



Optimizing Patient Flow by Minimizing the Patients' Movements in the Accident and Emergency Unit : A Case Study from Teaching Hospital Batticaloa

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Abstract

Background: Unnecessary patient movement within healthcare settings can lead to delays, inefficiencies, and dissatisfaction, particularly in high-pressure areas like Accident and Emergency (A&E) Units. At Teaching Hospital Batticaloa—the only tertiary care teaching hospital in Sri Lanka's Eastern Province—a significant delay in patient registration, Patient Health Number (PHN) issuance, and visitor's pass processing was observed due to the physical separation of administrative counters from treatment areas.

Objective: To streamline the patient admission process in Accident and Emergency Unit in Teaching Hospital Batticaloa.

Methods: A mixed-methods evaluation was conducted using time-motion studies, patient movement mapping, staff interviews and review of HHIMS data to assess the impact of the intervention.

Intervention: The hospital decentralized the registration process, PHN issuance, and visitor's pass processing by assigning responsibilities to on-site Medical Officers and Nursing Officers in the Resuscitation Unit, Treatment Unit, and Booked Admission Counter. Laptops, printers, and desktop systems were provided at Doctors and Nursing stations to enable point-of-care documentation. **Results:** Patient movement was reduced by over 70%, and admission processing time decreased from an average of 50 – 60 minutes to 10 – 12 minutes of category 3 and 4 patients. Staff reported improved efficiency and ownership of tasks, while patients and bystanders experienced higher satisfaction due to reduced physical burden and delays.

Conclusion: This low-cost, context-sensitive intervention demonstrates how Kaizen principles can be effectively applied in resource-limited settings to streamline workflow, enhance patient experience, and optimize healthcare delivery in emergency settings.

Background

The concept of Kaizen, originating from Japan, emphasizes continuous, incremental improvements in processes with the involvement of all staff members. In healthcare settings, Kaizen encourages reducing waste, enhancing workflow efficiency, and ultimately improving patient care. One of the key wastes identified in Lean and Kaizen approaches is unnecessary movement—whether of patients, staff, or materials—which can lead to delays, confusion, and reduced satisfaction (1,2).

In the context of emergency care, minimizing patient movement is essential not only for improving service delivery but also for ensuring timely clinical interventions. Excessive or uncoordinated movement within Accident and Emergency (A&E) Units can result in duplication of efforts, delayed treatment, and patient discomfort. Applying the Kaizen principle to streamline patient flow can significantly enhance

the operational efficiency of emergency care services (3).

Teaching Hospital Batticaloa (THB) stands as the only tertiary-level Teaching Hospital in the Eastern Province of Sri Lanka, offering a comprehensive range of specialties and sub-specialties. The hospital plays a crucial role in delivering advanced healthcare services to a large and diverse population. The fully equipped Accident and Emergency Unit, established in 2016, was a major milestone in strengthening emergency medical services in the region. Furthermore, the implementation of the Hospital Health Information Management System (HHIMS) in 2022 was aimed at digitizing and optimizing administrative and clinical processes (4).

Despite these advancements, the A&E Unit continues to face operational challenges, particularly during the patient admission process. Delays in patient registration, the generation of

Patient Health Numbers, and the issuance of Visitor's Passes often result in increased waiting times and unnecessary patient movement between counters and service points. These inefficiencies not only burden the staff but also compromise the quality and timeliness of patient care (5,6).

Therefore, this case study aims to streamline the patient admission process in Accident and Emergency Unit in the Teaching Hospital Batticaloa – particularly registration, issuance of the Patient Health Number (PHN), and visitor's pass – to minimize unnecessary movements between physically distant counters and clinical units. By identifying bottlenecks and implementing small yet impactful process changes, the hospital can move closer to achieving a more patient-centered and streamlined emergency care service (7).

