernutrition persists among vulnerable populations, particularly in socio-economically marginalized and post-conflict regions [4].

Sri Lanka's national supplementary nutrition program, Thriposha, has served as a cornerstone of maternal and

child nutrition since its inception in 1973. The program provides a fortified blended food to pregnant women, lactating mothers, and undernourished children under five years of age through the public health system [5]. However, the COVID-19 pandemic and subsequent economic crisis precipitated severe disruptions to food supply chains and public welfare programs. Shortages of foreign exchange and imported raw materials led to the suspension of Thriposha production in April 2022, compromising nutritional support for high-risk groups nationwide [6,7].

Batticaloa District in Sri Lanka's Eastern Province was particularly affected. Longstanding structural

vulnerabilities, including poverty, food insecurity, and the residual effects of prolonged civil conflict, amplified the nutritional impact of the program's suspension [8]. In response, the Regional Directorate of Health Services (RDHS) Batticaloa initiated a decentralized, community-based intervention aimed at mitigating the nutritional consequences of the national program failure through local production of a supplementary food alternative.

Public Health Significance

Undernutrition remains a leading contributor to child morbidity and mortality globally and continues to impose substantial social and economic costs in low- and middle-income countries [9]. In Sri Lanka, persistent undernutrition among women and young children threatens human capital formation and long-term economic development [10–12]. Economic shocks disproportionately affect food access and dietary quality among low-income households, exacerbating existing inequities [6].

Community-based nutrition interventions have demonstrated effectiveness in improving coverage, cultural acceptability, and program resilience, particularly during humanitarian emergencies and economic crises [13]. Locally produced supplementary foods can reduce dependence on imports, strengthen local food systems, and promote community ownership while ensuring continuity of nutritional support [14,15]. The Thenahaposhha initiative aligns with global recommendations advocating decentralized and context-specific nutrition responses during system-level disruptions.

Literature Review

Evidence from Sri Lanka and comparable settings indicates that undernutrition among pregnant women and young children is associated with adverse birth outcomes, impaired cognitive development, increased susceptibility to infectious diseases, and reduced educational performance [16–18]. District-level data from Batticaloa have consistently shown higher-than-average rates of child undernutrition, reflecting the cumulative effects of poverty, conflict, and limited dietary diversity [8,10].

The long-term consequences of childhood undernutrition extend beyond health, contributing to reduced workforce productivity and intergenerational transmission of poverty [11,12,19]. During periods of economic instability, disruptions to national nutrition programs can rapidly exacerbate these risks. International experience suggests that locally produced supplementary foods, when appropriately formulated and monitored, can provide nutritionally adequate and operationally resilient alternatives during crises [13,20]. However, empirical evidence comparing national programs with

emergent local alternatives in Sri Lanka remains limited, underscoring the relevance of the present study.

Methodology

A multidisciplinary committee comprising medical consultants, nutritionists, and engineers was convened to design and implement the intervention. A grinding mill was established at a rehabilitation center under the Regional Director of Health Services (RDHS) office in Batticaloa to produce Thenahaposhha using locally sourced ingredients, following basic quality assurance procedures. The produced flour was distributed monthly (1 kg per beneficiary) to nutritionally vulnerable pregnant women and undernourished children (children with weight for age lower than -1SD) identified through Medical Officer of Health (MOH) records in the Kiran MOH area.

A pilot longitudinal study was conducted in September 2022 involving 73 undernourished children under five years of age. The study population consisted of children aged 1–5 years residing in the Kiran MOH area who were receiving monthly Thenahaposhha supplementation.

Participants were selected using a simple random sampling method from children registered at and regularly attending well-baby clinics conducted by the MOH Kiran office.

Anthropometric data were summarized using descriptive statistics. Nutritional status was assessed using the wasting index, i.e., weight-for-height Z-scores (WHZ) using the Child Health Development Record (CHDR) which aligns with the World Health Organization growth standards. Children were classified as severely undernourished when their weight for height fell below -3SD, moderately undernourished when weight for height fell between -3SD and -2SD and mildly undernourished when weight was between -2SD and -1SD. Those with weights above -1SD were considered as having normal nutrition. Changes in nutritional status categories over time were evaluated by comparing baseline measurements with follow-up assessments at 3, 6, and 12 months. Data analysis was performed using SPSS version 24.

Results

A total of 73 undernourished children under five years of age were included in the analysis, comprising 45% (n = 33) males and 55% (n = 40) females. At baseline, 34.2% (n = 25) of children were classified as severely undernourished (WHZ below -3 SD), 60.3% (n = 44) as moderately undernourished (WHZ between -2 SD and -3SD), and 5.5% (n = 4) as mildly undernourished (between -2 SD and -1SD), based on World Health Organization growth standards.

Following 12 months of Thenahaposhha supplementation, no children (0%) remained in the severely undernourished

category. The proportion of children with moderate undernutrition decreased from 60.3% to 34.2% (n = 25), while those classified as mildly undernourished increased to 52.1% (n = 38). Notably, 13.7% (n = 10) of children achieved normal nutritional status. (Figures 1 & 2)

A McNemar test was performed to assess changes in nutritional status between baseline and 12 months. When nutritional status was dichotomized into undernourished and normal categories, a statistically significant improvement was observed (p = 0.002), indicating that the proportion of children achieving normal nutritional status increased significantly following the intervention. Overall, these findings demonstrate a substantial shift from severe and moderate undernutrition toward milder and normal nutritional categories over the follow-up period.

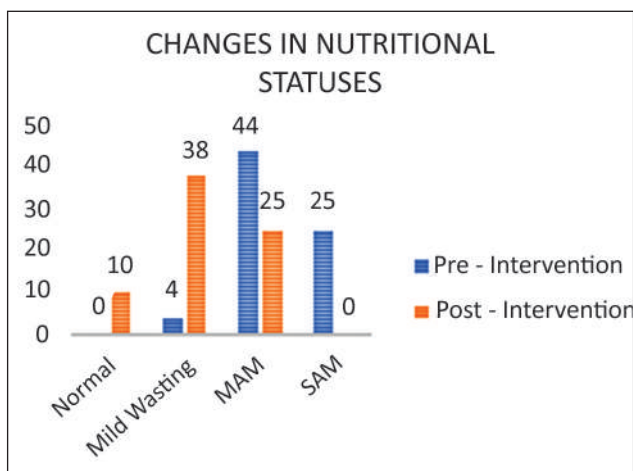


Figure 1: Changes in Nutritional Statuses (numbers)

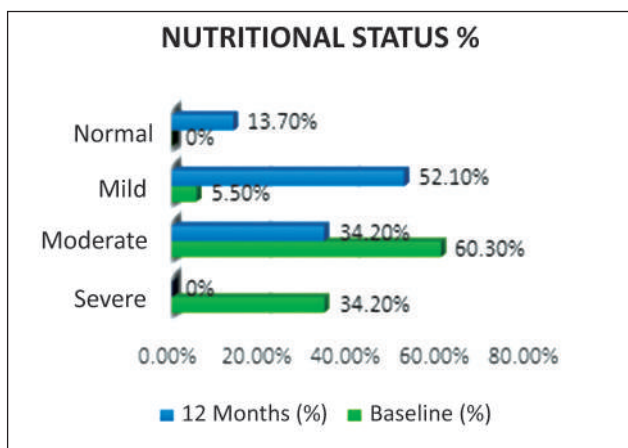


Figure 2: Changes in Nutritional Statuses (percentage)

A substantial shift from moderate and severe undernutrition toward mild undernutrition and normal nutritional status was observed.

Discussion

This study demonstrates that a locally produced supplementary nutrition flour can effectively improve

nutritional outcomes among vulnerable children during periods of national program disruption. The observed improvements are consistent with evidence supporting community-based supplementary feeding interventions during emergencies [13,20]. While Thriposhha remains the gold standard due to standardized fortification and national quality control mechanisms, the Thenahaposha initiative highlights the importance of decentralized, adaptive responses during systemic shocks.

A comparison between Thenehaposha and Thriposhha showed that energy content was comparable between the two products. Thenahaposha demonstrated higher levels of certain nutrients due to the use of locally sourced legumes and whole grains, while Thriposhha maintained consistent composition through standardized fortification. (21)

Beyond nutritional outcomes, the intervention contributed to community engagement, local capacity building, and reduced reliance on imported inputs. These attributes are increasingly recognized as critical components of resilient health and food systems. Integration of locally produced supplementary foods into emergency preparedness frameworks could enhance national resilience to future economic or environmental crises.

Strengths and Limitations

Strengths: This study has several notable strengths. First, it was conducted during an acute national nutrition program disruption, providing rare real-world evidence of an adaptive, community-based response under crisis conditions. Second, the intervention leveraged locally available raw materials and existing public health infrastructure, enhancing feasibility, acceptability, and contextual relevance. Third, longitudinal follow-up over a 12-month period allowed assessment of sustained nutritional changes rather than short-term effects alone. Fourth, anthropometric measurements were recorded through routine public health mechanisms using standardized Child Health Development Records, improving data reliability and programmatic relevance. Finally, the intervention demonstrated strong intersectoral collaboration between health services, technical experts, and community stakeholders, supporting scalability and policy translation.

Limitations: Several limitations should be acknowledged. The pilot nature of the study and relatively small sample size limit statistical power and generalizability beyond the study population. The absence of a contemporaneous control group precludes causal inference and limits attribution of observed improvements solely to the intervention. Potential confounding factors, including concurrent dietary intake, household food security changes, and morbidity patterns, were not systematically measured. Nutrient intake was not quantified at the

individual level, and biochemical markers of micronutrient status were not assessed. Additionally, while basic quality assurance measures were implemented, the locally produced supplement did not undergo formal national-level fortification or regulatory certification. Future studies should employ controlled designs, larger samples, and comprehensive dietary and biochemical assessments to strengthen the evidence base.

Although the study design does not permit causal inference, the magnitude and consistency of improvements observed over the 12-month follow-up suggest a meaningful association between regular Thenahaposha supplementation and improved child nutritional status. The absence of deterioration during a period of widespread food insecurity further underscores the potential protective effect of the intervention. These findings are particularly relevant in emergency contexts where randomized controlled trials may be impractical or unethical.

Conclusion

The Thenahaposha initiative addressed a critical nutritional gap during Sri Lanka's economic crisis and demonstrated the feasibility, effectiveness, and sustainability of a community-based supplementation model. Local production of supplementary nutrition can serve as a viable interim strategy during national program failures and offers a scalable approach for regions facing similar public health and socio-economic challenges. Policymakers should consider integrating decentralized nutrition solutions into national contingency planning to safeguard vulnerable populations during future crises.

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Original Article

Post Thyroidectomy Hypocalcemia in the Early Postoperative Period: A Clinical and Biochemical Analysis in a Surgical Unit at Teaching Hospital Batticaloa

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Abstract:

Hypocalcemia following thyroidectomy is a common complication. This prospective observational study/audit evaluates the clinical and biochemical evidence of hypocalcemia in the early postoperative period. This study has been carried out in consecutive patients who underwent thyroidectomy over a one-year period in a surgical unit at Teaching Hospital Batticaloa. Hypocalcemia is defined when the corrected calcium level is <2.1 mmol/l. Twenty-one consecutive patients who underwent total thyroidectomy between May 2024 and April 2025 were prospectively analyzed for clinical symptoms, signs and biochemical evidence of hypocalcemia. Male and female patients represented 03/21 (14.3%) and 18/21(85.7%) of the population respectively, with a mean age of 49.3years. Indications for thyroidectomy were mainly suspected malignancy 66.6%, for MNG 33.3%. Serum calcium levels measured on postoperative day 03, and corrected calcium levels were calculated. Clinical assessment was performed on postoperative day 03. Our study found the incidence of post thyroidectomy hypocalcemia in this unit was 19% and it lies within the international standards. Furthermore, the study reaffirms that there is significant correlation between perioral numbness and Chvostek sign, the and biochemical evidence of hypocalcemia.

Keywords: Thyroidectomy, Hypocalcemia, Serum calcium, Prospective study

Introduction

The British Association of Endocrine and Thyroid Surgeons (BAETS) registry defines post-thyroidectomy hypocalcemia as corrected calcium less than 2.10 mmol/l on first postoperative day, and its fourth national audit reported a rate of 24.9% (1).

Hypocalcemia is the most frequent postoperative complication of thyroidectomy (2). Hypocalcemia results from inadvertent injury, devascularization, or removal of the parathyroid glands during surgery. Other mechanisms proposed for post thyroidectomy hypocalcemia include hungry bone syndrome and intraoperative hemodilution (3). Clinical features of hypocalcemia can vary from asymptomatic biochemical abnormalities to severe symptoms such as perioral numbness, tetany, and cardiac arrhythmias.

Early detection through clinical and biochemical assessment is crucial to prevent complications and ensure timely management. Establishing the incidence of post-

thyroidectomy hypocalcemia in individual centers would provide valuable information to both surgeons and patients, therefore, facilitating informed consent. This study aims to prospectively evaluate the incidence of postoperative hypocalcemia in patients undergoing total thyroidectomy.

Methods

A prospective observational study/audit was conducted involving 21 consecutive patients who underwent total thyroidectomy at a single unit at a tertiary care center, Teaching Hospital Batticaloa, between May 2024 and April 2025. Patients were included irrespective of age, gender, or indication for thyroidectomy. Exclusion criteria included pre-existing hypocalcemia, chronic kidney disease, or calcium supplementation prior to surgery.

All surgeries were performed by the consultant surgeon, a senior registrar (SR) or a registrar. Surgeries performed

by an SR or a Registrar were closely supervised by the Consultant. Patient characteristics (age, gender & the pre-op thyroid status) were collected. On the third postoperative day, patients were assessed for perioral numbness, carpopedal spasms, Chvostek's and Trousseau's signs. Serum corrected calcium levels were also taken on the same day. Hypocalcemia was defined as a corrected serum calcium level below 2.1mmol/L. Clinical and biochemical data were collected and analyzed to determine the incidence of post thyroidectomy hypocalcemia.

Data were collected using a form by an intern house officer and crosschecked by a surgical registrar. Data were directly entered into IBM SPSS Statistics 27.0.1 and analyzed. Normally distributed data was presented as mean and standard deviation (SD) and categorical data as frequencies and percentages. To assess the association between clinical symptoms and biochemical hypocalcemia, patients were categorized based on the presence or absence of symptoms, and corresponding calcium levels. Statistical association was evaluated using chi-square test. The statistically significant level was set at 0.05.

As the examination of patients and performing serum calcium levels are routine ward procedures, we considered the study as an audit. Therefore, formal ethical clearance was not sought and implied consent was presumed. The identity of the patients was totally anonymized. However, verbal consent and approval of the hospital administration were taken.

Results

A total of 21 patients were recruited. The number of females was 18 (85.7%). The mean age of the population was 49.3years (SD = 11.249).

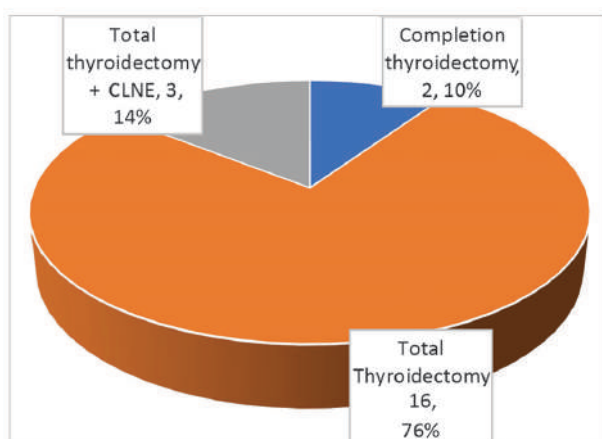


Figure 1. Types of Thyroidectomy Performed

Among the population, 16 (76.2%) underwent total thyroidectomy, 2 (9.5%) underwent completion thyroidectomy and 3 (14.3%) underwent Cervical LN Excision (CLNE) with total thyroidectomy (Figure 1).

Preoperative diagnosis included hypothyroidism, 4 (19%), hyperthyroidism 1 (4.8%).

Table 1. Clinical Features and Serum Calcium

Features	Incidence
Perioral Numbness	3 (14.3%)
Carpopedal spasms	Nil
Laryngospasm	Nil
Chvostek sign	3 (14.3%)
Trousseau's sign	3 (14.3%)
Hypocalcemia (Corrected calcium < 2.1mmol/L)	4 (19%)

Table 2. Clinical Signs & Symptoms Vs Hypocalcemia

		Serum Calcium Levels		Total
		<2.1mmol/L	>2.1mmol/l	
Clinical Signs & Symptoms	Yes	2	1	3
	No	2	16	18
Total		4	17	21

Out of 21 patients 4 patients had laboratory evidence of hypocalcaemia (19%). Out of the 3 patients who showed features, one had normal serum calcium, and out of the 4 who had biochemically low calcium, two did not elicit symptoms and signs (Table 2) All three patients with clinical features had perioral numbness, positive Chvostek and Trousseau's signs but no one had carpopedal spasm and laryngospasm. There is a statistically significant association between hypocalcemia (<2.1 mmol/L) and the presence of clinical signs/symptoms in this dataset, p value = 0.023).

Discussion

Many studies have highlighted considerable variability (0–46%) in the incidence of post-thyroidectomy hypocalcemia in the same cohort of patients depending on which definition was used (4). In this study, the incidence of post thyroidectomy hypocalcemia is 19% (95% CI 4.8%, 38.1%) compared with BAETS rates of 24.9%. The reported BAETS incidence of post-thyroidectomy hypocalcemia falls within our unit's 95% CI margin, indicating that the incidence of post thyroidectomy hypocalcemia in the early postoperative period in this unit was comparable with international standards.

There is a statistically significant association between hypocalcemia (<2.1 mmol/L) and the presence of clinical signs/symptoms in this dataset. Patients with hypocalcemia were more likely to be symptomatic, but the small sample size means this finding should be interpreted cautiously and ideally confirmed in larger cohorts.

Our study found that, on the third post-op day, one patient exhibited clinical symptoms despite normal serum calcium and two patients didn't elicit any signs despite low

calcium levels. This finding potentially indicates transient fluctuations and/or individual sensitivity, underscoring the importance of routine biochemical testing. The analysis stresses the complementary role of both clinical and biochemical evaluation (5).

Limitations of our study includes that we carried out in small sample size and it can impact generalizability of its findings. We hypothesize that there is no change in the calcium levels of the patients on postoperative Day1 and Day 3 (6). We compared the BAETS data which is obtained on postoperative Day 1 with our data which is obtained on postoperative Day3.

Preventative strategies such as meticulous surgical technique, identification, and preservation of parathyroid glands, and appropriate perioperative calcium supplementation may help reduce the incidence of this complication.

Conclusion

Post-thyroidectomy hypocalcemia remains a significant concern. This study underscores the value of a combined clinical and biochemical approach in detecting and managing this condition in the early postoperative period. Correlation between clinical presentation and serum calcium levels aids in identifying patients at risk and ensuring prompt intervention. This study concludes that the incidence of post thyroidectomy hypocalcemia in our surgical unit is comparable to the international findings.

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Original Article

Behind the Pain: A Study of Migraine Triggers in Batticaloa

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Abstract:

Background: Migraine is a common and disabling primary headache disorder characterized by recurrent episodes of headache associated with neurological and systemic symptoms. Trigger factors play a crucial role in precipitating migraine attacks and may vary based on regional, environmental, and socio-cultural contexts.

Objective: To describe the socio-demographic characteristics and identify common migraine trigger factors among patients attending the neurology clinic at Teaching Hospital Batticaloa.

