Implementation of the Interagency Integrated Triage Tool (IITT) in a Rural Emergency Department: A Qualitative Study in Western Nepal

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ABSTRACT

BACKGROUND: Triage, the process of organizing and prioritizing patient interventions, is a fundamental aspect of emergency departments. This study focuses on the implementation of the recently developed triage tool for resource-limited settings – the Interagency Integrated Triage Tool (IITT) at the Bayalpata Hospital (BH) Emergency Department located in rural Nepal.

METHODS: The study involved training healthcare workers and implementing the IITT. Pre- and post-implementation surveys of these healthcare workers were completed. Patient surveys gauged satisfaction and wait times.

RESULTS: Pre-implementation surveys revealed limited prior training, subjective triage methods, and identified barriers to appropriate triage. Post-implementation surveys showed improved staff comfort and understanding of triage and demonstrated a shift in reported barriers.

CONCLUSIONS: The study highlights the challenges faced by a low-resource rural emergency department. The IITT implementation addressed staff concerns, particularly regarding training, but ongoing education and addressing spatial limitations were persisting barriers.

KEYWORDS: Triage, Training, Education, Resource-limited, Rural

INTRODUCTION

Emergency care plays a vital role in the health system, acutely saving lives and serving as a major entry point for healthcare services.[1,2,3] An essential task of any emergency department is its ability to organize and determine urgency of intervention among its patients, known as triage. This process has been tailored to different settings and demographics since the first recordings in the 18th century.[4] Appropriate triage has been known to save lives during normal emergency care operations, as well as during disasters like mass casualty incidents.[3,5] Appropriate triage can help to ensure that proper care is delivered without delay and has been proven to make vast differences in patient outcomes.[6] Unfortunately, this practice is often not well defined and implemented in more rural areas, where limited staff and large patient volumes can become overwhelming.[7,8]

Though various triage systems have existed over the years, in 2019, the Interagency Integrated Triage Tool (IITT) was developed by the World Health Organization (WHO), International Committee of the Red Cross (ICRC), and Médecins Sans Frontières (MSF) to be applied in more rural and resource-limited settings.[9,10,11] The IITT is a straightforward and easy to follow tool that was designed for ease of use by healthcare workers with any level of training. It allows a uniform language across agencies to be utilized in the setting of disaster response, which can occur in this region. This tool aims to standardize triage using the common practice of color-coded categories while considering any high-risk vital signs.[12] This acuity-based triage serves as a guide to prioritizing patients based on the three-color system: red for high-acuity patients that should be seen immediately, yellow for moderate-acuity patients needing to be seen soon, and green for low-acuity patients that can wait.[13] The tool is also divided by age, with a separate list of criteria for those <12 years of age (pediatric).[13] The validation of this tool was performed by Mitchel et al and can be found in their publications.[12,14] However, few studies have evaluated the methods of training and implementation of this tool in rural settings.

Nepal is a small land-locked country in South Asia, with nearly 80% of its people living in rural areas.[15] Standardized emergency care is in its infant stage in the country, and currently focused in its urban centers in Kathmandu.[16] Bayalpata Hospital (BH) is a rural hospital that provides free integrated healthcare to nearly 100,000 people every year, and lies in the remote district of Achham in far-western Nepal.[17] BH Emergency Department (BHED) is staffed with mid-level providers (health assistants who are practitioners with three years of training by the Nepali government), medical officers (medical graduates without specialty training), nurses and an on-call orthopedic surgeon. This hospital provides emergency care to all ages, 24 hours a day, with 12 beds. The BHED cares for approximately 8,000 patients every year, with a high burden of traumatic injuries. Though BHED has been present since 2013, no triage model/system has been created there. Staff reported a loosely understood and non-standardized color-coding system for triage purposes. Building on this familiarity with color-coded triaging and in order to provide a straightforward and intuitive standardized triaging

tool, the IITT was selected for implementation at the BHED. Additionally, this tool also serves as a solid foundation for initial triage training, with scalability for expanded use as needed. Given the risk of earthquakes and other disasters in the region, staff had expressed a specific need for training in mass casualty and disaster response. Considering IITT was developed with this in mind, it aligned well with this need.

This study describes the implementation process of the IITT at BHED, and presents findings from a qualitative analysis of the implementation process. This work serves as part of a larger effort to improve emergency and trauma care delivery at Bayalpata Hospital and in the Achham district of rural Nepal.