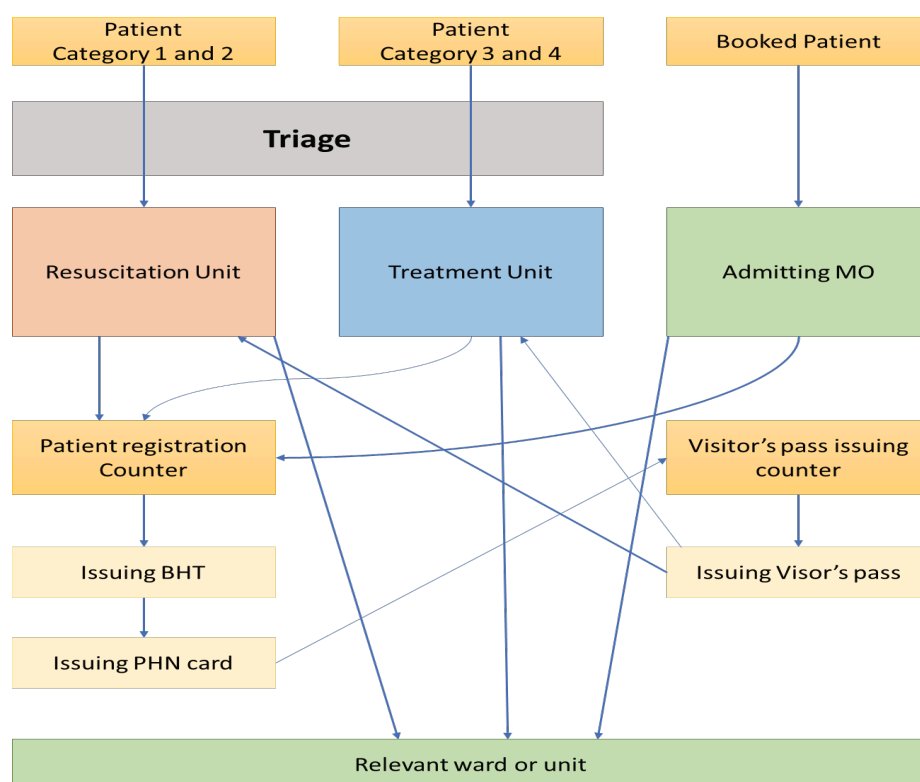


Figure 1: Process mapping of patients' admission in A & E.

Based on the provided flow diagram, the patient admission pathway in the Accident and Emergency (A&E) Unit at Teaching Hospital Batticaloa, with a focus on increased patient movements related to registration, Patient Health Number (PHN) issuance, and visitor's pass, which were done in different counters by Health Assistants (8).

Upon arrival at the A&E Unit, patients are categorized by Triage based on urgency. Category 1 and 2 patients (emergency and urgent) are directed to the Resuscitation Unit (RU), and Category 3 and 4 patients (semi-urgent and non-urgent) are sent to the Treatment Unit (TU). Booked patients (already scheduled for admission or follow-up) are managed by the Admitting Medical Officer (MO) (8).

However, irrespective of the patient category, the following essential administrative processes are required before admission.

- Patient Registration and BHT printing: Patients must go to the Patient Registration Counter, which is physically located away from both RU and TU. This requires either the patient or a bystander to move between units.
- Issuance of Patient Health Number (PHN): After registration, the patient proceeds to another point for obtaining the PHN card. This adds another layer of movement, particularly inconvenient for critical patients or their attendants.
- Visitor's Pass Issuance: Patients or relatives must then navigate to the Visitor's Pass Issuing Counter. This is also located away from the primary treatment areas, further increasing foot traffic.

Once the visitor's pass is issued, they return to the RU or TU. Multiple back-and-forth movements were observed between units that are geographically separated, causing Delays in admission and treatment initiation, confusion among patients, especially elderly or those with limited mobility, overcrowding in transitional spaces like corridors and additional workload for healthcare providers who must often guide patients or complete processes manually.

Description of the intervention

To address the increased movement of patients and their bystanders within the Accident and Emergency (A&E) Unit at Teaching Hospital Batticaloa, a targeted intervention was implemented, guided by the principles of the Kaizen approach.

1. Decentralization of Patient Registration and BHT Printing

Previously, all patients were required to visit a central registration counter, irrespective of their triage category. This process was time-consuming and inefficient, particularly for critically ill patients in the Resuscitation Unit and others requiring urgent care in the Treatment Unit.

Intervention: Designated Medical Officers (MOs) in the Resuscitation Unit, Treatment Unit, and Booked Admission Counter were assigned responsibility for directly handling patient registration and BHT (Bed Head Ticket) printing at the point of care. Laptops with Wi-Fi connectivity and WiFi printers were provided to these MOs, enabling them to perform registrations and print BHTs without referring patients to the central counter.

2. On-Site Issuance of Patient Health Number (PHN)

The previous system required patients or their attendants to visit another counter for PHN issuance, resulting in additional movement.

Intervention: PHN cards are now issued directly at the Nursing Stations of both the Resuscitation and Treatment Units. Nursing Officers at these units were trained and equipped with desktop computers and printers, allowing real-time generation of PHN cards immediately after triage and initial assessment.

3. Streamlined Visitor's Pass Issuance

The issuance of visitor's passes was also centralized earlier, further contributing to inefficiency and congestion.

Intervention: The same Nursing Officers who issue PHNs at the Resuscitation and Treatment Units are now responsible for issuing visitor's passes. For booked admissions, the existing Health Assistant continues to manage PHN and visitor's pass issuance from the designated counter, which is located near to admitting Medical Officer.