Methods: A descriptive cross-sectional study was conducted among 135 patients diagnosed with migraine according to the International Classification of Headache Disorders, 3rd edition criteria. Participants were selected using simple random sampling from patients attending the neurology clinic at Teaching Hospital Batticaloa from August 2024 to January 2025. Data were collected using an interviewer-administered structured questionnaire and analyzed using descriptive statistics.

Results: The mean age of participants was 38.9 years, with a predominance of females (66.7%, n = 90). Most participants were married and Tamil-speaking (64.7%, n = 87), and 76% (n = 103) belonged to low socioeconomic backgrounds. More than half (57.3%, n = 77) had been attending the clinic for over two years, and 62.2% (n = 84) were on preventive medication. The most commonly reported migraine triggers were lack of sleep (76.1%, n = 102), stress (57.5%, n = 77), exposure to bright sunlight (50.7%, n = 68), and reduced fluid intake (47%, n = 63). Among dietary factors, peanuts (74.8%, n = 86), cocoa-related foods (49.6%, n = 57), and chocolate (47%, n = 54) were frequently identified as triggers.

Conclusions: Lack of sleep and peanut consumption were the most commonly reported migraine triggers in this population. Identification of region-specific trigger factors is essential for improving patient education and developing targeted preventive strategies.

Keywords: Migraine; Trigger factors; Sleep deprivation; Dietary triggers; Batticaloa; Sri Lanka

Introduction

Migraine is a chronic, episodic neurological disorder characterized by recurrent attacks of moderate to severe headache, often associated with nausea, vomiting, photophobia, and phonophobia. It is classified as a primary headache disorder according to the International Classification of Headache Disorders, 3rd edition (ICHD-3) (1). Migraine represents a significant public health concern due to its high prevalence and substantial impact on quality of life and productivity.

Globally, migraine affects approximately 12–15% of the population and is recognized as one of the leading causes

of disability worldwide (2). It disproportionately affects individuals during their most productive years, particularly women, with a female-to-male ratio of approximately 3:1 (3). The higher prevalence among females is largely attributed to hormonal influences, especially fluctuations in estrogen levels (4).

The pathophysiology of migraine is complex and multifactorial, involving neurovascular dysregulation, cortical spreading depression, and activation of the trigeminovascular system (5). Genetic predisposition also plays a role, but environmental and behavioral factors are crucial in triggering migraine attacks. These trigger factors vary widely between individuals and may include

stress, sleep disturbances, dietary components, hormonal changes, and environmental stimuli (6).

Identifying and avoiding individual trigger factors is a cornerstone of migraine management. However, trigger profiles may differ based on geographical, cultural, and socio-economic contexts. In tropical regions such as Sri Lanka, environmental factors like intense sunlight and heat exposure, along with specific dietary habits, may influence migraine patterns. Despite this, there is limited research focusing on region-specific migraine triggers in Eastern Sri Lanka.

Therefore, this study aims to describe the socio-demographic characteristics and identify common migraine trigger factors among patients attending the neurology clinic at Teaching Hospital Batticaloa. Understanding these localized triggers will help improve patient education and tailor preventive strategies.

Literature Review

Migraine has been extensively studied worldwide, yet its triggers remain highly individualized and context-dependent. Previous studies have identified a wide range of precipitating factors, broadly categorized into lifestyle, environmental, hormonal, and dietary triggers.

Sleep disturbances are among the most commonly reported migraine triggers. Both insufficient and excessive sleep have been linked to migraine attacks, possibly due to their influence on hypothalamic regulation and neurotransmitter balance (7). Poor sleep quality is also associated with increased frequency and severity of migraine episodes.

Stress is another major trigger, reported by a significant proportion of migraine sufferers. Psychological stress is believed to activate the hypothalamic–pituitary–adrenal axis, leading to neurochemical changes that precipitate migraine attacks (8). Both acute stress and post-stress relaxation periods have been implicated.

Environmental factors, including bright light, extreme temperatures, and strong odors, have also been identified as common triggers. Exposure to sunlight is particularly relevant in tropical regions, where ultraviolet radiation and heat intensity are high (9). These environmental exposures can stimulate trigeminal nerve pathways, contributing to headache onset.

Dietary triggers are widely reported but remain controversial. Commonly implicated foods include chocolate, nuts, caffeine, aged cheese, and processed foods containing additives such as monosodium glutamate (10). However, recent evidence suggests that some perceived food triggers may actually represent premonitory symptoms rather than true causative factors (11).

Studies conducted in South Asia indicate that migraine

prevalence and trigger patterns may differ due to cultural and environmental influences. For example, dietary habits, climate, and socio-economic conditions can significantly shape exposure to trigger factors (12). However, there is a notable lack of data from Eastern Sri Lanka, particularly from Batticaloa, highlighting the importance of this study.

Methodology

Study Design and Setting

A descriptive cross-sectional study was conducted at the Neurology Clinic of Teaching Hospital Batticaloa over a six-month period from August 2024 to January 2025.

Study Population

The study population consisted of patients diagnosed with migraine according to ICHD-3 criteria who were attending regular follow-up at the neurology clinic.

Sample Size and Sampling Technique

A total of 135 patients were included in the study. Participants were selected using simple random sampling from clinic records to minimize selection bias.

Data Collection Tool

Data were collected using an interviewer-administered structured questionnaire. The questionnaire was developed based on existing literature and included the following sections:

- Socio-demographic characteristics
- Clinical history and duration of migraine
- Medication usage
- Exposure to potential trigger factors (lifestyle, environmental, and dietary)

Data Collection Procedure

Participants were interviewed during their routine clinic visits. Informed consent was obtained prior to data collection. Confidentiality and anonymity were maintained throughout the study.

Data Analysis

Data were entered and analyzed using statistical software. Descriptive statistics such as mean, frequency, and percentage were used to summarize the data.

Ethical Considerations

Ethical approval was obtained from the director Teaching Hospital Batticaloa. Participation was voluntary, and all participants provided informed consent.

Results

Socio-demographic Characteristics

The mean age of participants was 38.9 years, indicating that migraine predominantly affects individuals in their economically productive age group. Females constituted the majority of the study population (66.7%, n = 90), consistent with global trends.

Most participants were married and Tamil-speaking (64.7%, n = 87), reflecting the demographic composition of the region. A significant proportion of participants (76%, n = 103) belonged to low socioeconomic backgrounds, which may influence lifestyle factors and access to healthcare. The socio-demographic characteristics are summarized in Table 1.

Table 1: Socio-demographic characteristics of study participants (n = 135)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	45	33.3
	Female	90	66.7
Marital status	Married	86	64.4
	Unmarried	49	35.6
Ethnicity / Language	Tamil-speaking	87	64.7
	Others	48	35.3
Socioeconomic status	Low	103	76.0
	Middle/High	32	24.0

Clinical Characteristics

More than half of the participants (57.3%, n = 77) had been attending the migraine clinic for more than two years, suggesting a chronic disease course. Preventive medications were being used by 62.2% (n = 84) of participants, indicating ongoing management of the condition.

Clinical characteristics of participants are shown in Table 2.

Table 2: Clinical characteristics of migraine patients (n = 135)

Variable	Category	Frequency (n)	Percentage (%)
Duration of clinic follow-up	≤ 2 years	58	42.7
	> 2 years	77	57.3
Use of preventive medication	Yes	84	62.2
	No	51	37.8

Trigger Factors

The most commonly reported migraine triggers were:

- Lack of sleep (76.1%, n = 102)
- Stress (57.5%, n = 77)
- Exposure to bright sunlight (50.7%, n = 68)
- Reduced fluid intake (47%, n = 63)

These findings highlight the importance of lifestyle and environmental factors in precipitating migraine attacks. Common non-dietary triggers are presented in Table 3

Table 3: Common non-dietary migraine trigger factors (n = 135)

Trigger Factor	Frequency (n)	Percentage (%)
Lack of sleep	102	76.1
Stress	77	57.5
Bright sunlight exposure	68	50.7
Reduced fluid intake	63	47.0

Dietary Triggers

Among dietary factors, the most frequently reported triggers were:

- Peanuts (74.8%, n = 86)
- Cocoa-related foods (49.6%, n = 57)
- Chocolate (47%, n = 54)

These results suggest a strong association between certain locally consumed foods and migraine occurrence. Dietary triggers are summarized in Table 4.

Table 4: Dietary migraine trigger factors (n = 135)

Dietary Trigger	Frequency (n)	Percentage (%)
Peanuts	86	74.8
Cocoa-related foods	57	49.6
Chocolate	54	47.0

Discussion

The findings of this study provide valuable insights into the pattern of migraine triggers among patients in Batticaloa. The predominance of female participants is consistent with global epidemiological data and may be explained by hormonal influences (3).

Sleep deprivation emerged as the most common trigger, reinforcing the critical role of sleep regulation in migraine pathophysiology. Previous studies have shown that disruptions in sleep can affect hypothalamic function and neurotransmitter systems, increasing susceptibility to migraine attacks (7).

Stress was identified as another major trigger, consistent with existing literature. The relationship between stress and migraine is complex, involving neuroendocrine and autonomic mechanisms (8). Stress management interventions may therefore play a key role in reducing migraine frequency.

Environmental exposure, particularly bright sunlight, was reported by over half of the participants. This is particularly relevant in a tropical setting like Sri Lanka, where high levels of sunlight exposure are common. Similar findings have been reported in other studies conducted in warm climates (9).

Reduced fluid intake was also identified as a significant trigger, suggesting that dehydration may contribute to migraine onset. This highlights the importance of adequate hydration as a simple yet effective preventive measure.

Dietary triggers, particularly peanuts and cocoa-related foods, were prominently reported. While chocolate has been widely recognized as a potential migraine trigger, the high prevalence of peanut-related triggers in this study may reflect local dietary habits. However, it is important to interpret these findings cautiously, as the relationship between diet and migraine is often subjective and may vary between individuals (11).

Overall, the study emphasizes the importance of identifying individualized and region-specific trigger factors. Patient education focusing on lifestyle modification, stress management, and dietary awareness can significantly improve migraine control.

Conclusions

Lack of sleep and peanut consumption were the most commonly reported migraine triggers among patients attending the neurology clinic at Teaching Hospital Batticaloa. Other significant triggers included stress, exposure to bright sunlight, and reduced fluid intake.

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These findings highlight the importance of region-specific research in understanding migraine triggers. Incorporating this knowledge into clinical practice can enhance patient education and support the development of targeted preventive strategies.

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Original Article

A Descriptive Study on Blast Injuries Related to Elephant-Crackers and Improvised Explosive Devices Used in Human-Elephant Conflict at a Tertiary Care Hospital in Eastern Sri Lanka

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Abstract:

Background: Elephant crackers (Ali Wedi) and improvised explosive devices (IEDs) are widely used in rural areas in Sri Lanka where human elephant conflicts are endemic. These crackers and IEDs causes accidental blasts and cause severe injuries when improperly handled. To the best of our knowledge, there are only limited local data available on this and its health impact.

Methods: This ambispective study analyzed 21 consecutive patients, of whom 17 were analyzed retrospectively and 4 were observed prospectively. Complete surgical and injury records were available for 16 patients. All patients presented with accidental blast injuries caused by elephant crackers and improvised explosive devices (IEDs) to Teaching Hospital Batticaloa over a three-year period, between March 2022 and March 2025. Data were collected from hospital records and included demographic details, types of explosive, overview of injuries, types of surgeries performed, types of anesthesia administered, antibiotic therapy, and the duration of hospital stay. Descriptive statistics were used for analysis.

Results: All patients were male, with a mean age of 37.05 (SD± 12.82) years and 85.7% were below 50 years. Most injuries occurred at night (71.4%), and 85.7% resulting from elephant crackers. The most commonly affected site (81.2%) was hands, with multiple cases of partial or complete finger amputations. About 62.5% of patients required major plastic surgical intervention and surgical subspecialties involved included ENT, oral and maxillofacial, gastrointestinal, and orthopedics. General anesthesia was needed in 75% of cases and intravenous (IV) antibiotics were administered to 93.75% of patients. The mean duration of IV antibiotics was 6 days and the mean hospital stay was 6.6 days. No deaths or ocular injuries were recorded.

Conclusions: Elephant cracker and IED-related blast injuries are a serious but readily preventable health hazard in human elephant conflict zones. Community-level education, safer deterrent strategies, and policy interventions are essential to reduce the burden on individuals and the healthcare system.

Keywords: Elephant crackers, improvised explosive devices, blast injury, finger amputations, plastic surgery, human-elephant conflict

Introduction

Elephant crackers (Ali wedi) and improvised explosive devices (IED) are used to deter elephants in the regions where human elephant conflicts are endemic. Injuries caused by elephant crackers and IEDs in human elephant conflicts have not been reported in the Sri Lankan literature. Nevertheless, the prevalence of injuries due

to firecrackers in general has been reported worldwide. Wang et al. reported that the most frequently injured body parts due to fireworks in Beijing (China) were hands and fingers (32%), whereas in 11.4% of cases the eyes were also involved (1).

Ocular injuries may have a significant impact on quality of life and potentially lead to a temporary or even a long-

term inability to work (2). As majority of patients with these injuries are below the age of 50 years, a potential long-term disability could have both critical economic consequences and a relevant impact on the public health system. To the best of our knowledge, only limited data on elephant cracker and IED – related injuries are available for Sri Lanka. A case series of injuries due IED (Hakka patas and Ali wedi) at District General Hospital Ratnapura, Sri Lanka has been published recently (3).

Human-elephant conflict is a recurring issue in rural parts of Sri Lanka, particularly in districts like Batticaloa where agricultural activities and wildlife habitats intersect (4). To protect crops and property, local populations often resort to using explosive devices such as elephant crackers and IEDs. Although these devices may temporarily deter elephants, they pose a significant risk to human health when mishandled or accidentally detonated.

This study aimed to describe the pattern of injuries caused by elephant crackers and IED blasts, providing insight into the burden these incidents place on the healthcare system and highlighting the need for policy-level interventions.

Materials and Methods

We studied 21 consecutive cases with injury due to elephant crackers and IEDs presenting to Teaching Hospital Batticaloa over the last three years from 29th of March 2022 to 27th of March 2025. An ambispective approach was used, with 17 patients analyzed retrospectively and 4 observed prospectively. Relevant demographic data, overview of injury and type of surgery performed, mode of anesthesia given, surgical subspecialties involved, use of IV antibiotics and duration of hospital stay were collected from the hospital records such as admission book, Bed Head Ticket, diagnosis cards and records from hospital police post. Furthermore, information about the type of firecracker used and a brief history of the incident was also collected.

Descriptive statistics were used to analyze the data. IBM SPSS Statistics 27 was used to analyze data. Continuous data were presented with mean $\pm$ standard deviation (SD). Due to the descriptive nature of the study, no statistical comparisons were performed, and only descriptive data are presented.

Ethical clearance was obtained from the Ethics Review Committee of Eastern University of Sri Lanka. Informed written consent was obtained from the patients whose images are used in the study.

Results

A total of 21 patients were admitted to Teaching Hospital Batticaloa for the entire three years period with Elephant cracker or IEDs-related blast injuries. All patients were male with a mean age of 37.05 (SD12.82) years. Eighteen

patients (85.7%) were aged below 50 and 14.3% were aged above 50 years. More than 50% (n= 12) of the cases were reported in 2022 and only one patient was reported in 2023. Five patients were reported in 2024 and three patients in 2025. Most injuries occurred at nighttime in (15 patients, 71.4%), between 8 pm and 8 am, 6 patients (28.6%) have sustained injuries at daytime between 8 am and 8 pm. About 85.7% of patients (n= 18) had injury due to blast of elephant cracker and 14.3% (n= 3) had injury due to IEDs/Onion cracker. Highest number of cases (n= 7) were reported from Eravur Pattu Divisional Secretariat (DS) division followed by Manmunai West DS division with four cases (Figure 1). Sixteen patients (76.2%) sustained injuries while trying to deter elephants during a conflict with elephants and one patient had an injury while trying to chase a pig. Four patients had elephant cracker blast accidentally while having no conflicts with elephants or any other animals.

Detailed information regarding surgical intervention and injury pattern of five patients could not be retrieved. Hence, analysis was done only for 16 patients.

The most common injury site was hands (81.2%, n=13) (Figure 2) with complete amputation of at least one finger in five patients (three fingers amputated in a patient), partial finger amputation in three patients and partial thumb amputation in two patients (Figure 3 A, B). Hand injuries also included carpometacarpal joint with scaphoid, metacarpophalangeal (MP) and interphalangeal (IP) joint disruption, ulnar arterial injury, thenar muscle injury with tissue loss and tendon injuries. (Box 1). One patient had a metatarsal fracture of the foot and two patients had injuries in the head and neck region. One patient who had IED blast sustained head and neck injuries and had pellets passing through the left side of the cheek and hard palate, reaching the jugular fossa and damaging the vagus and glossopharyngeal nerves (Figure 3 C, D). He developed difficulty in swallowing and hoarseness of voice.

About 62.5% (n=10) required major plastic surgical interventions, including finger amputations and refashioning, k-wire fixation and soft tissue reconstruction. Three patients underwent only a wound debridement and suturing. One patient underwent ENT surgical procedures, for an ear laceration. One patient underwent OMF surgical intervention for a palatal injury and the same patient underwent a gastrointestinal surgical intervention for a Gastrostomy tube insertion as he was unable to swallow due to injuries involving cranial nerves at jugular fossa. One patient underwent orthopedic intervention for metatarsal bone fracture.

General anaesthesia (GA) was administered once in 56.3% (n=9) of patients and twice in 18.8% (n=3). Four patients underwent surgeries under local anesthesia and wrist block. A total of 93.75% (n=15) required IV antibiotics

of which 12 patients were administered cefuroxime, 2 patients were administered co-amoxiclav and one patient was administered meropenem. Intravenous antibiotics were administered for a mean duration of 6 days. Mean duration of hospital stay was 6.6 days. No mortalities or ocular injuries were recorded.