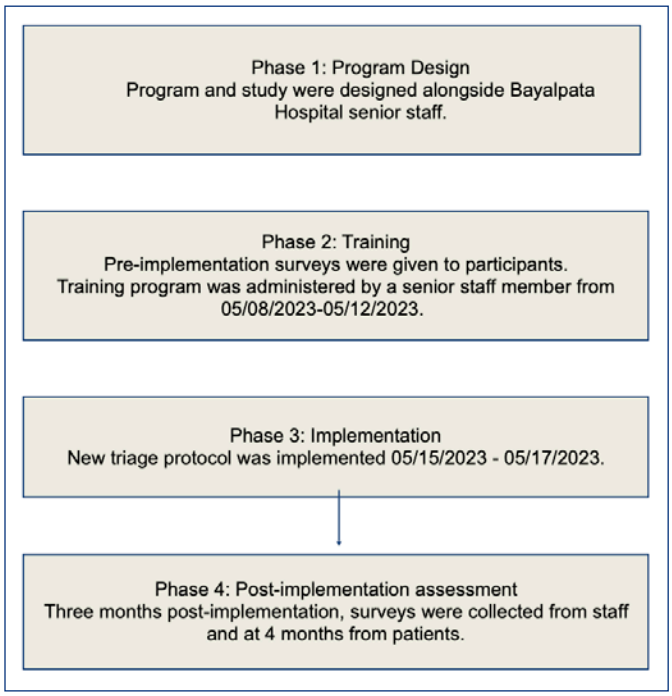
METHODS

Setting, Design and Participants Selection

The implementation of the IITT at BHED was done on May 8th, 2023. The follow-up assessments concluded by October 2nd, 2023. Participants for triage tool training were selected with convenience sampling in conjunction with BH leadership, and included healthcare providers who normally staff the BHED (described above). In total, six medical officers, 14 health assistants (HA), 11 certified medical assistants (CMA), and one orthopedic surgeon rotate through the emergency department. Twenty-five participants were identified and encouraged to participate in the training program. Of that, approximately 20 participants who were available and actively working in the hospital underwent five, live, separate, one-hour training sessions specific to the triage tool. The tool was instituted the following week, and the implementation was directly supervised by the primary course instructor (AN) and other hospital leadership for the entire period of one week. Three months after the implementation and integration was completed, participants who underwent the training were approached by BH research personnel to participate in a qualitative assessment to evaluate the process of implementation. Any BHED staff not participating in the initial training sessions were excluded for the qualitative analysis. Verbal consent was obtained from the participants. Three months after the implementation, patients that received medical care in the emergency department were approached by BH research personnel at random times of the day to conduct a survey to gather their experience. No patient identifier information was collected and only anonymous feedback was sought. (**Figure 1**)

The IITT was implemented as a part of larger effort at Bayalpata Hospital to improve trauma and emergency care in collaboration with Brown Emergency Medicine of Brown University (BEM). This tool was implemented and tailored to this setting in conjunction with hospital leadership and staff. This process resulted in adding an additional vital sign of blood pressure to the high-risk vital signs, provided an additional pathway to allow certain "green"-labeled patients to be deferred to the outpatient department (OPD) next door if appropriate, and other workflow modifications discussed below.

Figure 1. Implementation Schematic

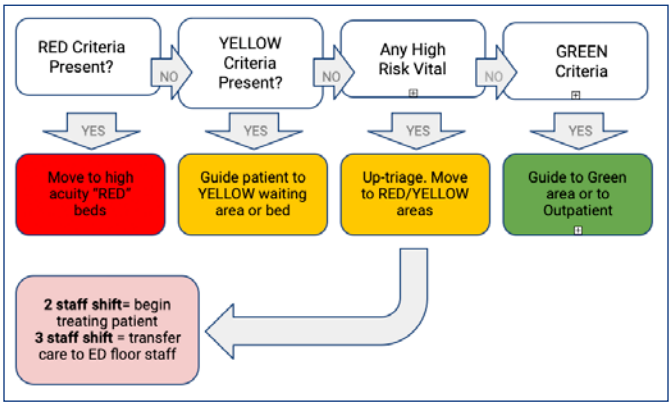


Assessment

Prior to the training program for IITT, emergency department staff members completed pre-training surveys assessing their comfort and understanding of the triage process. Surveys included both open-ended questions and Likert scales. The pre-implementation surveys sought to address the following: (1) comfort of triaging process, (2) existence and understanding of the current triaging protocols, (3) the need for more training, (4) current barriers that exist when triaging patients.