This decentralization model enhances coordination between clinical and administrative functions, reduces waiting times, and significantly minimizes the need for patient or bystander movement within the A&E Unit. Furthermore, it ensures the timely initiation of care and improves the overall patient experience while optimizing staff efficiency.

Methods used for the evaluation

To assess the effectiveness of the intervention aimed at reducing patient movement within the Accident and Emergency (A&E) Unit of Teaching Hospital Batticaloa, a combination of qualitative and quantitative evaluation methods was employed. The following approaches were used.

1. Time-Motion Study

A before-and-after time-motion analysis was conducted to measure the average time taken for patient registration, PHN issuance and visitor's pass processing.

Data was collected for 30 randomly selected patients before and after the intervention to compare efficiency improvements.

2. Patient Movement Mapping

A flow mapping exercise was used to track the physical movement of patients and their bystanders from the triage point to final admission in the relevant ward or unit. This was done through direct observation and pathway analysis, identifying the number of movement steps required before and after implementation.

Table 1: Implemented interventions to reduce the patients' movement

Interventions	Responsible person	Place	Remarks
Patient Registration and BHT printing	Medical Officer	Resuscitation Unit	Providing laptops for
		Treatment Unit	doctors with Wi-Fi
		Booked admission counter	printer
Issuance of Patient Health Number (PHN)	Nursing Officer	Resuscitation Unit	Providing desktops
		Treatment Unit	and printers on their Nursing stations.
Visitor's Pass Issuance:	Health Assistant	For booked admissions	Using the existing counter for issuance of PHN and visitor's pass

3. Staff feedback and Key Informant Interviews
Semi-structured interviews were conducted with Medical Officers, Nursing Officers, and Health Assistants. These interviews explored perceptions of the intervention's feasibility, ease of implementation, and impact on their workflow and patient care.

This mixed-methods evaluation provided a comprehensive understanding of how the intervention influenced operational efficiency and staff performance, allowing for informed conclusions and future recommendations.

Results

The implementation of the decentralized registration and documentation process in the Accident and Emergency (A&E) Unit of Teaching Hospital Batticaloa yielded significant improvements in operational efficiency and staff workload. The results observed within the first few weeks of implementation are as follows.

1. Reduction in Patient Movement.

Patient and bystander movement between the Resuscitation Unit, Treatment Unit, and centralized administrative counters was reduced by over 70%. Critically ill patients no longer needed to be moved or accompanied by attendants for registration or documentation processes.

2. Decrease in admission processing time.

The average time for completing registration, BHT printing, and PHN issuance was reduced from 50 – 60 minutes to 10 – 12 minutes per patient. This significantly accelerated the time to admission and initiation of clinical care, particularly for emergency cases.

3. Improved staff efficiency and Satisfaction.

Medical Officers and Nursing Officers reported greater control over patient documentation and smoother handover between administrative and clinical responsibilities. Reduced dependence on clerical staff and centralized counters minimized delays during peak hours and night shifts.

Overall, the intervention demonstrated that simple, low-cost adjustments grounded in the Kaizen principle can result in measurable improvements in healthcare delivery, particularly in high-pressure settings like emergency units. This model holds promise for replication in other departments or hospitals facing similar workflow challenges.

Lessons learnt

The implementation of a decentralized approach to patient registration, PHN issuance, and visitor's pass processing in the A&E Unit at Teaching Hospital Batticaloa offered several important lessons that can inform future quality improvement initiatives in similar settings.

1. Simple process changes can create a big impact.

Even without structural changes or additional manpower, reorganizing existing processes and utilizing available human resources and technology can lead to significant improvements. The Kaizen principle of making small, continuous changes proved highly effective in reducing inefficiencies.

2. Decentralization enhances Efficiency and Responsiveness.

Bringing administrative services such as registration and documentation closer to the point of care empowered frontline staff and eliminated unnecessary movement. This greatly improved the speed and quality of patient admissions and initial treatment.

3. Multidisciplinary involvement is critical.

The success of the intervention was largely due to active involvement and collaboration among Medical Officers, Nursing Officers, and Health Assistants. Engaging all stakeholders early in the planning process helped ensure practical, sustainable solutions.

4. Technology can be a strong enabler.

Strategic use of laptops, desktop computers, and printers supported the effective rollout of the intervention. Ensuring reliable connectivity and access to HHIMS played a key role in integrating clinical and administrative workflows.

5. Staff empowerment leads to ownership.

Providing staff with the tools and autonomy to manage registration and documentation at their own units increased their sense of responsibility and job satisfaction. This helped improve compliance and sustained the intervention with minimal supervision.

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