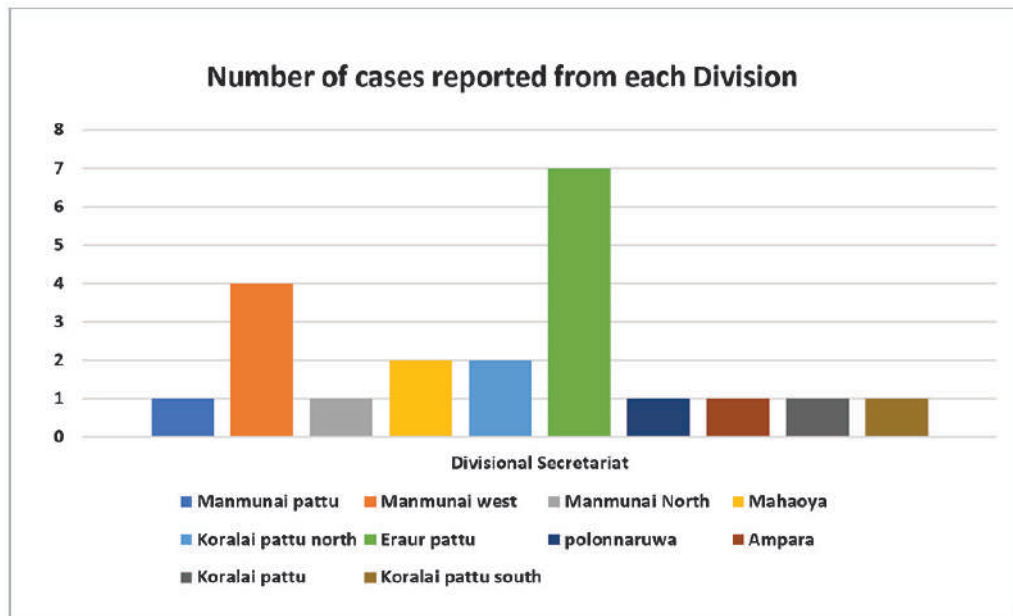


Figure 1: Number of cases reported from each DS division

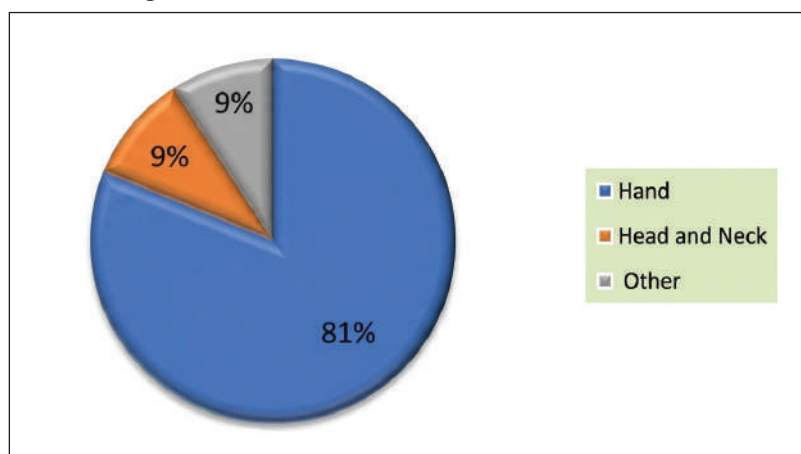


Figure 2: Patterns of injury in percentage

Types of Hand Injuries
Complete amputation of at least one finger (5)
Partial finger amputations (3)
Partial thumb amputation (2)
Scaphoid, metacarpophalangeal (MP) and interphalangeal (IP) joint disruption
Ulnar arterial injury
Thenar muscle injury with tissue loss and tendon injuries

Box 1



Figure 3. Common injuries due to Elephant Cracker blast injury (A) Finger amputations, (B) Deep tendon rupture, (C) Palatal injury with a pellet, (D) Patient with gastrostomy tube



Figure 4. Commonly used Elephant crackers

Discussion

The use of elephant crackers is a common practice in human elephant conflict zones in Sri Lanka and such crackers blasts often involve critical areas such as the face and upper extremities, resulting in long-term disability and requiring specialized surgical care.

All victims were male and majority (85.7%) were below 50 years. They are typically considered economically active and productive. These injuries occur mainly due to time factor where less time to confront the elephants and the cracker blast accidentally while in hands. The other reason was improper technique and lack of awareness in using the crackers. Nearly 71.4% of the injuries occur at night as elephant attacks are common at night (5). Eravur pattu and Manmunai West DS divisions have shown more than 50% of the reported incidents which reveals the increased occurrence of elephant conflicts in these regions.

Most surgeries were performed under general anesthesia and some needed repeated surgeries under GA. Except one patient all were given intravenous antibiotics with a mean duration of 6 days and one patient received IV meropenem for 10 days. Average duration of hospital stay was 6.6 days. One patient had to undergo repeated CT scans of head and neck and CT angiograms to evaluate the extent of injuries and vascular involvement as the injury involved the jugular fossa. All these findings reveal the significant financial burden to the health sector caused by these injuries.

Furthermore, our study revealed hand injuries were the commonest types of injuries, accounting for 81.2% which carries a significant morbidity (6). The high percentage of patients needing plastic surgery reflects the severity of soft tissue damage associated with these injuries. The additional involvement of ENT and OMF surgeons underscores the complexity of craniofacial trauma in such blast cases.

Given the outcome of these injuries in this region, there is an urgent need for public awareness campaigns about the dangers of using elephant crackers and IEDs, introduction of safer and more humane elephant deterrent systems, policy-level actions to reduce access to harmful materials and explosives.

This study was primarily aimed at raising awareness of the burden of elephant cracker-related injuries in this region; therefore, detailed injury severity or disability assessments were not performed and it is a limitation of this study.

Conclusion

This study reveals the significant burden on the health sector and morbidity in victims due to elephant cracker related blast injuries. These injuries are dangerous but preventable. Preventive measures at community-level and development and introduction of new safer and human friendly systems are critical to mitigate future injuries.

Declaration of competing interest

The authors declare that there is no conflict of interest. This study was presented as a poster presentation at Sri Lanka Surgical Congress 2025 -Colombo.

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Original Article

Therapeutic Workplace-Based Intervention in the Management of Substance Use Disorders Science to Application: Community Model Approach in a Rehabilitation Unit in Eastern Sri Lanka

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Abstract:

The objective of this exercise was to evaluate the effectiveness of Therapeutic Workplace model in the management of substance use disorders (SUD).

A prospective analysis of clients admitted with SUD who underwent the Therapeutic Workplace model treatment at Arogya Illam, was conducted during a two-year period from February 2024 to February 2026.

Eighty-six clients were admitted for SUD during the study period and fifty who were unemployed were assigned to workplaces after basic training. They were also provided with counselling, spiritual support and capacity building. Jobs included restaurant work, sales persons, security and janitorial services and agriculture-based work. All fifty subjects were diagnosed to have comorbid mental disorders. The majority (45, 90%) remained abstinent at the time of reporting, while 05 went into relapse.

The Therapeutic Workplace model is not only a successful intervention in the treatment of substance abuse, it also empowers of the affected individuals towards a productive life.

Clients with SUD should be accommodated for rehabilitation with other clients in common centers. Community based centers, with the involvement of families will yield better outcome compared to military /prison models. The rehabilitation process of substance use clients must be led by medical professionals through a Multi-Disciplinary Team (MDT). The support of government and corporate sectors is essential in implementing the Therapeutic Workplace model of treatment.

Keywords: Substance use disorders, Therapeutic Workplace Intervention, community based rehabilitation centers

Introduction

In the past, persons suffering from a substance use disorder (SUD) have been viewed as individuals with a character flaw or a moral deficiency, and stigmatized with labels such as “an addict”. Advances in neuroscience have expanded our understanding of the brain changes responsible for this condition and have provided the basis for recognizing SUD as a progressive, chronic, relapsing disorder that is amenable to treatment and recovery. (Volkow, Koob, & McLellan, 2016).

Drug use disorders, a pressing issue globally, have particularly strained Sri Lanka’s public health and security

systems, affecting its youth and communities. Sri Lanka has witnessed a troubling rise in drug-related issues, with a 13% increase in arrests for drug offenses during the 2022 economic crisis, totaling 152,979 individuals. The infiltration of narcotic drugs like cannabis, heroin, cocaine, and prescription medications has significantly impacted adolescents and young adults, including school-aged children. Despite these alarming statistics, there has been a notable shortage of effective prevention and treatment programs, leading to high relapse rates due to the chronic, relapsing nature of drug use disorders. (Sri Lanka Police, 2022)

Literature Review

Employment as an Incentive to Motivate Drug Abstinence

Addressing chronic drug addiction among unemployed and economically disadvantaged adults is a daunting challenge. Employment is clearly critical in addressing the poverty and economic disadvantage of these individuals; however, controlled research suggests that employment could play a valuable role in treating drug addiction as well (Silverman, DeFulio, & Sigurdsson, 2012).

Contrary to common conceptions, employment alone may not have robust effects on drug use (DeFulio, Donlin, Wong, & Silverman, 2009; Silverman et al., 2007). Employment may have greatest effects on drug use when employers use it as an incentive to promote drug abstinence (Silverman et al., 2012). This article reviews controlled research on the utilization of employment in the treatment of drug addiction, highlights the key ways in which employment can be used to promote and maintain drug abstinence and adherence to addiction nonmedical interventions like individual counselling, group interventions, family interventions, and suggests potential models of applying these findings in society. (Mental Health Among the Tamil Community by Prof. Daya Somasundaram).

The majority of research suggests that incentives for drug abstinence can be highly effective in both initiating and maintaining abstinence from most commonly abused drugs (Dutra et al., 2008; Lussier, Heil, Mongeon, Badger, & Higgins, 2006; Silverman, Kaminski, Higgins, & Brady,

2011). These interventions are rooted in basic and applied research on operant conditioning and arrange reinforcement for drug abstinence (Bigelow & Silverman, 1999). These abstinence reinforcement interventions commonly referred to as incentive or contingency management interventions are relatively simple procedures in which patients receive a tangible benefit for providing objective evidence of drug abstinence. The nature of the benefit can vary as long as it is attractive to the clients and can be applied and withheld. Money or some kind of monetary incentive can be particularly useful because it is attractive to most people; its magnitude and frequency can be varied over a wide range; and because most people will not lose interest in this benefit, even after receiving a fair amount of it. The parameters of incentive interventions matter (Lussier, Heil, Mongeon, Badger, & Higgins, 2006).

Employment-Based Abstinence Reinforcement in Promoting Drug Abstinence

Research has shown that employment alone is not sufficient to promote sustained abstinence in our

participants; our participants achieve sustained abstinence primarily when required family reunion, keeping the Activities of Daily Living(ADL), social contacts, meaningful entertainments, sports /physical activities, practicing yoga and relaxations, have good friends, spiritual helps and community acceptance etc, The results of these studies are clear. In the populations studied, employment alone does not appear sufficient to promote sustained abstinence; however, employment-based abstinence reinforcement can both promote initiation (Silverman et al., 2007) and maintenance of sustained abstinence (DeFulio et al., 2009).

Long-Term Maintenance of the Abstinence Requirement to Prevent Relapse

Like other substance abuse treatments, abstinence reinforcement or incentive interventions do not reliably produce lasting effects (Silverman et al., 2011). Employment-based abstinence reinforcement can be used to maintain substance use abstinence; these studies suggest that for some people it may be necessary to maintain employment-based abstinence reinforcement contingencies for extended periods of time, and possibly indefinitely. It is not yet clear whether employment-based abstinence reinforcement will have lasting effects in some people if it is maintained for some period of minimal time.

Background

Arogya Illam is a rehabilitation centre for mental health disorders, substance use disorders and neurological disorders attached to the Regional Directorate of Health Services Batticaloa. It is situated in Mavadvembu, a village 30 km north of Batticaloa. It serves to clients of various mental and neurological illness categories, including substance use disorders. The inmates receive medical, nursing, counselling, rehabilitation (physical, occupational, communication, social skills, anger management, money management and life skills) and skills training. It was established in 2006, constructed by Austrian/Swiss Red Cross, as a part of the post tsunami, rebuilding/reconstruction of the nation

Methodology

Fifty unemployed clients admitted with SUD from February 2024 to February 2026 were included in the Therapeutic Workplace programme. Our model consists four phases namely,

Introduction to the workplace through an Induction

Period Promoting adherence to an addiction medication

Promoting spiritual and family practices

Vocational skills training and employments

The Process of Implementation

Introduction to the Workplace through an Induction Period

During the “induction” period, participants are invited to attend the workplace eight hours every weekday, where they can earn money for working. This induction period is intended to engage participants in the workplace by allowing them to experience the workplace and the opportunity to earn and spend money through their participation prior to imposing requirements for drug abstinence.

Promoting Adherence to an Addiction Medication

Medications used in the treatment of drug addiction with pharmacological effects that should make them effective treatment agents were prescribed by the medical personnel. Incentives can promote adherence to naltrexone, and employment-based reinforcement in the Therapeutic Workplace has been effective in promoting adherence both to oral naltrexone (Dunn et al., 2013) and extended-release naltrexone (Defulio et al., 2012; Everly et al., 2011).

Arogya Illam did not extend any medications like Naltrexone/Methadone for opioids, or Disulfiram/Acamprosate for alcohol abstinences.

Promote spiritual and family practices

Apart from therapeutic work place approach, we have integrated spiritual, familial and social approaches. We focused on family, community and spiritual wellbeing for abstinence. Arogya Illam is open for 24 hours for family members without any barriers. The prayer room allocated for Muslims and our clients, staffs train the Muslims who are living without religious practices, every Fridays they attend the mosque for joint prayers, Hindus, Christians and Buddhist clients have morning prayers in our multi religious prayer room.

Vocational Skills Training and Employments

Following the war and tsunami significant percentage of youth failed to attend a standard in education due to the war, and many parents gave their children early marriage. For those who terminated their education, no opportunities exist to continue a meaningful life thereafter leading them to turn to illicit substance. An employment based multi skill vocational training along with other life skills are very important to sustain an income generation activity and manage their life in balance accepted way without any substances.

Results

Out of 86 clients admitted for SUD, 50 who were unemployed were included in the study. Most of them had been referred by the legal system whereas 10 (20%) of

them volunteered their own admission. (Figure 1).

The majority of the subjects were males (47, 94%), The distribution by ethnicity is given in Figure 2. There were five clients (10%) below the age of 20, and two were below 15 years. The majority were between 21 and 55 years. The distribution by age is given in Figure 3. The majority of the clients were under addiction of alcohol, closely followed by cannabis and heroin. Five clients were identified to have multiple substance uses. Substances used by the population studied is given in Figure 4.

While the majority, 19 (38%) were from Batticaloa District, the rest came from Ampara (7, 14%); Kilinochchi and Trincomalee (3, 6% each), Jaffna, Colombo, Gampaha, Kurunagala, Kururunagala, Mullaitivu, Puttalam, Polonnaruwa, Mannar and Vavuniya (2, 4% each), Kandy and Anuradhapura (1, 2% each).

All 50 were diagnosed with a mental disorder, psychosis being the commonest (Figure 5).

Intervention

All 50 were assigned to a workplace, most of them were placed in restaurants, and for four people job opportunities abroad were found (Figure 6).

An employment based multi skill vocational training along with other life skills are very important to sustain an income generation activity and manage their life in balance accepted way without any substances. Our clients were trained in many life skills. (Table 1)

Further, all clients were encouraged to engage in spiritual activities, according to their faith; Hindus to attend kovils, Muslims to pray regularly and observe fasting on the days of Ramzan and Christians to observe the Lent. Counselling sessions were made available and family members were encouraged to visit them at their convenience. These activities enriched the spiritual well-being and family connectiveness in the mental healthcare practice.

The success stories of three of our clients are given in Boxes 1 to 3, the names have been changed to maintain anonymity.

Out of our 50 clients 45 (90%) achieved abstinence and remained so to date.