Participants were then asked to attend five, one-hour training sessions. These sessions took place during the staff's pre-existing morning lecture hour and were conducted by a senior physician of the hospital, who is part of this study team. Sessions were developed by the study team using various resources, literature review, and online teaching materials. A PowerPoint presentation form of MSF's Tembo – a free, online-learning platform – IITT course was adapted to the group learning setting. Participants were given lectures and also asked to work in small groups to solidify their knowledge. If unable to attend in-person sessions, they were given the option to complete the training course online. On the final day of the training session, the new triage strategy and protocols were explained and scenario examples were conducted. The following week, the new protocols were implemented.

Figure 2. Integrated Interagency Triage Tool Flow for Bayalpata Hospital



In the week of implementation, posters and laminated cards of the triage criteria and model were created to ensure easy reference to criteria. (**Figure 2**) A new triage desk was installed at the front of the department with the necessary tools: blood pressure cuff, pulse oximeter, etc. This new workflow also assigned responsibilities for triage based on the number of available staff in the emergency department. A designated triage staff member would direct patients to areas of the emergency department based on the color of triage criteria they were given. Their paperwork was also placed on a corresponding green/yellow/red clipboard. During the week of implementation and integration, hospital leadership and/or members of this study team were available to guide the trained health workers.

At three months post-implementation and training, an online survey was used to reassess the emergency department staff. Post-implementation trainee surveys sought to address: (1) comfort and understanding of triage after training, (2) evaluation of training methods, (3) evaluation of new triage protocols, (4) areas for improvement and barriers to triage.

At four months post-implementation, anonymous patient surveys were also collected by BH research personnel to gauge patient satisfaction with wait times and their experience in the triage.

Timeline, Data and Ethics

No patient-identifying information was collected in this study. All staff participant identifying information was de-identified during the analysis period. All data was stored in a password- protected computer on a secure Excel file, with only direct access to the study team. All paper forms were inputted by BH research personnel into the secure Excel, and paper forms were secured safely at BH. This study was deemed exempt from IRB by the local IRB guidelines. The project was supported by BH and no external fundings was obtained.

RESULTS

Pre-implementation: Staff

Surveys from staff prior to training and implementation were collected from a total of 14 emergency department staff – one medical officer (MO), four health assistants (HA), five certified medical assistants (CMA), and four participants who did not disclose their title. Surveys were only given to CMA, HA and medical officers of the emergency department; therefore, those that did not disclose their title are one of the above staff members. These surveys were evaluated utilizing thematic analysis. Responses were reviewed and analyzed for common themes and patterns. Additionally, non-parametric testing was utilized to interpret Likert-scale responses.

Initial surveys collected prior to training revealed that staff agreed on the importance and value of triage in the ED, with nine participants explaining its role in quality patient care and saving lives. One responder stated that triage is important to "identify and prioritize patients according to their condition and provide necessary management faster." The remaining five did not provide a response.

Only three of 14 staff had reported prior training on triaging patients. Nine of the 14 participants reported using their own subjective methods of triaging patients into red/yellow/green categories, stating that red referred to a critical patient and green indicated a stable patient. All staff (14/14) responded that more training in triage as well as a standardized protocol was needed. All staff (14/14) also reported that it was the health assistants or CMA responsibility to perform triage. When asked (open-ended) what were the biggest problems they faced with triage, the most common responses were "lack of training" and "lack of staff" with one responder stating, "we have no proper idea of triage." (**Table 1**) Managing crowds and a lack of beds/waiting area were also reported. Twelve participants reported that additional training in triage would help address the barriers they reported, while three identified that a designated triage area would be beneficial.

Table 1. Staff Reported Barriers – Pre- and Post-Implementation

Barriers Reported	Pre-Implementation	Post-Implementation
Crowd Control	3	2
Limited Staff	5	0
Lack of Training	12	1
Limited Space	3	4

Post-Implementation: Staff

Three months after implementation, eight emergency department staff volunteered to complete surveys – four medical officers, two health assistants, one CMA, one auxiliary health worker (AHW). Of these eight staff members, two were excluded as they did not participate in the initial

training. All six respondents that participated in training reported feeling comfortable utilizing the IITT. Four participants (66%) also agreed that the new triage system improved patient flow, while two participants answered 'neutral'(33%). Five participants (83%) felt the new system improved patient and staff safety and one felt it did not. This same one participant did, however, agree that the new system improved flow and worked well to prioritize urgent patients. Two participants agreed that the length of the provided training was sufficient, while three answered 'neutral' and one disagreed. All six participants answered 'yes' when asked if more training would be beneficial to appropriately triage patients. When asked to identify barriers to appropriate triage, the majority stated a lack of space and difficulty controlling crowds. (**Table 1**)