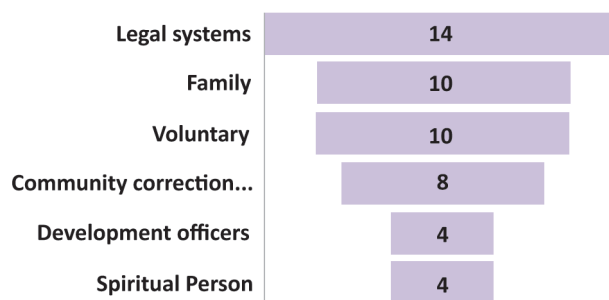


Figure 1. Sources of Referral

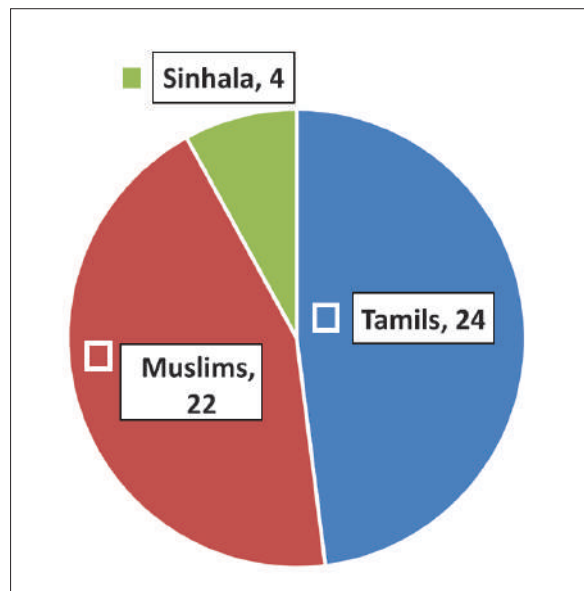


Figure 2. Distribution by Ethnicity

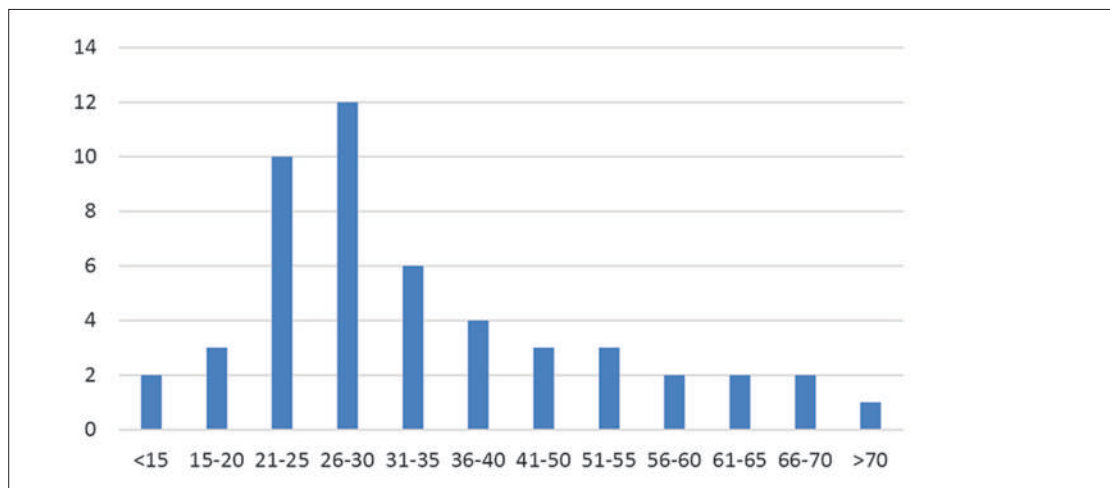


Figure 3. Distribution by Age

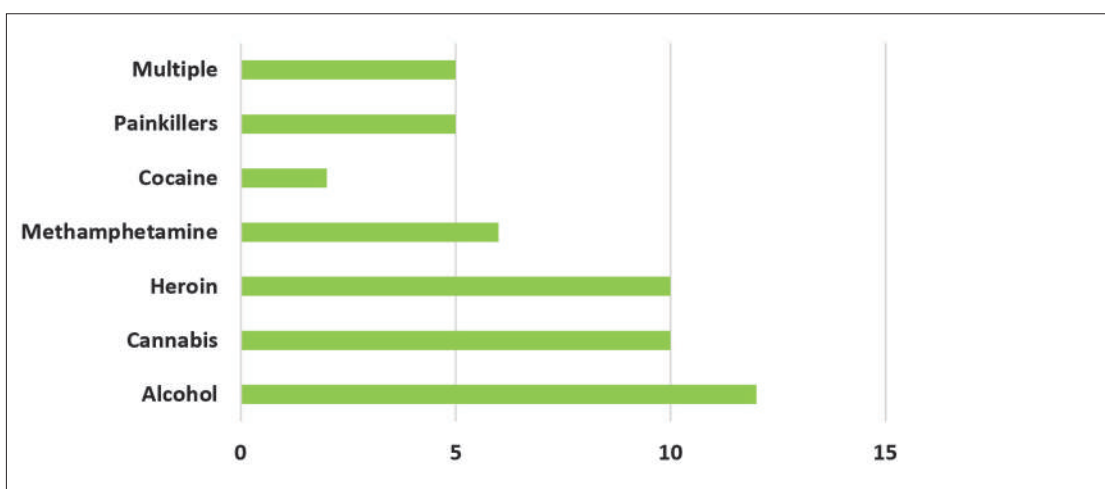


Figure 4. Substances Used

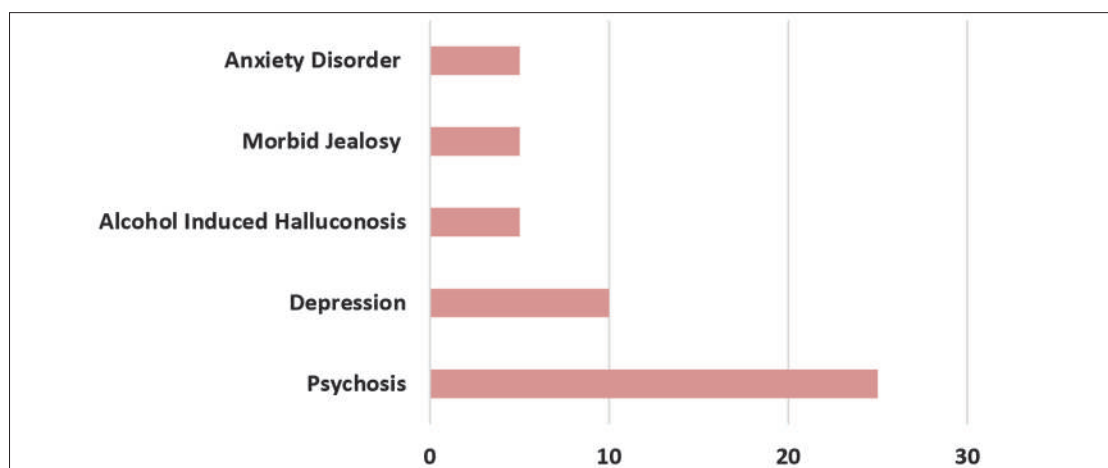


Figure 5. Mental Disorders Seen Clients

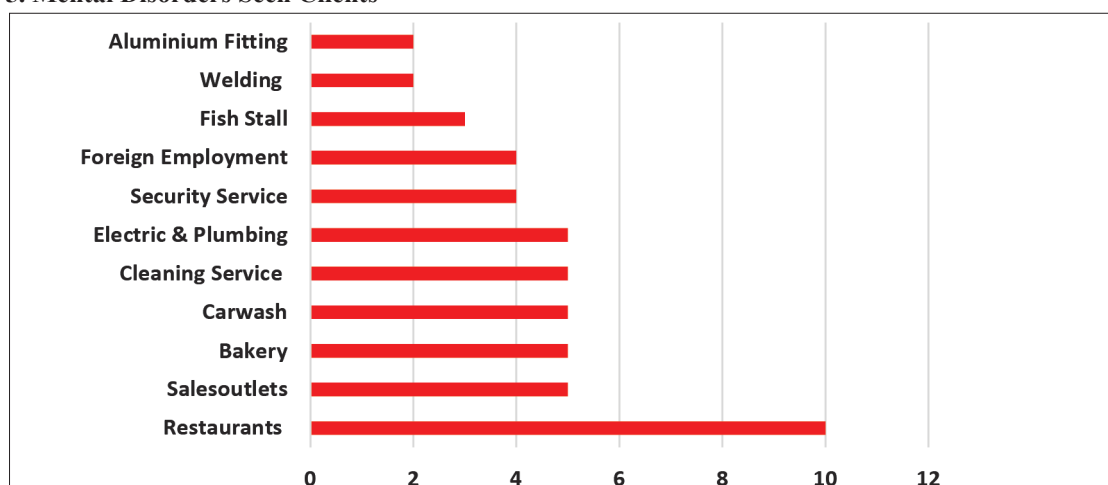


Figure 6. Employment Placement of Clients

Table 1. Details of Therapeutic Input Given to Clients

Industrial Skills	Healthy Life styles	Relationship Building	Economic well being	Social Responsibilities
Horticulture	Nutritional supplementation	Concepts of family life	Avoiding debts	Prevention of road traffic accidents
Poultry farming	Safe use of social media and avoiding addiction	Roles & responsibility of parents, children and relatives	Economic enhancement	Prevention of child trafficking and child abuse
Traditional cooking	Physical well being	Common psychosocial problems	Savings and safe investments	Appropriate social behaviour
Mushroom cultivation	Recycling	Sexual well being	Career development	Anger management
Hair cutting & beauty culture		Marital Preparation		

Case 1

Mr. Babu (not his real name) has been abusing alcohol, heroin, methamphetamine, cocaine and pills over 5 years since his age of 23 years. Both parents had passed away and his two siblings live overseas. He had studied up to advanced level, He was brought to us by the Development Officers of a nearby Divisional Secretariat.

He presented with withdrawal symptoms and psychosis. He was put on anti-psychotic medications for 6 months. He is now a security guard and receives a salary of 35,000 monthly with EPF/ETF. He has also developed the skills of three-wheeler driving, electrician work, plumbing, hair dressing, painting and farming. All above skills were self-learned during his time of rehabilitation over one year at Arogya Illam. He refrained from all substances including smoking, beetle at present.

BOX 1

Case 2

Mrs. Kamala (not her real name) has been abusing alcohol over two decades, and ended in the streets, begging money for alcohol. She defied treatment and was rejected by her children. Six months back she met with an accident and ended up at the Teaching Hospital Batticaloa with fractures of the distal tibia and fibula on the right side. She took to the roads again before formal discharge, with an above knee POP, begging for money around liquor shops in Batticaloa town. She was apprehended by the police and was referred to Arogya Illam by the courts. Here she underwent the Work-place based Therapeutic Intervention programme, and currently she is in charge of the shop at the centre. She remains abstinent, earns her own living and holds a bank account.

BOX 2

Case 3

Mr.Raja (not his real name) a 36 year old married man with two children and a painter by profession, has been abusing multiple substances over 5 years. He was apprehended by the police several times and was admitted to Arogya Illam 2 years ago. He was legally separated from his wife but his parents and siblings visited him. He was detoxified and was started on a typical anti-psychotic for six months. Currently, he is off all medications, and abstinent from all substances including smoking and betel chewing. He took up elderly-care and rehabilitation and supported the MDT at the centre. Eventually, he was employed as a security guard and was reunited with his family.

BOX 3

Discussion

Therapeutic Workplace-based Intervention for SUD has been successful in achieving abstinence in the majority of individuals with SUD. SUD is markedly commoner in males than females, suggesting an environmental and lifestyle risk in males. The number of children under 20 years coming for treatment is a positive finding, indicating the awareness of rehabilitation in the community. Although most clients were admitted through the legal system, the number of self-referrals and family-initiated admissions shows an optimistic trend.

The variety of skilled and semi-skilled job placements signifies the importance of opening multiple venues for individuals undergoing rehabilitation, involving the public and corporate sector.

The multifaceted therapeutic inputs given, highlights the importance of a multi-disciplinary and multi sectoral involvement in these type of rehabilitation processes. Centres like Arogya Illam which provide services beyond geographical boundaries and should continue to have that autonomy.

Conclusion

Therapeutic Workplace intervention is an efficient method in the treatment of substance use disorder. The income generated through employment serves as an incentive

for abstinence, although it poses a risk of relapse. The involvement of local businesses and community in employing members of Arogya Illam can be seen as a strength for future advancement in this field.

Recommendation

Clients with SUD should be accommodated for rehabilitation with other clients in common centres. Community based centres, with the involvement of families will yield better outcome compared to military / prison models. The rehabilitation process of substance use clients must be led by medical professionals through a Multi-Disciplinary Team (MDT). The support of government and corporate sectors is essential in implementing the Therapeutic Workplace model of treatment.

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Original Article

Wild Animal Attacks Presenting to a Surgical Casualty Ward: A Single-Unit Experience

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Abstract:

Wild animal attacks remain a significant cause of trauma in regions with close human–wildlife interaction, contributing to considerable morbidity and mortality, particularly in rural settings. This study was aimed to describe the epidemiology, injury patterns, management, and clinical outcomes of patients presenting with wild animal related injuries.

A descriptive study was conducted at Teaching Hospital Anuradhapura from October 2025 to March 2026. Twenty patients with documented wild animal attacks were included. Data was extracted from hospital records and analyzed for demographic characteristics, circumstances of injury, injury patterns, management strategies, and outcomes.

The median age of the victims was 52.5 years (range:19-78), with a male predominance (75%, n=15). Most victims were farmers (55%) from rural areas (85%). Elephant attacks accounted for the majority of incidents (60%). Injuries most frequently occurred in the early morning (50%) and commonly involved the lower limbs (45%). Lacerations (40%) and crush injuries (40%) were the predominant injury types. Wound debridement was performed in 55% of cases, and antibiotics were administered in 95%. Complications were observed in 80% of patients, with fractures (45%) and wound infections (20%) being the most common. Outcomes included discharge (35%), referral for specialized care (35%), amputation (10%), and mortality (10%).

Wild animal attacks disproportionately affect rural farmers and are associated with considerable morbidity and adverse outcomes. Strengthening preventive strategies and improving trauma care systems are essential to reduce the burden of these injuries.

Keywords: wild animal attacks, rural Sri Lanka, crush injury, laceration

Introduction

Wild animal attacks are a notable cause of traumatic injuries, especially in areas with close human–wildlife interface due to deforestation, habitat encroachment, or agricultural activity near forests. Such incidents may involve elephants, leopards, wild boars, monkeys, bears, depending on the local fauna. These attacks can result in severe injuries, permanent disability, psychological trauma, and fatalities.

Study on these cases will help identify epidemiological trends, evaluate the timeliness and appropriateness of care, and guide preventive measures in collaboration with wildlife and public health authorities.

Literature Review

Wild animal attacks commonly result in soft tissue injuries, lacerations of various body parts, and blunt trauma to the head, chest, abdomen, and extremities, often resembling injuries seen in road traffic accidents or physical assaults. Because of their powerful jaws and grinding teeth, wild animals can inflict severe tissue destruction, and the risk of wound infection is significant [1]. Mortality has been reported in patients with severe spinal injuries, abdominal trauma, and blunt chest injuries [2]. The mechanism, site, and pattern of injury vary depending on the species involved. Bull attacks are typically associated with penetrating abdominal injuries,

frequently causing multiple bowel perforations [2].

Elephants are generally peaceful animals; however, females may become aggressive when protecting their young, and bulls are particularly aggressive during musth, a period of surge in reproductive hormones [3]. Elephant attacks commonly occur in farmlands, near homes, or in forests when humans intrude into their habitat. High human density, dependence on forest resources, and residence near migration routes increase vulnerability, particularly among marginalized communities along forest fringes [4]. Most elephant-related injuries are crush injuries to the chest, abdomen, and pelvis, often sparing the head. Rib fractures are the most common, followed by fractures of the extremities and vertebrae. Injury severity depends on proximity to the elephant, the victim's position, duration of trampling, and the animal's weight and speed [4].

Wild boar attacks are more frequent during winter, morning hours, and breeding seasons. Most incidents are unprovoked and occur during farming or forest visits. Injuries range from superficial lacerations to penetrating visceral injuries, fractures, tendon damage, joint infections, and occasionally death [5].

Objectives

To describe the demographic characteristics, type of wild animal, injury patterns, and circumstances of attacks.

To assess the timeliness of presentation and initiation of medical care.

To evaluate adherence to recommended protocols for wound management, tetanus immunization, and trauma care.

Methodology

A Descriptive study, conducted at surgical casualty ward, in a single unit at Teaching Hospital Anuradhapura, from October 2025 to March 2026. This study included

twenty patients, presenting with injuries sustained from wild animal attacks with all ages, both genders and documented history of injury caused by wild animals (e.g., elephant, leopard, wild boar, bear, monkey, snake). We excluded the injuries from domestic or feral animals (dogs, cats, cattle), and cases with incomplete or missing essential data.

Data were extracted from casualty/emergency registers and in-patient records (BHT).

Data points included:

1. Patient details: Age, gender, occupation, residence, history of alcohol intake.
2. Incident details: time, location, activity at time of attack,
3. type of wild animal, alone or group, history of provocation.
4. Injury details: Anatomical site, multiple vs single injuries, injury type, history of major bleeding.
5. Management at injury site: First aid care (Wound irrigation, application of irritants), transport mode
6. Clinical management: Triage category, surgical intervention, tetanus immunization, antibiotics.

Outcome: complications, disability, discharge or death.

Results

A total of 20 patients with animal-related injuries were analyzed. The age distribution of the victims are given in Figure 1, the mean age was 51.3 years (range: 19–78 years), with a male predominance (75%, n=15). Farmers constituted the largest occupational group (55%, n=11), followed by others (25%, n=5), household workers (15%, n=3), and fishermen (5%, n=1). Most patients were from rural areas (85%, n=17) Only 15% (n=3) of patients were under the influence of alcohol at the time of attack.

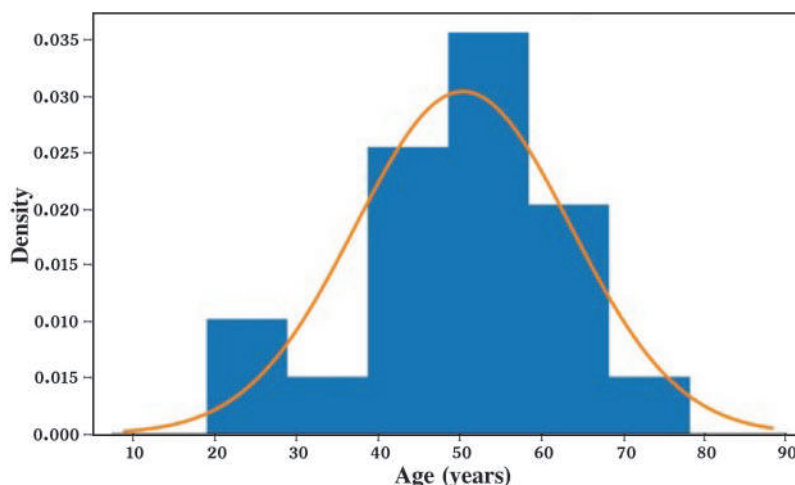


Figure 1: Age distribution of victims of wild animal attacks

Injuries most commonly occurred during the early morning (50%,10), followed by afternoon (25%, 5) and night (25%, 5). The majority of incidents took place in farm or field settings (50%, 10), followed by road or railway track (30%, 6). Most patients were engaged in farming activities (50%, 10), with others involved in walking or travelling (25%), driving (15%), collecting firewood or water (10%), and fishing (5%). All attacks involved a single animal, with provocation reported in 25% (5) of cases.

The animal species involved are shown in Figure 2. Elephants were the most common animals involved (60%, 12), followed by wild boars (20%, 4). Lacerations (40%, 8) and crush injuries (40%, 8) were the predominant

injury types, with lower limbs being most frequently affected (45%, 9) (Figure 3). Blood loss was less than 500 mL in 40% and greater than 1000 mL in 25%, 5 patients. Loss of consciousness and first aid were each noted in 10% of cases. Most patients were transported by private vehicles (40%) or three-wheelers (35%, 7) and triaged as yellow (85%, 17). Wound irrigation was performed in 90%, debridement in 55%, and antibiotics and tetanus prophylaxis in 95%. Most patients were managed in the ward (85%), while 15%, 3 patients required ICU care. Complications occurred in 80%, mainly fractures (45%) and infections (20%). Outcomes included discharge (35%, 7), referral (35%, 7), amputation (10%, 1), death (10%, 2) and permanent disability (5%, 1).

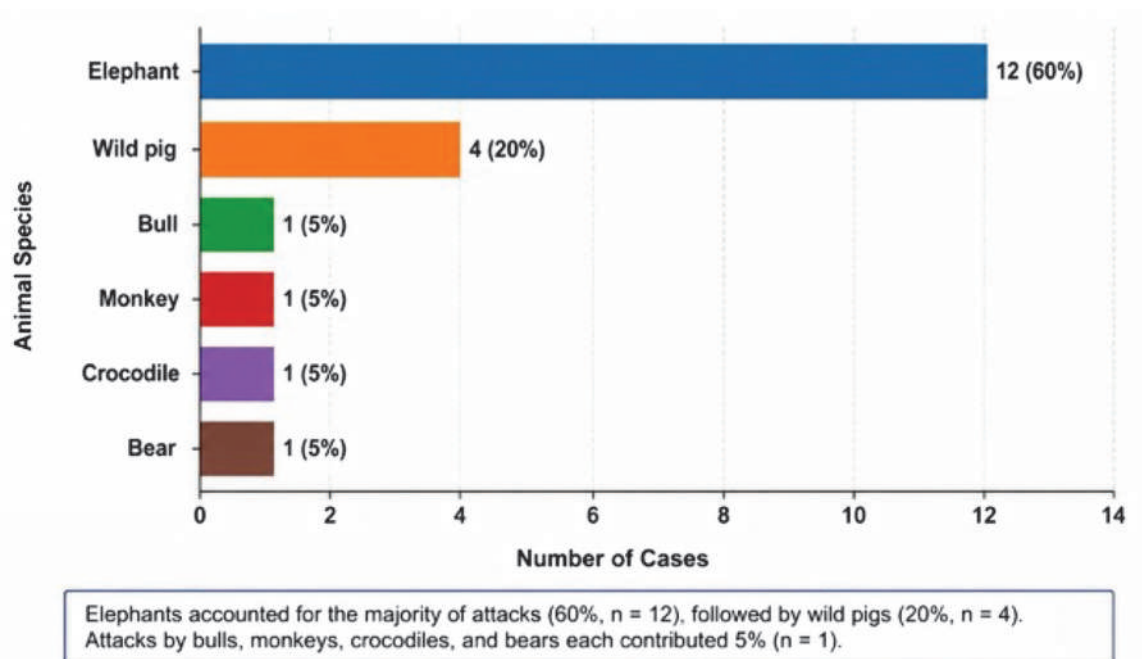


Figure 2: Animal species involved

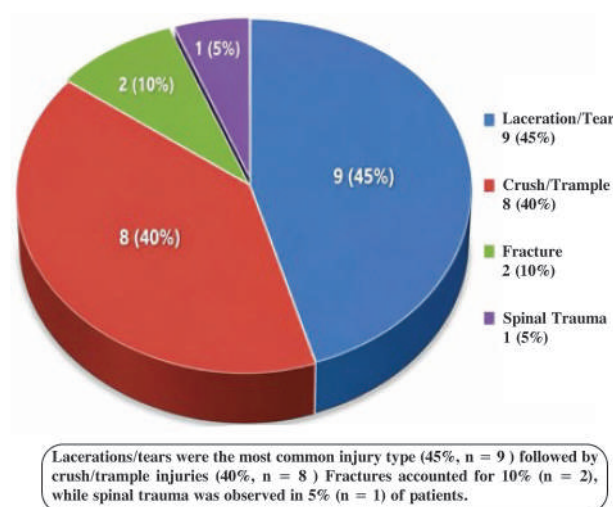


Figure 3: Patterns of injuries

Discussion

This study provides important insights into the epidemiology, injury patterns, management, and outcomes of wild animal attacks in a predominantly rural population. The affected cohort was characterized by a marked male predominance (75%) and a mean age of 51.3 years, with farmers accounting for more than half of all victims. These findings are consistent with previous reports from South Asia, where individuals engaged in agriculture and other outdoor occupations are disproportionately exposed to wildlife encounters because of their frequent interaction with forest-adjacent environments and agricultural lands [1,5]. The predominance of rural residents (85%) in our cohort further emphasizes the close relationship between human activities and wildlife habitats, particularly in regions where expanding human settlements overlap with animal migration routes and forest boundaries [4].

Most injuries occurred during the early morning hours (50%) and while engaged in farming activities (50%). Similar temporal and occupational patterns have been described in previous studies, reflecting periods of increased human activity in agricultural settings and peak wildlife movement [4,5]. The relatively low proportion of alcohol-related incidents (15%) suggests that environmental exposure and occupational risk factors, rather than behavioral factors, are the principal determinants of injury occurrence in this population.

Elephants were responsible for the majority of attacks in our series (60%), followed by wild pigs (20%). This distribution reflects the epidemiological pattern of human–wildlife conflict in Sri Lanka, where elephant-related injuries constitute a major public health concern [3,4]. Elephant attacks commonly occur in farmlands, near human settlements, and in forested areas when humans enter elephant habitats or migration corridors [4]. High human population density, dependence on forest resources, and residence near elephant ranges have been identified as major risk factors for such encounters [4]. The predominance of crush injuries (40%) observed in this study is consistent with the known mechanism of elephant attacks. Most elephant-related injuries result from trampling, compression, or forceful impact, producing severe blunt trauma involving the chest, abdomen, pelvis, and extremities [4]. Previous studies have reported rib fractures as the most common skeletal injury, followed by fractures of the vertebral column and long bones [4]. The severity of injury depends on multiple factors, including proximity to the animal, duration of trampling, victim position, and the size and momentum of the elephant [4]. In a Sri Lankan forensic case series, Thalaspitiya et al. (2023) described three fatal elephant attacks involving young male farmers residing near forests. All victims sustained extensive blunt polytrauma with crush injuries and multiple fractures, findings that closely mirror the

severe injury patterns observed in our cohort [4]. The high incidence of fractures (45%) in our study further supports the substantial musculoskeletal burden associated with elephant-related trauma.

Wild pig/boar attacks represented the second most common cause of injury. Previous studies have shown that wild boar attacks frequently occur during farming activities and forest visits, particularly during breeding seasons and early morning hours [5]. These attacks are often unprovoked and may result in injuries ranging from superficial lacerations to deep penetrating wounds, tendon injuries, fractures, visceral trauma, and occasionally death [5]. In our study, lacerations accounted for 40% of all injuries and lower-limb involvement was the most frequently affected anatomical region (45%), findings that are consistent with the typical attack behavior of wild pigs and other terrestrial animals, where victims are injured while standing, working, or attempting to escape. The injury patterns observed in our cohort are also comparable to findings reported by Quraishi et al. from India, who demonstrated that animal-related injuries commonly affect economically productive age groups and that injury mechanisms are highly species-dependent [5]. In their study, bulls and deer predominantly caused penetrating injuries through horn attacks, whereas bears inflicted severe lacerations and degloving injuries to the head and face using claws [5]. Similarly, our findings demonstrate distinct injury patterns according to the attacking species, with elephant attacks primarily producing crush injuries and wild pig attacks resulting predominantly in lacerations and soft-tissue trauma.

The findings of this study highlight the substantial healthcare burden imposed by human–wildlife conflict in rural Sri Lanka. Preventive interventions should focus on reducing encounters between humans and wildlife through community education, improved agricultural safety practices, habitat management, and early warning systems in high-risk areas [4]. Simultaneously, healthcare facilities serving vulnerable rural populations should be equipped to provide rapid trauma assessment, definitive surgical management, infection prevention measures, and rehabilitation services. Such strategies are essential to reduce both the immediate and long-term consequences of wild animal attacks.

The limitations of this study include its small sample size and single-center design, which may limit the generalizability of the findings. Nevertheless, it provides valuable contemporary data on the epidemiology, injury characteristics, management, and outcomes of wild animal attacks in Sri Lanka and contributes to the limited body of evidence available from South Asia.

Conclusion and recommendations

Wild animal attacks represent a significant occupational hazard, particularly for farmers and individuals living or working near forest fringes. Effective risk reduction begins with proper occupational risk assessment, identifying vulnerable populations, high-risk seasons, and exposure patterns. Preventive safety measures, including community awareness programs and training on avoidance strategies, are essential to reduce primary injuries. Equally important is knowledge of first aid management at the community level, as early bleeding control, wound care, and immobilization can significantly influence outcomes. In rural settings, the availability of ambulances and safe transfer of critically ill patients remain crucial determinants of survival. Efficient pre-hospital care, stabilization, and continuous monitoring during transport can prevent secondary complications. The accessibility and capability of primary care centers to manage critically injured victims—including resuscitation, wound management, and early referral—play a vital role. Clear communication between referring and receiving centers before transfer ensures preparedness and minimizes delays. Prompt triaging and definitive treatment without unnecessary postponement are essential to reduce morbidity and mortality. Finally, structured follow-up and rehabilitation services are necessary to address long-term physical and psychological consequences, ultimately improving functional recovery and quality of life among survivors of wild animal attacks.

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Featured Article

Home-Based Palliative Care Services in Batticaloa: A Public Health Initiative by the RDHS Team.

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Abstract:

Palliative care has become an increasingly important component of modern health systems, particularly in low and middle-income countries where the burden of chronic, non-communicable and life-limiting diseases continues to rise. Batticaloa District, with its diverse urban, rural, and remote populations, faces growing healthcare challenges related to advanced cancer, chronic kidney disease, stroke-related disability, neurodegenerative illnesses, and frailty among older adults. In response to these needs, the Regional Director of Health Services (RDHS) team in Batticaloa initiated a structured home-based palliative care service model aimed at delivering compassionate, accessible, and patient-centered care within the home setting.

This article describes the rationale, structure, implementation strategy, achievements, challenges, and future directions of the Batticaloa home-based palliative care initiative. The programme integrates medical, nursing, psychosocial, rehabilitative, and community support services through a multidisciplinary team approach, coordinated by the RDHS office in collaboration with divisional hospitals, Medical Officer of Health (MOH) areas, and field health staff.

The initiative has demonstrated significant benefits in improving quality of life, reducing avoidable hospital admissions, strengthening family caregiver support, and promoting dignity in end-of-life care. The Batticaloa experience may serve as a replicable district-level model for strengthening community palliative services across Sri Lanka.

Keywords: Palliative care, home-based care, RDHS Batticaloa, community health, chronic disease, end-of-life care

Introduction

Palliative care is an essential health service that aims to improve the quality of life of patients and families facing life-threatening illness, by preventing and relieving suffering through early identification, assessment and treatment of pain, and physical, psychosocial and spiritual problems. According to the World Health Organization, approximately 56.8 million people worldwide require palliative care annually, yet only about 14% receive it.

The need for palliative care has grown rapidly in Sri Lanka due to the increasing burden of non-communicable diseases, population ageing, and improved survival from acute illnesses that often leave patients with long-term disability. Recent Sri Lankan studies highlight persistent gaps in access, staff training, caregiver support, and opioid use for symptom relief.

Batticaloa District presents unique public health challenges including geographically dispersed communities, transport barriers, economically vulnerable households, post-conflict health inequalities, increasing elderly population and limited specialized palliative units. In this context, hospital-based care alone cannot adequately meet the needs of patients with chronic progressive illnesses. Recognizing this service gap, the RDHS Batticaloa team introduced a home-based palliative care initiative to bring essential services directly to patient's homes.

Background and Need Assessment

- (i) The health profile of Batticaloa has undergone a transition over the last decade.

There is an increase in the number of patients suffering from advanced malignancies, cerebrovascular accidents with long-term disability, chronic renal disease, heart failure, chronic obstructive pulmonary disease, dementia,

parkinsonism, terminal neurological disorders and frailty among elderly persons. Many of these patients are bed-bound, dependent on caregivers, unable to travel and socioeconomically disadvantaged

- (ii) Repeated hospital visits often impose severe financial and emotional burdens on families.

A major local issue identified by the team was that many terminally ill patients were repeatedly admitted to hospitals for conditions that could have been managed at home, such as pressure ulcers, pain crises, urinary catheter complications, feeding issues, medication non-adherence and caregiver exhaustion. Recent Sri Lankan literature also confirms significant caregiver burden in palliative settings. This need assessment formed the basis for developing a district-level home palliative programme.

Distribution of Palliative Care Patients in Batticaloa District

Figure 1 illustrates the distribution of a total of 1,293 palliative care patients across the Medical Officer of Health (MOH) areas in Batticaloa District. The data demonstrate considerable variation in patient numbers

between divisions. The highest number of patients is reported in Chenkalady (172), followed closely by Vellavelly (168) and Kaluwanchikudy (152), indicating a relatively higher burden of palliative care needs in these regions. Batticaloa MOH area itself accounts for 115 patients, while Oddamavady (99) and Vaharai (97) also show notable figures.

Moderate patient loads are observed in Paddipalai (66), Kattankudy (63), Arayampathy (63), Eravur (61), and Valaichenai (61). Lower numbers are reported in Vavunatheevu (57) and Kiran (54), suggesting a comparatively lesser identified needs or possible underreporting in these areas.

Overall, the distribution highlights disparities in palliative care demand across the district, which may reflect differences in population density, disease burden, healthcare accessibility, and reporting mechanisms. The concentration of higher patient numbers in selected MOH areas underscores the need for targeted resource allocation, strengthening of home-based care services and equitable distribution of healthcare support systems to ensure comprehensive palliative care coverage throughout the district.

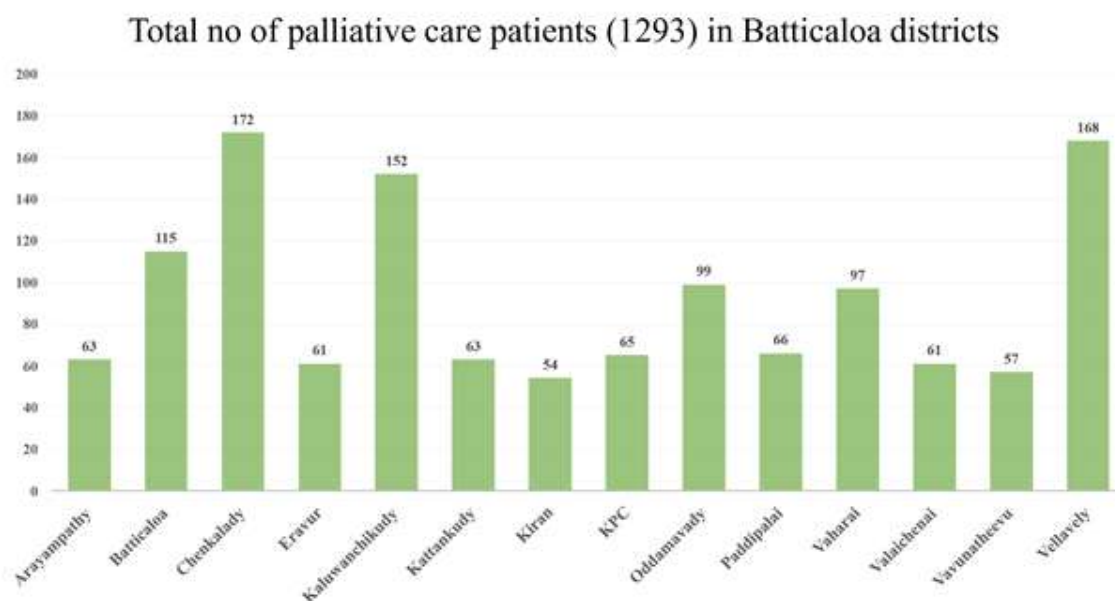


Figure 1. The distribution of individuals needing palliative care across the MOH areas

Gender Distribution of Palliative Care Patients in Batticaloa District

Figure 2 presents the gender wise distribution of palliative care patients in Batticaloa District, with a total of 1,006 patients, comprising 447 males and 559 females. Overall, females outnumber males in most MOH areas, indicating a higher palliative care burden among women. Notably,

higher female counts are observed in Kaluwanchikudy, Kiran, and Vellavelly, while Chenkalady and Eravur show relatively higher male representation. Some divisions such as Vaharai and Batticaloa display near gender balance. These variations may reflect demographic patterns, disease prevalence, and healthcare-seeking behaviour, highlighting the need for gender-sensitive palliative care planning and service delivery across the district.

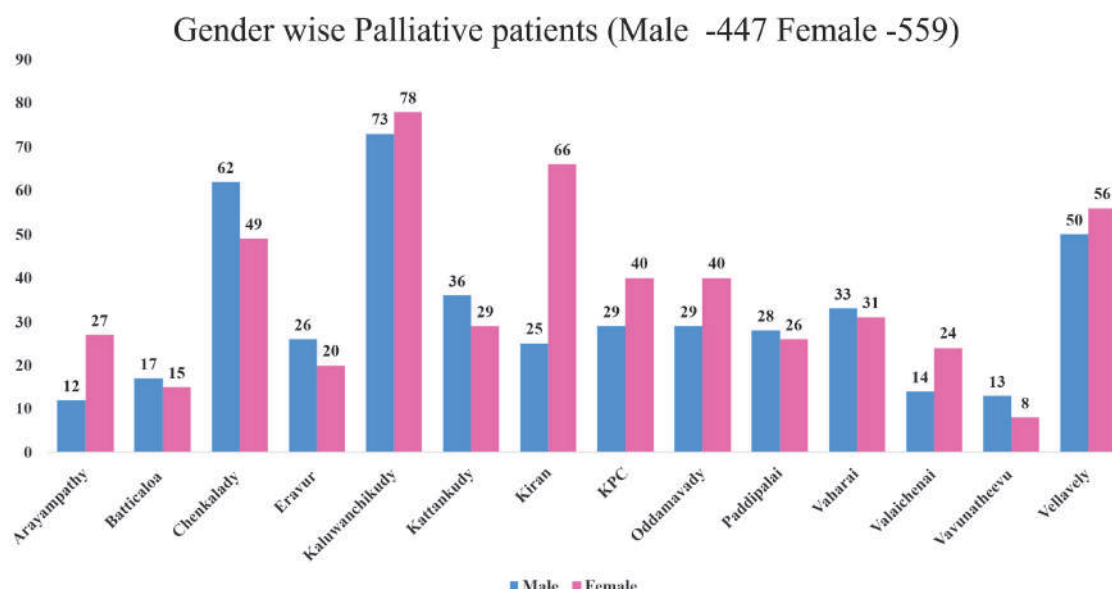


Figure 2. Distribution of patients needing palliative care by gender

Vision and Objectives of the Initiative

The vision of the RDHS Batticaloa Home-Based Palliative Care Programme is:

“To ensure compassionate, accessible, dignified and holistic care for patients with life-limiting illnesses within their own homes.”

Core Objectives,

1. Improve quality of life of patients
2. Ensure symptom relief and comfort care
3. Reduce unnecessary hospital admissions
4. Support family caregivers
5. Provide dignified end-of-life care
6. Strengthen continuity of care
7. Integrate hospital and community services

Programme Structure

The programme is coordinated centrally by the RDHS office with operational support from the Teaching Hospital, Base Hospitals, Divisional Hospitals, MOH offices, field public health staff and community nursing teams

Multidisciplinary Team Composition

The team includes Medical Officers, Nursing Officers, Public Health Nursing Sisters, Public Health Midwives, Public Health Inspectors, physiotherapists, medical social workers, mental health officers and palliative volunteers. This multidisciplinary approach aligns with global best practices.

Service Delivery Model

1. Patient identification

Patients are identified through ward discharges, oncology clinics, medical clinics, nephrology units, MOH referrals, PHM community visits and PHI field surveillance

2. Home assessment

Initial assessment includes diagnosis and prognosis, symptom severity, mobility status, nutrition, pain score, caregiver availability and Environmental safety

3. Care plan

An individualized care plan is prepared. This includes medication schedule, wound care plan, physiotherapy, psychosocial counselling and referral pathways

Clinical services provided

Pain Management

Pain is the most common symptom among palliative patients. Pain control medications include paracetamol, NSAIDs where appropriate, weak opioids, morphine for severe pain, and neuropathic pain agents. Sri Lankan evidence shows morphine underutilization remains a challenge. The RDHS initiative aims to improve rational opioid access.

Symptom Relief Management

This includes management of breathlessness, nausea, vomiting, constipation, anxiety, insomnia, delirium and terminal restlessness.

Wound and Bedsores Care

Pressure ulcer prevention and management, form a major component of palliative care. This includes dressing changes, pressure relief positioning, caregiver education, skin care and infection prevention.

Catheter and Tube Care

Services include urinary replacement, nasogastric tube care, PEG tube maintenance and infection monitoring.

Rehabilitation Services

Patients with stroke and neurological disorders require long-term rehabilitation. Services include passive limb exercises, contracture prevention, positioning, mobility training and caregiver-assisted exercises.

Psychosocial and Spiritual Support

Palliative care extends beyond physical treatment. The Batticaloa model includes family counselling, anticipatory grief support, emotional support, spiritual care and religious leader engagement when requested. Caregiver burden is a well-documented issue in Sri Lanka.

Role of Family Caregivers

Family caregivers are central to the success of home-based care. They are trained on medication administration, feeding, wound prevention, patient lifting, hygiene and emergency signs. This significantly reduces complications.

Community Participation

A major strength of the Batticaloa model is community involvement. This includes village leaders, volunteers, welfare societies, religious organizations and NGOs. The Kerala home-based palliative care model demonstrates similar success through community integration.

Role of RDHS Leadership

The RDHS office provides strategic leadership through policy direction, intersectoral coordination, training, logistics, monitoring, reporting and performance review. This district leadership is essential for sustainability.

Monitoring and Evaluation

Indicators monitored include, number of patients enrolled, number of home visits, symptom control scores, pressure ulcer incidence, hospital readmission rates, and caregiver satisfaction Digital follow-up tools may further strengthen outcomes, as recent Sri Lankan studies suggest.

Achievements of the Initiative

1. Improved access
2. Patients in remote villages now receive direct services.
3. Reduced admissions

4. Preventable readmissions have decreased.
5. Better quality of life
6. Pain and distress are better managed.
7. Caregiver Confidence
8. Families feel supported and trained.

Challenges

Despite success, challenges remain.

1. Workforce Shortages
2. Limited trained palliative personnel
3. Transport Issues
4. Remote areas are difficult to reach
5. Drug Availability
6. Especially morphine access
7. Funding
8. Need for sustainable district allocation
9. Staff burnout
10. Emotional burden on visiting teams

The Future....

1. Establish dedicated district palliative units
2. Regular staff training
3. Improve morphine access
4. Digital patient registry
5. NGO partnerships
6. Mobile nursing units
7. Research and publication

Discussion

The Batticaloa initiative demonstrates that palliative care can be effectively integrated into district public health systems.

Home-based models are particularly suitable for Sri Lanka due to Strong family structures, Community health networks and PHM and PHI field systems. The model is scalable to other districts.

Public Health Significance

This initiative supports universal health coverage, healthy ageing, NCD management and Compassionate end-of-life care. WHO strongly supports such integrated palliative services.

Conclusion

The Batticaloa RDHS home-based palliative care service represents a landmark district health initiative. It demonstrates Leadership, Compassion, Service innovation and Public health integration. This model can serve as a national template for district-level palliative care services in Sri Lanka.

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Quiz Page

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Quiz 1

Bleeding Palms and Epistaxis

A 40-year-old man presented with a long-standing history of recurrent spontaneous epistaxis since early adulthood. He also noticed multiple small red patches over his palms and soles. Recently, one of the lesions on his palm bled following minor trauma.

Physical examination revealed multiple punctate erythematous telangiectatic lesions over the palms, soles, and tongue (Figure 1). There was no evidence of connective tissue disease or coagulopathy.

Laboratory investigations showed a haemoglobin level of 8.0 g/dL with microcytic hypochromic anaemia. Other routine blood investigations were unremarkable.

Upper gastrointestinal endoscopy demonstrated multiple telangiectatic lesions involving the gastric mucosa (Figure 2).



Figure 1: Multiple telangiectatic lesions involving the palm.



Figure 2: Upper gastrointestinal endoscopy showing gastric mucosal telangiectasia. (Image credit- Dr. V. Vijitharan, Consultant Gastroenterologist)

What is the most likely diagnosis?

Quiz 2

A New Onset of Fecal Soiling

A previously well 15-year-old boy developed fecal soiling over the past few months. The X-ray of his spine is given in Figure 3.



Figure 3. The X-ray of the lumbosacral spine of a boy with fecal soiling

What is the most likely cause for his symptom?

Case Report

Beyond Appendicitis: An Unexpected Diagnosis of Appendix Mucocele

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Abstract:

A 70-year-old female presented with acute right iliac fossa pain, clinically suggestive of acute appendicitis. She underwent an open appendectomy, and intraoperative findings revealed an enlarged, cystic appendix. Histopathological examination confirmed the diagnosis of a mucinous cystadenoma, also known as a mucocele of the appendix. This rare condition can mimic acute appendicitis, posing a diagnostic challenge preoperatively. Early recognition and surgical management are crucial to prevent complications such as rupture and pseudomyxoma peritonei. This case highlights the importance of considering mucocele as a differential diagnosis in elderly patients presenting with right iliac fossa pain.

Keywords: right iliac pain, appendectomy, cystic appendix, mucocele of the appendix, mucinous cystadenoma

Introduction

Mucocele of the appendix is a rare clinical entity, characterized by abnormal accumulation of mucus within the appendiceal lumen, leading to progressive distension of the appendix. It accounts for approximately 0.2–0.3% of all appendectomies (1). The condition can arise due to various etiologies, including non-neoplastic causes such as obstruction or inflammation, as well as neoplastic processes like mucinous cystadenomas or cystadenocarcinomas.

Although many patients with appendiceal mucoceles are asymptomatic, the condition can present with non-specific abdominal symptoms such as right lower quadrant pain, a palpable abdominal mass, or even mimic acute appendicitis (2). A critical complication of this condition is the rupture of the mucocele, which may lead to pseudomyxoma peritonei, a potentially life-threatening condition characterized by intraperitoneal dissemination of mucin-secreting cells.

Preoperative diagnosis is essential for appropriate surgical planning and prevention of complications. Imaging modalities, particularly ultrasound and computed tomography (CT), play a pivotal role in diagnosing and assessing the extent of disease. Definitive management typically involves surgical resection, with a tailor-based

approach on the underlying pathology and risk of rupture.

This case report discusses the clinical presentation, imaging findings, surgical management, and histopathological evaluation of a patient diagnosed with appendiceal mucocele, highlighting the importance of early recognition and appropriate treatment to prevent complications.

Case Presentation

A 70-year-old female, with a medical history of type 2 diabetes mellitus, hypertension, and dyslipidaemia, and a surgical history of left hemithyroidectomy 15 years ago, presented with complaints of right iliac fossa pain and fever for one day. The pain was sharp, localized, and associated with low-grade fever with vomiting but no changes in bowel habits.

On examination, the patient was febrile and had localized tenderness in the right iliac fossa without guarding or rebound tenderness. Laboratory investigations showed an elevated white blood cell count of $15.22 \times 10^9/L$ and a C-reactive protein (CRP) level of 213 mg/L (<6), indicative of significant inflammation. An ultrasound scan of the abdomen revealed an unruptured appendicular mass suggestive of an abscess measuring 5.2 cm × 5 cm, with no evidence of free fluid.

The patient underwent an open appendectomy. Intraoperatively, a dilated, cystic appendix consistent with a mucocele was identified, without evidence of rupture or mucin spillage (Figure 1). The mucocele was completely excised, and the specimen was sent for



Figure 1 Intra operative image of mucocele of the appendix

histopathological evaluation.

Postoperatively, the patient had an uneventful recovery and was discharged after three days. Histopathological examination confirmed the diagnosis of a mucocele of the appendix. This case emphasizes the importance of considering appendiceal mucocele as a differential diagnosis in elderly patients presenting with right iliac fossa pain and imaging findings of a cystic lesion.

Discussion

Appendiceal mucocele refers to the abnormal enlargement of the appendix due to the buildup of mucous material within its lumen. This condition can arise from one of four underlying causes: retention cyst, mucosal hyperplasia, mucinous cystadenoma, or mucinous cystadenocarcinoma (3). Approximately 10%–15% of appendiceal mucoceles develop into pseudomyxoma peritonei, significantly altering the prognosis and clinical outcome (4).

Appendiceal mucocele is an uncommon condition, found in only 0.2–0.3% of appendectomy specimens. While early reports suggested a higher prevalence in females, more recent studies have not confirmed this trend. It most frequently occurs in individuals between the ages of 50 and 70, with an average age of onset around 55 (1).

Appendiceal mucoceles can be asymptomatic and are often detected incidentally through radiological or endoscopic examinations, or during laparotomy or laparoscopy

performed for unrelated reasons. However, in over 50% of cases, they present with right iliac fossa pain, mimicking acute appendicitis (4).

The diagnosis of an appendiceal mucocele is typically confirmed through abdominal CT imaging, which reveals a well-encapsulated cystic mass, ranging from 2 to 20 cm in diameter, most located in the right lower quadrant. Ultrasonography can also aid in diagnosis, often identifying a sausage-shaped cystic structure in the appendix region. In some cases, mucous ascites may be observed (3). Although appendiceal mucoceles exhibit distinct endoscopic, ultrasonographic, and radiologic characteristics, preoperative diagnosis remains uncommon (2).

When an appendiceal mucocele is identified during laparoscopy, conversion to open laparotomy is the safest approach to prevent rupture, which could transform a benign process into a malignant one. Laparotomy also enables thorough abdominal exploration to assess for mucoid fluid accumulation. If laparoscopy is performed, direct handling of the mucocele should be avoided, and an endo-bag must be used (5). Historically, right colectomy was recommended for appendiceal epithelial malignancies, but recent prospective data indicate no survival benefit in cases of mucinous carcinomatosis or pseudomyxoma peritonei (6). If malignancy is found in appendiceal or ileocolic lymph nodes, or if there is doubt about tumour spread or a positive margin at the appendectomy site, right colectomy or cecectomy may be required, with cryostat sectioning used to assess surgical margins (6).

The prognosis for simple mucocele, mucosal hyperplasia, and mucinous cystadenoma after appendectomy is excellent, but cystadenocarcinomas at risk for pseudomyxoma peritonei have a poor 5-year survival (7).

In comparison with the literature, the present case of a 70-year-old woman with an incidental finding of appendiceal mucocele shares similarities with previous reports regarding the age group and lack of specific preoperative symptoms. However, in this case, there were no signs of rupture or peritoneal spread, and the patient has shown no signs of recurrence during the short-term follow-up period.

Conclusion

Appendiceal mucocele, while rare, should be considered in the differential diagnosis of patients undergoing appendectomy, especially in the elderly or those presenting with atypical appendicitis symptoms. As seen in this case, the condition is often discovered incidentally during surgery, and a definitive diagnosis is made through

histopathological examination. The prognosis for benign types of mucocele, such as mucosal hyperplasia and mucinous cystadenoma, is generally favourable following appendectomy. However, care should be taken during surgery to prevent rupture, which can lead to the serious complication of pseudomyxoma peritonei. This case highlights the importance of recognizing the clinical and surgical management aspects of appendiceal mucocele, as well as the need for continued surveillance to detect any potential complications.

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Case Report

Laparoscopically Repaired Bilateral Morgagni Hernia with Focal Liver Herniation

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Abstract:

Morgagni hernia is a rare type of congenital diaphragmatic hernia (CDH) where abdominal contents herniate into the thoracic cavity through a defect in the anterior diaphragm. Accounting for only 2% of CDHs, Morgagni hernias are predominantly right-sided and are associated with congenital anomalies such as bowel malrotation, congenital heart disease, and Down syndrome.

A 13-month-old previously healthy child presented with respiratory distress and fever for six hours. Clinical evaluation and blood investigations were unremarkable. Chest radiographs revealed bilateral herniated gut loops within the thoracic cavity, consistent with Morgagni hernia. A thoracoscopic exploration confirmed bilateral defects in the anterior diaphragm. Herniated intestines and part of the liver were identified and reduced. Laparoscopic herniorrhaphy was performed using intra- and extracorporeal sutures, ensuring complete closure of the defects. Postoperative recovery was uneventful, with the child being discharged after 48 hours of observation in stable condition.

Minimally invasive laparoscopic repair demonstrates significant advantages, including reduced morbidity, faster recovery, and excellent cosmetic outcomes.

Keywords: Morgagni hernia, Focal liver herniation, Pediatric surgery

Introduction

Morgagni hernia is a rare type of congenital diaphragmatic hernia in which the abdominal contents protrude into the thoracic cavity through a defect in the parasternal gaps of the anterior diaphragm (1). The first report of Morgagni hernia was described an Italian anatomist, Giovanni Battista Morgagni following dissection of a cadaver (2). Morgagni hernia is generally located on the right side (3, 4). Evidence shows that Morgagni hernias are associated with congenital heart disease, bowel malrotation, and Down syndrome (4). The age at diagnosis is highly variable as Morgagni hernia is commonly asymptomatic (5). However, they are also known to present with gastrointestinal and respiratory symptoms (6).

The authors, herein, have reported a rare case report of a child presenting with bilateral Morgagni hernia and focal liver herniation that was successfully managed with laparoscopic repair.

Case history

A previously healthy 13-month-old child presented to the hospital following respiratory distress and fever for 6 hours. There were no recurrent respiratory tract infections in the past. Her blood investigations were within normal limits (Full Blood Count – WBC – 11.1 x 10³/ mm³, Haemoglobin – 12 g/dL, platelets – 231 x 10³ / mm³, C-reactive protein – 1 mg/dL. A chest x-ray was performed to arrive at a diagnosis and bilateral Morgagni hernia

(was revealed as an incidental finding (Figure 1 and 2). The child was subsequently, transferred to the Paediatric Surgical Unit for further management.

Bilateral Morgagni hernia was confirmed by thoracoscopic exploration and managed with laparoscopic repair. Large defects were seen in the anterior part of left and right diaphragm. Large intestines, small intestines and part of liver were found inside the hernia during surgical repair. Herniorrhaphy was performed with intra and extracorporeal sutures. The lips of the defects were sutured and closed completely.

The child was admitted to the Paediatrics Intensive Care Unit for postoperative surgical care and was moved to ward after 48 hours of observation. She was discharged from ward with no complications.



Figure 1 – Anteroposterior view of chest radiograph showing bilaterally herniated gut loops in thoracic cavity



Figure 2 – Lateral view of chest radiograph showing herniated gut loops in retrosternal thoracic cavity

Discussion

Morgagni hernias are the least frequent type of congenital diaphragmatic hernias (CDH) and account for 2% of CDH (7). The radiological diagnosis of Morgagni hernia is made with x-ray, ultrasound or computed tomography of the chest. Anteroposterior view of chest x-ray is useful for assessment of severity of hernia whilst lateral images show the precise location of the hernia. Radiological diagnosis of Morgagni hernia in our patient was made with chest x-rays whilst the diagnosis was confirmed by laparoscopic exploration of the thoracic cavity.

Most Morgagni hernias contain omental fat and colon. Liver and stomach can protrude thorough the defect rarely (8) and part liver was noted within the thoracic cavity during the laparoscopic exploration of our patient. Due to its unusual presentation, diagnosis of Morgagni hernia in children is often challenging. When determining the diagnosis, a typical chest radiograph that shows the density of the right, left, or both pericardiophrenic angles is highly useful (9). In the index case, chest X-ray lateral view showed retrosternal herniation of gut loops, which supported the diagnosis of Morgagni hernia. It is important to note that a previously normal radiograph does not always rule out the diagnosis of Morgagni hernia because the hernial sac occasionally starts off empty. Contrast barium scans can be conclusive in cases of uncertainty by demonstrating the existence of bowel loops in the thorax. Rarely, the hernial sac contains liver or omentum, which on radiography can be mistaken for a chest tumor. Ultrasonography, computed tomography, and magnetic resonance imaging scans can offer helpful information in these circumstances.

Congenital Morgagni's hernia can manifest in a variety of ways in the pediatric age group. The clinical presentation of MH is highly diverse, ranging from asymptomatic instances accidentally discovered to life-threatening surgical situations such colonic perforation and acute intestinal obstruction (10). The diagnosis is typically delayed due to the rarity of the disease and its vague presentation.

Surgery to repair the defect with a laparotomy or thoracotomy is the conventional treatment for Morgagni hernia (11). Currently, a number of laparoscopic procedures have been suggested for the repair, including the primary closure of the defect with intracorporeal sutures, staplers, or mesh (12). The rate of complications is still significant, despite the fact that minimally invasive repair of Morgagni hernia has produced good results with less trauma and an earlier return to physical activity. In addition to producing cosmetic results, the laparoscopic method offers other benefits such quicker hospital stays,

earlier feeding, and easier movement. There are several techniques for performing a laparoscopic repair; some researchers have documented entire intracorporeal repair, while others have suggested transabdominal sutures with extracorporeal knots with similar outcomes.

Conclusion

The authors report a rare presentation of bilateral Morgagni hernia with focal liver herniation that was successfully treated with laparoscopic repair. Since most children with Morgagni hernia are asymptomatic, a high index of suspicion is essential for early diagnosis. Chest x-ray enables early identification of Morgagni hernia. Timely management alleviates the risk of incarceration and bowel obstruction. Laparoscopic surgery is associated with decreased morbidity, an earlier return to physical activity, and infrequent recurrence

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Case Report

Foreign Bodies in Bilateral Bronchi Due to Peanut Aspiration in An Infant

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Abstract:

Foreign body aspiration is a life-threatening emergency in children, often requiring prompt diagnosis and intervention to prevent significant morbidity and mortality. Peanuts are among the most commonly aspirated food particles in young children.

We report the case of an 18-month-old girl who presented with sudden-onset respiratory distress following peanut ingestion. The child developed vigorous coughing, tachypnea, and paradoxical breathing, with decreased air entry on the left side and an oxygen saturation of 84% on room air. Despite a normal chest X-ray, a strong clinical suspicion prompted urgent bronchoscopy, which revealed bilateral airway obstruction, partial obstruction on the right and complete obstruction on the left, due to peanut fragments. The foreign bodies were successfully removed, and the child made a full recovery.

This case underscores the importance of maintaining a high index of suspicion for foreign body aspiration, even in the absence of radiographic findings. Early bronchoscopy is crucial for both diagnosis and treatment, and public awareness efforts should focus on preventing choking hazards in young children.

Keywords: Foreign body aspiration, peanut aspiration, pediatric airway obstruction, bronchoscopy, respiratory distress

Introduction

Foreign body aspiration (FBA) is a life-threatening condition and a common cause of emergency admissions among children, particularly those under the age of three. It often occurs when small objects, such as food particles, toys, or household items, are accidentally inhaled into the airway. Among aspirated food particles, peanuts are a frequently reported culprit due to their small size, irregular shape, and tendency to fragment, leading to partial or complete airway obstruction. Early diagnosis and timely intervention are crucial, as delayed management can result in severe complications such as respiratory failure, pneumonia, or even death. Clinical suspicion is essential, as radiological findings may not always confirm the presence of a foreign body. Bronchoscopy remains the gold standard for diagnosis and removal. This case report

highlights the challenges in diagnosing FBA in children and emphasizes the importance of early intervention to prevent complications.

Case history

An 18-month-old baby girl was admitted to the emergency treatment unit with difficulty in breathing for four hours. The symptoms started suddenly. She had no fever, no cold, and no past history of wheezing. Upon further questioning, it was revealed that the child had consumed peanuts 30 minutes before symptom onset. She then abruptly developed a vigorous cough. However, she did not develop cyanosis, seizures, or apneic episodes. The mother did not administer any first aid measures or induce vomiting. The child was immediately taken to a divisional hospital and later transferred to a teaching hospital.

On arrival, tachypnea was noted, with a significantly high respiratory rate. Paradoxical breathing was observed. Air entry on the left side was significantly reduced, but no added sounds were noted. Oxygen saturation was measured at 84% on room air. She was also tachycardic, but her blood pressure remained within the normal range. The rest of the abdominal and neurological examinations were normal.

Initially, the child was kept undisturbed on her mother's lap. Supplemental oxygen was administered via a facemask at 8L/min. Nebulization with adrenaline was given, and a single dose of intravenous dexamethasone was administered. A chest X-ray was ordered, which showed no pneumothorax, no hyperinflated chest, no evidence of consolidation, and no solid evidence of a radiopaque foreign body. Arterial blood gas analysis revealed respiratory acidosis. Blood count and inflammatory markers were within normal limits.

An otolaryngology consultation was obtained. Due to a strong suspicion of a foreign body, the child was taken for emergency bronchoscopy under anesthesia. Both the ENT and anesthetic teams were summoned. Bronchoscopy revealed a partial obstruction on the right side and a complete obstruction on the left side due to peanut particles, which were successfully removed. The child was monitored in the intensive care unit for seven hours. The next day, she was transferred to the ward with an uneventful recovery. Ultimately, she was discharged in full recovery.



Discussion

Foreign body aspiration is a significant cause of respiratory distress in children, with serious morbidity and mortality risks if not promptly diagnosed and treated. The peak incidence occurs in children aged 2–4 years, given their tendency for oral exploration and immature swallowing coordination. Peanuts are among the most

commonly aspirated food particles, particularly in Western populations, and are well-documented as a cause of pediatric airway obstruction.

The index patient presented with classic symptoms of aspiration, including sudden-onset cough, respiratory distress, and asymmetric air entry. While obstructive emphysema is the most common radiographic finding, normal chest X-rays do not rule out foreign body aspiration, as seen in up to 31% of cases⁶. Given the high index of suspicion, bronchoscopy remains the gold standard for diagnosis and management, effectively identifying and removing the obstructing foreign body.

Prompt intervention is crucial, as delayed removal can lead to complications such as pneumonia, bronchiectasis, or even fatal airway obstruction. In this case, early bronchoscopy successfully removed bilateral peanut fragments, leading to a complete recovery. This emphasizes the importance of early recognition and a multidisciplinary approach involving pediatricians, anesthetists, and otolaryngologists for optimal patient outcomes.

Conclusion

Foreign body aspiration remains a critical pediatric emergency requiring early recognition and prompt management to prevent serious complications. This case highlights the importance of maintaining a high index of suspicion, even in the absence of radiographic evidence, as normal chest X-rays do not rule out airway obstruction. Clinicians should consider foreign body aspiration in any child presenting with sudden-onset respiratory distress, particularly following a choking episode. In this case, timely intervention led to the successful removal of bilateral airway obstructions and a full recovery, reinforcing the importance of early diagnosis and coordinated emergency care.

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Case Report

A Rare Giant Sliding Indirect Inguinoscrotal Hernia Involving Ileum to Transverse Colon

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Abstract:

Giant inguinoscrotal hernias are rare and complex, often associated with significant surgical challenges. We report a 62-year-old man with a large right-sided sliding inguinoscrotal hernia extending to the mid-thigh, containing ileum, caecum, appendix, ascending and transverse colon, and omentum. The hernia was managed electively through an inguinal approach with careful adhesiolysis and Lichtenstein tension-free mesh repair. Postoperative recovery was uneventful under ERAS protocols, with no respiratory compromise or complications. This case highlights the importance of meticulous surgical technique, appropriate operative planning, and adherence to enhanced recovery principles in managing complex giant sliding hernias.

Keywords: Giant Sliding Hernia, Enhanced Recovery After Surgery (ERAS), Lichtenstein tension-free mesh onlay repair

Introduction

A giant inguinoscrotal hernia is defined as an inguinal hernia that extends below the midpoint of the inner thigh when the patient is standing, or one with an anteroposterior diameter of ≥ 30 cm or a transverse diameter of about 50 cm, remaining non-reducible for over 10 years [1]. This rare entity can involve intraperitoneal, retroperitoneal and pelvic organs constituting part of the sac wall, often complicating surgical repair due to anatomical distortion [2]. If long-standing, it may lead to serious complications such as loss of domain, where reintegration of herniated contents is hindered by insufficient intra-abdominal space, along with an increased risk of postoperative respiratory compromise, abdominal compartment syndrome, and significant intraoperative surgical challenges [1]. This report describes a rare case of a giant sliding inguinal hernia containing the ileum, caecum, ascending colon, transverse colon, appendix, and greater omentum, and highlights the surgical management guided by current best practices and enhanced recovery protocols.

Case Presentation

A 62-year-old previously healthy male manual labourer presented with a three-year history of a progressively enlarging swelling in the right inguinoscrotal region

extending up to mid-thigh. This was also accompanied by intermittent episodes of pain and discomfort, which had begun to significantly restrict his daily activities and quality of life.

Physical examination revealed a large, non-reducible right inguinoscrotal hernia (Figure 1A). There was evidence of incarceration, but no signs of obstruction or strangulation were seen at the time of evaluation; the rest of the systemic examination was unremarkable. An ultrasound scan of the region showed a hernial sac containing small and large bowel loops, appendix and omentum with no features of obstruction or strangulation. The basic laboratory parameters at presentation were normal. We decided for potential surgical intervention to alleviate the patient's discomfort and restore normal function. After a thorough explanation of potential risks, including bowel resection, respiratory compromise, and orchidectomy, the patient provided informed consent for the surgical intervention.

Preoperative chest physiotherapy was commenced. An elective inguinal approach surgery was attempted with the possibility of needing a midline laparotomy if it fails. An indirect sliding hernia containing the ileum, caecum, appendix, ascending colon, transverse colon, and greater omentum was encountered (Figure 2A,2B). Careful adhesiolysis, partial omentectomy, and meticulous haemostasis facilitated safe reduction of contents into the abdominal cavity. The sac was transfixed, the

posterior wall repaired, and a Lichtenstein tension-free mesh onlay repair was done in a tension-free manner. An orchidectomy was not needed during the surgery. An intraperitoneal closed drain and an extraperitoneal suction drain to the surgical site were inserted, and layers were closed routinely (Figure 1B).

Postoperatively, the patient was managed at the highly dependent unit in the ward, as intensive care treatment was not needed. Enhanced Recovery After Surgery (ERAS) protocols were implemented, including early mobilisation, multimodal analgesia per WHO guidelines, and respiratory physiotherapy [3]. There was no respiratory compromise or signs of abdominal compartment syndrome during the recovery. The drains were removed on the third post-operative day, and the patient was discharged without complications on day 10, with instructions to avoid strenuous manual activity for three months. Follow-up after two weeks and 3 months demonstrated excellent recovery without complications. A routine follow-up was arranged every 3-6 months for monitoring the recurrence and future complications.



Figure 1: Preoperative and postoperative images, A: right side giant inguinal hernia extending up to mid-thigh; B: Postoperative site with intra-abdominal and subcutaneous drain in situ.

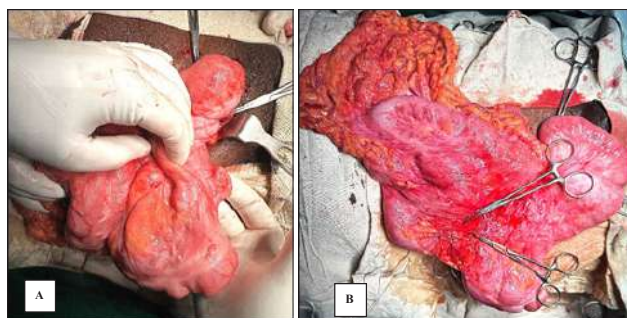


Figure 2: Intraoperative findings, A: Appendix, ileo-caecal junction; and B: Ascending colon, transverse colon with greater omentum.

Discussion

This case illustrates a rare and complex presentation of a sliding hernia with extensive visceral involvement, in which segments of the gastrointestinal tract formed an abnormal association with the hernial sac. Giant inguinal hernias are best repaired electively once diagnosed, as emergency presentations carry a higher risk of complications. Compared with simple inguinal hernias, they are more likely to present as emergencies and cause considerable discomfort in daily life [4].

Surgical management may involve a midline abdominal approach, an inguinal approach, or a combination of both, selected based on the size of the hernial sac, its contents, adhesions, and the surgeon's preference. The goal is meticulous repair to minimise the risk of bowel injury and preserve cord structures. When reduction of contents is difficult, primary bowel resection with anastomosis is a viable option, though the risks of anastomotic leakage and mesh infection must be considered [1].

In our case, the hernial sac was successfully reduced without bowel resection, and dissection was completed without injury to the cord structures. If the testicular blood supply is compromised or post-dissection orchitis occurs, orchidectomy remains an accepted management option.

We performed a standard tension-free mesh repair, the current gold standard, which minimises recurrence (<1%) and postoperative complications. A notable potential postoperative risk is respiratory compromise due to the loss of the domain effect, where reintegration of the hernial contents into the abdominal cavity impairs diaphragmatic movement. Preventive measures described in the literature include preoperative chest physiotherapy and progressive preoperative pneumoperitoneum. However, pneumoperitoneum may enlarge the hernial sac further, aggravate symptoms, and prolong hospitalisation. Abdominal compartment syndrome can be managed by increasing intra-abdominal space through reconstructive procedures (e.g., component separation) or resection of excess bowel [5]. The latter, however, carries the aforementioned risks. Our patient developed none of the above complications. Scrotal skin reduction following surgery is a cosmetic concern in this surgery, which has different approaches according to the literature. Early reconstruction helps prevent haematocoele/seroma and provides a better cosmetic outcome, while preserving excess scrotal skin in non-surgical management can serve as a temporary reservoir for visceral contents in cases of early hernia recurrence or when postoperative respiratory compromise necessitates decompression [1]. We opted for the latter approach, with late reconstruction of the scrotal skin planned.

We adhered to ERAS protocols, which promote faster recovery, shorten hospital stay, and improve overall outcomes [3]. Postoperatively, avoiding heavy manual work is advised, in line with established guidelines, to minimise the risk of recurrence and complications

Conclusion

This rare giant sliding indirect inguinoscrotal hernia case underscores the importance of careful preoperative planning, meticulous surgical technique, and strict adherence to ERAS protocols to achieve optimal outcomes and minimise complications.

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Case Report

Spontaneous Cervical Esophageal Tear due to Hyperemesis Gravidarum

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Abstract:

Spontaneous esophageal rupture is a rare, potentially life-threatening emergency, typically triggered by forceful vomiting. Its occurrence during early pregnancy is extremely uncommon and requires high clinical suspicion due to overlapping symptoms with benign pregnancy-related conditions.

A 19-year-old primigravida at 10 weeks and 3 days of amenorrhea presented with sudden onset chest tightness and shortness of breath following two days of persistent vomiting. Clinical examination revealed subcutaneous emphysema in the neck, and epigastric tenderness. CECT scan with oral contrast confirmed a small cervical esophageal tear with significant pneumomediastinum. Upper GI endoscopy showed severe gastroesophageal erosion but no visible perforation.

An endoscopy-guided nasogastric tube was inserted, and she was kept nil by mouth. Fetal wellbeing was monitored throughout the hospital stay. The patient showed clinical improvement and was discharged on day seven in stable condition.

This case highlights the importance of early recognition of esophageal rupture in pregnant patients presenting with atypical chest symptoms and vomiting. Conservative management can be successful in selected cases with favorable anatomy and clinical stability. Multidisciplinary care is critical to optimizing maternal and fetal outcomes.

Keywords: Esophageal rupture, Hyperemesis gravidarum, Early pregnancy, Pneumomediastinum, Conservative management

Introduction

Hyperemesis gravidarum is a severe form of nausea and vomiting in pregnancy that can lead to dehydration, weight loss, and electrolyte imbalance. It typically begins in the first trimester and may persist throughout pregnancy, often requiring hospital-based interventions such as intravenous fluids or antiemetic therapy. The condition affects approximately 0.3–3.6% of pregnant women, and is a leading cause of early pregnancy hospital admission (1).

Spontaneous esophageal rupture, also known as Boerhaave syndrome, is a rare and life-threatening emergency resulting from a sudden rise in intraesophageal pressure, usually following forceful emesis (2). While this condition has been well described in middle-aged males and

individuals with excessive alcohol use, it is exceedingly rare in pregnancy (3, 4).

Early diagnosis is crucial, as delays can lead to severe complications such as mediastinitis, sepsis, or death (3). However, its presentation can be subtle and mimic benign symptoms of pregnancy, such as vomiting and chest discomfort. This case report presents a rare instance of a cervical esophageal tear in a young primigravida, successfully managed without surgery.

Case Presentation

A 19-year-old married primigravida at 10 weeks and 3 days of amenorrhea presented to the Divisional Hospital with a sudden onset of shortness of breath and central chest tightness, which began in the evening. The

symptoms were acute and progressively worsening. She was hemodynamically stable on arrival and was initially managed in the resuscitation unit of the emergency department. The patient reported experiencing persistent nausea and vomiting over the past two days, along with orthopnea. However, there was no bleeding per vaginum, abdominal pain, fever, palpitations, cough, or leg swelling. There was no history suggestive of gastrointestinal disorders, and no prior episodes of similar complaints. Notably, a dating scan had not been performed before this presentation. This is her first pregnancy, and apart from the recent symptoms, her antenatal period had been uneventful. She had no significant past medical or surgical history and no known family history of cardiovascular or thromboembolic diseases.

Due to the concerning nature of her symptoms and at the patient's preference, she was transferred to the Teaching Hospital Batticaloa for further evaluation and definitive management.

She was initially managed in the resuscitation unit of the emergency department. On admission, she appeared ill-looking and mildly dehydrated. Vital signs revealed tachycardia (HR 116 bpm), BP 116/80 mmHg, and SpO₂ 96% on room air. Subcutaneous emphysema was evident over the chest and neck. Lung auscultation revealed bilateral crepitations and air entry was equal on both sides. Epigastric tenderness was noted without signs of peritonism.

The patient was initially admitted and managed in the medical ward for 12 hours to evaluate potential medical causes for her shortness of breath, such as cardiac, pulmonary, metabolic, or infectious etiologies. During this time, she was given supplemental oxygen and intravenous fluid resuscitation using alternating 0.9% NaCl and Hartmann's solution. Intravenous thiamine (1 vial/day) was administered.

Point-of-care ultrasound confirmed a single live intrauterine fetus. ECG was within normal limits. CRP was mildly elevated (13 mg/dL), and serum electrolytes were normal.

Due to the presence of subcutaneous emphysema and persistent respiratory symptoms, a surgical referral was made to exclude pneumothorax and other thoracic causes. Following the surgical referral, a chest X-ray (posteroanterior view, with abdominal shielding and patient informed consent) was obtained, which showed subcutaneous emphysema and retropharyngeal free gas, raising suspicion of an esophageal perforation.

Broad-spectrum antibiotics were initiated to prevent mediastinitis. Antiemetics and proton pump inhibitors were given.

Subsequently, a contrast-enhanced CT (CECT) scan of the neck and chest with oral contrast confirmed a small cervical esophageal tear with significant pneumomediastinum.

The patient was transferred to the surgical ward for further monitoring. Upper GI endoscopy showed severe gastroesophageal erosions without a visible perforation. An endoscopy-guided nasogastric tube was inserted, and she was kept nil by mouth.

By day two, the patient's symptoms, including shortness of breath and vomiting resolved. On day four, she was clinically well and started on a liquid diet. By day six, she tolerated a semisolid diet, and her vital signs remained stable. Fetal viability and development were monitored and confirmed normal by the gynecology team.

On day seven, she was transferred to the gynecology ward for further anaemia treatment, where she resumed a regular diet and received intravenous iron therapy. She was discharged in stable condition with oral antibiotics, antiemetics, antihistamines and hematinics, and was scheduled for follow-up with surgical and obstetric teams.



Figure 1: Axial contrast-enhanced CT of the neck showing subcutaneous emphysema and a focal air pocket adjacent to the posterior cervical esophagus, with evidence of oral contrast leak—findings consistent with a cervical esophageal perforation.

Discussion

Esophageal rupture is a rare clinical entity with high mortality if not diagnosed and treated early (5). In pregnant patients, the diagnostic challenge is amplified by the overlapping symptomatology with common pregnancy-related conditions such as uncomplicated hyperemesis gravidarum (3). Subcutaneous emphysema was a key clinical clue in this case.

While spontaneous rupture most commonly affects the distal thoracic esophagus, cervical tears may occur in

isolated cases of vomiting-related pressure changes. Imaging plays a critical role in diagnosis (2). Chest X-rays, when performed with appropriate fetal shielding, are safe and essential in life-threatening conditions during pregnancy (2). Contrast-enhanced CT with oral contrast remains the gold standard for diagnosing and localizing esophageal perforation (5).

Management depends on the location, size, containment, and clinical status. In this case, conservative treatment was selected due to the cervical location, early presentation, and absence of systemic sepsis. Nutritional support, antibiotics, and gastric acid suppression were pivotal to recovery. Endoscopy-guided nasogastric tube placement allowed controlled enteral feeding, and iron deficiency anemia was addressed with intra venous iron supplementation (4).

This case emphasizes the importance of a multidisciplinary approach, involving surgeons, obstetricians and internal medicine teams. The patient's favorable outcome reinforces the viability of conservative management in select cases of esophageal rupture.

Conclusion

This case illustrates that cervical esophageal rupture, though rare, should be considered in pregnant patients presenting with chest symptoms following severe vomiting. Conservative management can be successful in appropriately selected cases. Prompt diagnosis, safe imaging, and multidisciplinary care are critical to ensuring favorable maternal and fetal outcomes.

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Case Report

Tuberculous Vasculitis Mimicking Takayasu arteritis: A Case of Fever of Unknown Origin with Bilateral Carotid Bruit

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Introduction

Vasculitis refers to inflammation of blood vessels, and may arise from autoimmune or infectious causes. In tuberculosis-endemic countries, infectious etiologies must be considered in patients presenting with features suggestive of systemic vasculitis.

Takayasu arteritis (TA) is a large vessel vasculitis of unknown etiology affecting the aorta and its major branches. Tuberculous arteritis, caused by *Mycobacterium tuberculosis*, can closely mimic TA both clinically and radiologically (1). Furthermore, tuberculosis (TB) has been proposed as a possible trigger for TA.

We report a case of tuberculous vasculitis presenting as fever of unknown origin with bilateral carotid bruit, an uncommon clinical presentation.

Case Presentation

An 18-year-old previously healthy female presented with a 20-day history of intermittent fever associated with chills and rigors. She also reported loss of appetite and intermittent joint pains without morning stiffness. There was no history of weight loss, night sweats, hemoptysis, limb claudication, syncope, or neck pain.

She had no significant past medical or surgical history and no known contact with tuberculosis.

On examination, her body mass index was 20.13 kg/m². She was febrile and her pulse rate was 88/min. All peripheral pulses were palpable and no delay was noted. Her blood pressure was 110/70 mmHg and there was no inter-arm difference. Examination of her neck revealed bilateral carotid bruits but no other murmurs. Other systemic examinations were unremarkable.

Investigations

Laboratory investigations demonstrated moderate anemia (hemoglobin 10 g/dL) with elevated inflammatory markers (CRP 66 mg/L, ESR 73 mm/hr). Renal and liver function tests were within normal limits.

Autoimmune screening showed a weakly positive ANA (1:80, nuclear pattern), while the extractable nuclear antigen panel was negative. Infectious workup including blood cultures and sputum studies for tuberculosis were negative.

Chest radiograph was normal. High-resolution computed tomography revealed mediastinal lymphadenopathy with normal lung parenchyma. Carotid Doppler demonstrated bilateral common carotid artery wall thickening without luminal compromise. CT aortogram showed a normal aorta with mediastinal and iliac lymphadenopathy. Mantoux test was strongly positive (20 mm).



Figure 1 Contrast CT angiogram.

The thoracic aorta and its branches were normal with mediastinal lymphadenopathy.

Video-assisted thoracoscopic surgery (VATS) with mediastinal lymph node biopsy revealed caseating granulomatous lymphadenitis. GeneXpert confirmed *Mycobacterium tuberculosis* without rifampicin resistance.

Management

The patient was initially treated with empirical antibiotics due to persistent fever and elevated inflammatory markers but showed no clinical response.

Given the presence of bilateral carotid bruit and arterial wall thickening, Takayasu arteritis was initially suspected. However, further evaluation, including imaging and histopathology, confirmed tuberculosis.

She was commenced on standard anti-tuberculosis therapy (ATT).

Outcome and Follow-up

Following initiation of ATT, the patient showed significant clinical improvement with complete resolution of fever and improvement in appetite. She remains under regular follow-up to monitor treatment response and adverse effects. Screening of close contacts was negative for tuberculosis.

Discussion

Tuberculosis is a well-recognized mimic of systemic vasculitis, particularly in endemic regions such as Sri Lanka. Differentiating tuberculous arteritis from Takayasu arteritis is challenging due to overlapping clinical and radiological features (1).

Large vessel involvement in tuberculosis is rare but has been reported in major branches of the aorta, including the carotid arteries (4). The underlying mechanism may involve direct extension from adjacent infected lymph nodes or hematogenous dissemination.

In this case, the presence of mediastinal lymphadenopathy and histological confirmation of caseating granulomas were crucial in establishing the diagnosis.

Importantly, misdiagnosis as primary vasculitis and initiation of immunosuppressive therapy may lead to dissemination of tuberculosis and adverse outcomes.

Therefore, tuberculosis should be carefully excluded in all suspected cases of vasculitis in endemic areas (3).

Conclusion

Tuberculosis should be considered in the differential diagnosis of systemic vasculitis in endemic regions. Tissue diagnosis is essential in atypical presentations, and exclusion of tuberculosis is crucial before initiating immunosuppressive therapy.

Consent for Publication

Written informed consent was obtained from the patient.

Conflicts of Interest

None declared.

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Case Report

Ileal Perforation Following Blunt Trauma to an Undiagnosed Inguinal Hernia

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Introduction

Inguinal hernias are a globally prevalent condition, carrying a lifetime risk of 27% in men and 3% in women [1]. The majority of cases are repaired electively before the onset of complications such as obstruction, incarceration, or strangulation. However, blunt trauma to the inguinal region resulting in bowel perforation in the hernia sac is a very rare presentation. We report a case of ileal perforation within the hernia sac secondary to blunt trauma.

Case description

A 75-year-old female presented with lower abdominal pain following an accidental fall on the ground. On examination she was hemodynamically stable with lower abdominal tenderness, but no guarding, rigidity, or palpable inguinal swellings. Focused Assessment with Sonography for Trauma (FAST) scan was reported negative.

Over the next 48-72 hours, she developed progressive abdominal distention, generalized abdominal pain and oliguria with a urine output of <0.5 ml/kg/h. She developed tachycardia, 108 beats per minute, with a blood pressure of 110/70 mmHg. Her platelets dropped to 47 x10⁹ /L, which suggested of possible sepsis-associated coagulopathy, necessitating a transfusion of 6 units of platelets. Given the clinical deterioration, a contrast-enhanced computed tomography (CECT) of the abdomen and pelvis was performed which revealed obstructed left sided inguinal hernia with no evidence of strangulation.

An immediate exploration of the left side inguinal hernia was performed which revealed an obstructed hernia sac containing a ruptured distal ileal loop and a localized abscess (Figure 1). The procedure was converted to an exploratory midline laparotomy, which discovered moderate fecal contamination of the pelvis (Figure 2) but no perforations elsewhere. The ileal perforation of 1.5 cm

was repaired with 3/0 polyglactin sutures, and hernia was repaired primarily with 2/0 polypropylene sutures without mesh.

Postoperatively, she received broad-spectrum antibiotics and resumed a semi-solid oral diet by day six. A superficial surgical site infection on day twelve was managed conservatively.



Figure 1. Perforation of Ileum



Figure 2. Moderate fecal contamination

Discussion

Bowel perforation secondary to blunt trauma to a hernia is a very rare clinical entity. The first case of small bowel rupture in a hernia due to blunt abdominal trauma was reported in 1814 by Antonio Scarpa. [2]. Our case is unique by the fact that the inguinal hernia was not clinically apparent at presentation. The subsequent delayed manifestation of perforation signs serves as a crucial reminder that a high index of suspicion must be maintained in these cases.

Several theories have been proposed to describe the mechanism that causes bowel rupture within a hernia sac. Blunt trauma can cause a sudden increase in intra-abdominal pressure, which subsequently elevates intraluminal pressure within the intestinal loops. In a normal intact bowel, the pressure will be transmitted equally throughout the intestine without causing any damage. But in an inguinal hernia, a higher pressure gradient is created due to the confined space. It can reach even up to 300mmHg, when only 150-260 mmHg pressure threshold is required to cause bowel rupture[2]. Also, the shearing force applied between the fixed herniated bowel loop and its mesentery may lead to stretching and subsequent tearing of the intestinal wall. The pathological changes of the herniated bowel loop, such as inflammation and edema, may further weaken the wall, making it more susceptible to rupture even with a minor trauma [3].

In our case, the diagnosis of bowel rupture was delayed due to the fact that the initial FAST scan was negative and the patient presented solely with lower abdominal pain. Studies show that the initial FAST scan may be false-negative in cases of bowel injury, warranting repeated FAST scans after 12 to 24 hours following blunt abdominal trauma [4]. After 48-72 hours, the patient developed signs of peritonitis and sepsis, including generalized abdominal pain and early hemodynamic instability. The progressive abdominal distention indicated an intestinal obstruction. The localized abscess likely contained the fecal contamination, delaying its dissemination into the peritoneal cavity.

The identification of an intestinal rupture within a hernia mandates an immediate exploratory laparotomy to

assess any other sites of rupture and to perform thorough peritoneal lavage. Although the gold standard treatment for inguinal hernia is mesh repair, the presence of fecal contamination and peritonitis carries a high risk of mesh infection[5]. Therefore, tissue repair without mesh was performed in our case. Despite administering broad spectrum antibiotics and adequate source control, the patient developed a superficial surgical site infection. Given the degree of peritoneal contamination, this was an anticipated postoperative complication and was managed conservatively.

Conclusion

This case study highlights that blunt trauma to an inguinal hernia can result in a rare but life-threatening complication of intestinal rupture that may need immediate surgical interventions. Maintaining a high degree of suspicion and repeated utilization of ultrasound imaging and CECT, is crucial for early recognition of such injuries.

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Review Article

Determinants of Effective Clinical Education

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Abstract:

Clinical teaching and learning are essential components of undergraduate medical education, enabling students to develop clinical knowledge, skills, and professional behaviours. This narrative review aimed to examine the factors influencing clinical teaching and learning in undergraduate medical education programmes. A literature search was conducted in PubMed using the keywords “Undergraduate Medical Education”, “Students’ Learning Environment”, “Factors Affecting Teaching and Learning”, and “Impact of Clinical Teaching/Learning”. Fifteen articles published between 2003 and 2024 met the inclusion criteria and were critically reviewed. The findings revealed that clinical learning is influenced by five key domains: teachers, students, the learning environment, organisational factors, and curriculum. Effective supervision, feedback, and role modelling by teachers enhanced learning, while student motivation and engagement contributed positively to educational outcomes. Supportive clinical environments, adequate organisational resources, and the curriculum's structure further facilitated learning. Addressing these interconnected factors is essential to improving the quality and effectiveness of clinical education in undergraduate medical programmes.

Keywords: Clinical teaching, Curriculum, Learning environment, Medical students, Organisational factors, Undergraduate medical education;

Introduction

Clinical teaching/learning is an important educational aspect of the medical programme. Clinical clerkships provide opportunities to integrate theoretical knowledge into practice. At the bedside, students develop compelling learning experiences, critical thinking, and professional attitudes in healthcare facilities. Early exposure to clinical education enables students to better relate to the clinical and basic sciences, providing them with an in-depth understanding of the curriculum (Ewnte & Yigzaw, 2023). Clinical settings are complex and dynamic, requiring learners to acquire not only clinical knowledge and skills but also professional attitudes, communication abilities, and clinical reasoning competencies.

Clinical teaching involves learning skills such as communication and patient assessment, where experiential learning enhances the confidence and competency of healthcare professionals (Peyton, 1998). Furthermore, clinical teaching/learning provides students with

opportunities to learn how to communicate effectively with patients and to understand their sociocultural beliefs, which may influence treatment. Students learn ethical principles, empathy, and professionalism by observing their teachers as role models in the clinical environment. Efficient clinical teaching and professional conduct enhance students’ attitudes towards caring for patients and teamwork (Irby, 1995).

Methodology

The objective of this study was to examine the factors influencing clinical teaching and learning in undergraduate medical education programmes. A narrative literature review was conducted using the PubMed database. Relevant articles were identified through a search strategy incorporating the keywords: “Undergraduate Medical Education”, “Students’ Learning Environment”, “Factors Affecting Teaching and Learning”, and “Impact of Clinical Teaching and Learning”.

Results

A narrative review identified 15 articles published between 2003 and 2024 that were relevant to the study. The selected literature comprised a range of study designs, providing a comprehensive understanding of factors influencing clinical teaching and learning in undergraduate medical education. Among these articles, 11 were observational studies, three were review articles, and one was a policy document. The review identified five key themes influencing clinical teaching and learning: teacher factors, student factors, the learning environment, organisational factors, and curriculum factors.

The teacher's clinical experience and skills significantly improve the quality of clinical teaching. Teachers' knowledge and their ability to practice evidence-based approaches are more effective in training students to improve their critical thinking (Irby, 2014). Furthermore, the time a teacher can spend teaching medical students will have an impact on students' learning, with the responsibility of patient care in a busy clinical environment, most clinical teachers have limited time to teach medical students (Ramani & Leinster, 2008). Students have varied abilities and different learning styles. Learning styles are important in medical education. When students are motivated, their academic performance improves, helping them achieve their goals. Furthermore, a teacher must plan and implement educational activities tailored to students' learning styles and academic motivation to encourage effective classroom participation (Gayef et al., 2023). It has been shown that many students are accustomed to passive learning within hierarchical systems in clinical settings, which can limit their ability to participate actively in discussions (Spencer, 2003). A study found that medical students' perceptions of their learning experience, interactions with faculty, and academic support have declined over the years (Alblooshi et al., 2024).

Medical students' well-being is a crucial factor in achieving better learning outcomes. Many medical schools in the USA have introduced undergraduate medical education (UME) well-being programmes in recent years, as medical students are experiencing high levels of distress. The study found that depression and suicidal ideation were prevalent in the medical undergraduate students (Lawrence et al., 2024). Another aspect we need to consider is the student's financial status. Research indicates that students' socioeconomic status influences their academic performance. A study on socioeconomic disparities and their impact on medical students' academic attainment found that family monthly income and age were significantly associated with academic achievement. It further states that aspects such as parental education, especially mothers' education, influence students' attitudes towards learning (Jabar et al., 2024).

A good learning environment is essential for both teaching and learning. A learning environment is one in which students feel safe and supported by others, enabling them to achieve their goals. Clinical learning takes place in various settings, including hospitals, outpatient clinics, inpatient facilities, and community settings. Each learning environment has its challenges. A study on learning environments among undergraduate medical students found that experiencing a supportive, positive learning environment significantly impacts their academic performance and well-being (Shahzad & Wajid, 2024). Students face several challenges during clinical learning, including physical space constraints, language barriers, rotation schedules, and workplace engagement (Adnan et al., 2024). The workplace culture and teamwork among professionals also influence the learning environment. Team dynamics can enhance students' integration into the learning environment, whereas negative staff attitudes may discourage their participation, which can impact learning (Seabrook, 2004). Notably, difficulties such as staff shortages and limited resources further limit opportunities for effective teaching (WHO, 2013). Previous studies show that assessing the learning environment is essential for any medical school to evaluate its programme and implement necessary reforms.

Organisational factors include published clerkship schedules, logbooks, and handbooks which guide student learning. Having defined outcomes, assessment models, and schedules helps students learn effectively. The institution should have regular faculty development programmes to enhance teachers' capacity (Shahzad, 2024). There have been studies about the curriculum that state the structure of the curriculum is a crucial aspect in determining the outcome of a programme. Many medical educators recommend vertical integration, integrating the basic sciences into the clinical sciences throughout the medical programme, as the dominant approach to the medical education curriculum. Vertical integration extends far beyond the structure of the curriculum, influencing students' understanding of subjects, helping them engage in the learning process, and facilitating lifelong learning in professional practice (Wijnen-Meijer et al., 2020).

Another study outlines the steps of curriculum integration in medical education, which involves integrating disciplines and gradually progressing toward a knowledge-skills-based approach. Ultimately, the study highlights how students can assume responsibility for patient care, a key goal of becoming a healthcare professional (Youm et al., 2024). A study conducted at a Sri Lankan university following the implementation of a student-centred and integrated curriculum found that students reported the integrated curriculum was encouraging and that learning in the pre-clinical years was more relevant to their future practice (Ellawala & Marasinghe, 2021). The effectiveness

of clinical teaching depends on support from teachers, students, and the organisation, including curriculum design, as well as a positive learning environment that promotes and motivates well-being, critical thinking, and lifelong learning.

Conclusion

A complex interaction between teachers, students, organization, environment, and curriculum-related factors influences clinical teaching and learning. Although clinical teachers are expected to facilitate learning through supervision, feedback, and role modelling, increasing clinical workloads and service commitments often restrict the time available for teaching. Similarly, students are not passive recipients of knowledge; their motivation, preparedness, confidence, and willingness to engage actively in clinical activities significantly affect learning outcomes. Organisational factors also play a critical role in determining the effectiveness of clinical education. Curriculum design, number of staff, institutional policies, and administrative support influence the availability and quality of learning opportunities. In many healthcare settings, patient care responsibilities are prioritised over educational activities, resulting in reduced teaching time and fewer opportunities for direct observation and feedback. Therefore, clinical learning should be viewed as a multidimensional process shaped by the interaction of individual, environmental, and organisational factors. Improvements in clinical education require not only motivated teachers and learners but also supportive learning environments and institutional structures that actively promote and value teaching and learning.

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Short Communication

The Tragedy of a Slipped Cystic Artery Clip

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Abstract:

A teenage girl underwent elective laparoscopic cholecystectomy for symptomatic gallstones. Despite an uneventful surgery, she developed sudden postoperative collapse due to massive intraperitoneal haemorrhage. Emergency laparotomy revealed a slipped clip on the cystic artery stump. Despite intensive surgical and critical care interventions, the patient succumbed to irreversible multi-organ failure. This case underscores the fatal potential of a rare complication, clip slippage, and highlights the importance of vigilant postoperative monitoring and early recognition of subtle signs of internal bleeding.

Keywords: Laparoscopic cholecystectomy, postoperative haemorrhage, slipped clip, cystic artery, surgical complication

Laparoscopic cholecystectomy is a routine and safe procedure; however, rare complications such as cystic artery clip slippage can result in fatal outcomes.

A previously healthy teenage girl in late adolescence was admitted to a tertiary hospital in Sri Lanka with symptomatic gallstones. After a short period of conservative management for biliary colic, she was scheduled for elective laparoscopic cholecystectomy. Preoperative evaluation, WHO surgical safety checklist, and consent procedures were completed. The risks of intraoperative bleeding, bile leakage, and postoperative complications were explained to the patient and her father.

Under general anaesthesia administered by a Consultant Anaesthetist-led team, laparoscopic cholecystectomy was performed by a Gastroenterological Surgeon-led team using a standard four-port technique. The procedure lasted approximately 105 minutes. The Calot's triangle was clearly dissected, and both the cystic duct and artery were securely clipped and divided. There were no intraoperative complications, no anatomical anomalies noted, and the surgical field was dry at the end of the procedure. The patient remained stable throughout the operation.

In the recovery room, she was alert and oriented but exhibited subtle signs suggestive of internal bleeding: low-normal blood pressure (~95/60 mmHg), tachycardia

(~105 bpm), equivocal capillary refill, and mild pallor. These findings were identified and documented by the anaesthesia team, with appropriate monitoring and communication to the relevant consultant. She was transferred to the surgical ward with both written and verbal handover.

Between 11:00 am and 12:45 pm, ward observations did not reveal alarming parameters. However, at 12:55 pm, the patient suffered sudden cardiovascular collapse. The resuscitation team successfully achieved return of spontaneous circulation after 10 minutes. An urgent decision was made for emergency re-exploration, and emergency laparotomy revealed approximately 2.5 litres of blood and active arterial bleeding from the cystic artery stump due to a slipped surgical clip. The artery was ligated and re-clipped.

Despite aggressive fluid resuscitation, massive transfusions and intensive care support, the patient remained haemodynamically unstable with refractory shock, metabolic acidosis, coagulopathy, and early multi-organ dysfunction. Recombinant Factor VII and continuous renal replacement therapy (CRRT) were initiated.

On postoperative Day 1, she underwent bedside laparotomy for abdominal compartment syndrome.

During surgical closure, she suffered a refractory cardiac arrest and was declared dead at 10:45 am. Death was communicated to the family with transparency. Legal proceedings were followed despite requests from family to avoid post-mortem. An inquest and post-mortem confirmed cause of death as massive haemoperitoneum secondary to cystic artery clip slippage.

Laparoscopic cholecystectomy is widely accepted as the gold standard for managing symptomatic gallstone disease. Although considered safe, it is not devoid of life-threatening complications. Postoperative haemorrhage due to clip slippage from the cystic artery stump is rare but potentially fatal. Vascular injuries during or after laparoscopic cholecystectomy occur in approximately 0.1–1% of cases, with cystic artery-related bleeding being one of the major contributors [1].

In this case, the patient displayed subtle but significant signs of early haemodynamic compromise during recovery, tachycardia, borderline hypotension, and mild pallor, which could have reflected internal bleeding. The delayed recognition in this case was partly due to normal vital parameters on the ward, which masked ongoing bleeding. Studies stress the importance of correlating objective data with clinical signs. Young patients, especially adolescents, may maintain stable vital signs despite substantial blood loss until abrupt decompensation occurs [4]. This physiological compensation often delays recognition and intervention, worsening outcomes.

Clip slippage may result from technical errors, such as improper placement, inadequate clip engagement, or use of clips on inflamed, thickened, or retracted vessels. Other contributing factors include mechanical tension on the vessel, postoperative pressure changes, or thermal injury from adjacent energy devices that weaken the vessel wall or adjacent tissue [2,3]. Double clipping or the use of energy-sealing devices (e.g., harmonic scalpel, LigaSure) has been recommended in situations where clip security is questionable [2].

In this case, the diagnosis was swiftly followed by surgical re-intervention. Emergency laparotomy allowed rapid control of the bleeding source. Despite timely and appropriate surgical haemostasis and intensive resuscitative efforts, the patient progressed to a state of irreversible haemodynamic shock, abdominal compartment syndrome and multi-organ dysfunction. She developed the “lethal triad” of coagulopathy, acidosis, and hypothermia, a cascade often observed in exsanguinating patients [5].

The use of recombinant activated Factor VII (rFVIIa) has shown benefit in managing uncontrolled bleeding in trauma and surgical settings. However, its success depends heavily on timing of use and correcting acidosis, hypothermia, and ongoing coagulopathy, conditions that were already advanced in this case [5].

While vascular complications such as intraoperative bleeding and postoperative haemorrhage have been reported in Sri Lankan series of laparoscopic cholecystectomy, specific documentation of cystic artery clip slippage as a cause of fatal haemorrhage has not been previously published to our knowledge. This case therefore adds unique clinical and academic value to local literature, highlighting the catastrophic potential of a known yet rare postoperative complication. It underscores the need for vigilant postoperative monitoring, high clinical suspicion for internal bleeding, and prompt multidisciplinary escalation in even seemingly stable patients.

This case highlights a rare but fatal complication of laparoscopic cholecystectomy, cystic artery clip slippage, not previously reported in Sri Lankan literature. It underscores the critical importance of early recognition of subtle postoperative deterioration and the need for robust postoperative monitoring and prompt multidisciplinary intervention to improve outcomes.

Ethical Concerns

Identifying information has been fully anonymized.

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Quiz Answers

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Quiz - 1 Answer

Hereditary Haemorrhagic Telangiectasia (Osler–Weber–Rendu Syndrome)

Hereditary haemorrhagic telangiectasia (HHT), also known as Osler–Weber–Rendu syndrome, is a rare autosomal dominant vascular disorder characterised by mucocutaneous telangiectasias and visceral arteriovenous malformations. The condition most commonly results from pathogenic variants in the ENG, ACVRL1, or SMAD4 genes, leading to abnormal vascular development.

The diagnosis is primarily clinical and is based on the Curaçao criteria, which include:

1. Spontaneous and recurrent epistaxis.
2. Multiple mucocutaneous telangiectasias at characteristic sites (lips, oral cavity, tongue, fingers, palms, and nasal mucosa).
3. Visceral lesions such as gastrointestinal telangiectasias or arteriovenous malformations involving the lungs, liver, brain, or spinal cord.
4. A first-degree relative with HHT.

A diagnosis is considered:

- Definite HHT: Three or more criteria present.
- Possible HHT: Two criteria present.
- Unlikely HHT: Fewer than two criteria present.

This patient fulfilled three Curaçao criteria: recurrent epistaxis, characteristic mucocutaneous telangiectasias, and gastrointestinal telangiectasias, making the diagnosis of HHT highly likely.

Chronic blood loss due to recurrent epistaxis and gastrointestinal bleeding is a common cause of iron deficiency anaemia in patients with HHT, explaining the patient's severe microcytic anaemia.

Learning Points

- Recurrent epistaxis is the most common and often the earliest manifestation of HHT.
- Telangiectasias involving the tongue, oral mucosa, palms, fingertips, and nasal mucosa are important diagnostic clues.
- Gastrointestinal telangiectasias may cause occult or overt bleeding, leading to iron deficiency anaemia.
- Patients diagnosed with HHT should be screened for pulmonary, cerebral, and hepatic arteriovenous malformations.
- Early diagnosis allows appropriate surveillance and prevention of potentially life-threatening complications.

Quiz - 2 Answer

A neurogenic bowel due to a tethered spinal cord, associated with spina bifida occulta.

Tethered cord is a developmental anomaly where the spinal cord is attached to the vertebra or other surrounding tissue, restricting its movement. It may also occur as an acquired condition secondary to inflammatory or infiltrative processes. It can present in many ways like, lower back ache, bladder and bowel dysfunction or weakness of lower limbs, and usually presents during adolescence or adulthood, when the spinal cord is pulled.

Spina bifida occulta is a form of spinal cord dysraphism which occurs during development and there is an incomplete closure of the spinal column. It may be associated with abnormalities of the spinal cord such as tethering. Usually, it is an incidental finding and does not need further evaluation; however, when spina bifida is seen in an X-ray, an examination of the back for telltale signs of spinal cord anomaly like a hairy tuft, a lipoma or naevus should be looked for, and a thorough neurological examination and inquiry into bowel and bladder continence is warranted.

The spectrum of spinal cord dysraphism includes, spina bifida occulta, meningocele and meningomyelocele.



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