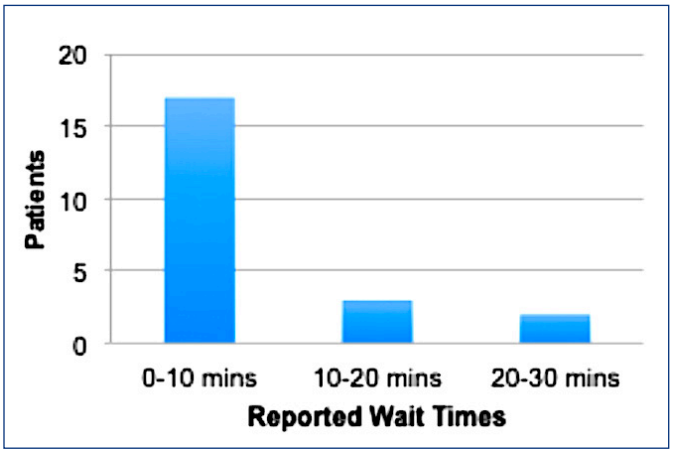
To help improve the triage process, participants made multiple suggestions including triage training for paramedics, "mock and live training in the ED", and space for dividing the ED into different color zones.

Post-implementation: Patients

A total of 22 patients and/or their guardians were surveyed approximately four months after implementation, with a demographic breakdown of 40% female, 60% male, aged 4–72.

Patient surveys showed a wait time before first evaluation (triage) of 0–10 minutes for 17 patients (77%), 10–20 minutes for three patients (14%), and 20-30 minutes for two patients (9%). One hundred percent of participants felt they were evaluated in a timely manner and felt this was appropriate for the severity of their condition. (**Figure 3**)

Figure 3. Patient-reported Wait Times After Triage Implementation at BHED



DISCUSSION

BHED is a low-resource and rural emergency department that faces many unique challenges.

A majority of emergency departments in this remote region of Nepal lack a standardized triage system, and like BHED, do not have ventilatory support or intensive care units.[7] The nearest hospital with this capability is nearly an eight-hour car ride through mountainous terrain. Thus, the establishment of an appropriate and organized triage system at BHED is fundamental.

Through our program we found that, overall, staff had limited prior training in triage and were relying on their own interpretations of a subjective color-coded triaging process. Our initial survey of staff identified barriers that existed in proper triage in this setting. The most commonly reported issue being a lack of training in triage as well as lack of staff, with 85% of respondents citing a lack of training as their biggest obstacle. Our program to provide this training directly addressed this deficiency. Lack of staff, however, is a common problem in rural settings due to a majority of the skilled workforce concentrated in more urban centers.[18,19] To help address the lack of available staff, we created a system of shared responsibilities for triage when staff is limited.

In the post-implementation assessment, it was clear that the IITT training and implementation program addressed staff concerns regarding lack of training in appropriate triage. This program reduced this concern to 12.5% of participants. As for the reported barrier of a lack of staff, while there were no changes in staff numbers during this program, participants no longer reported this as a barrier at the time of post-implementation survey. We attribute this to the system that was developed, taking into account the number of available staff when assigning triage duties. However, the small sample size and make-up of the participants in the post-implementation evaluation also plays a role, which is discussed further in the limitations.

Our methods of using dedicated time for training in a group-learning setting utilizing free online resources (Tembo platform) proved to be a good introduction into the triaging process and tool of IITT. A few participants felt the training would have been more useful if it included more hands-on training and supervision outside of the classroom. Considering staff had limited prior training and experience in appropriate triage, we can appreciate the need for a more multi-modal form of training with closer supervision and feedback from senior staff. Establishing avenues for questions, feedback, and continuing education is a consideration for the future.

Limitations

It is important to note that in the post-implementation evaluation, a higher proportion of participants were medical officers compared to the pre-implementation surveys. The post-implementation surveys were less representative of

the staff members that more often conduct and participate in the triage system (CMA, HA). There may be potential bias in that participants who were more satisfied with the IITT may have been more likely to respond. Additionally, the small sample size may limit the generalizability of the findings. The study's reliance on self-reported data may also introduce bias, as participants may have overestimated or underestimated their knowledge and skills.

Patient surveys prior to implementation would have provided a more complete analysis but were unable to be performed with limited available staff for data collection. In addition, the reported barrier of a lack of space for patient-waiting areas and beds were unable to be addressed. Thus, the plan for physically separating waiting areas by patients of red/yellow/green was ultimately not practical.

CONCLUSION

Introducing the IITT as a triage system for the BHED patient demographic and setting yielded overall positive outcomes in a rural emergency department in western Nepal. The employed methods not only enhanced staff confidence but also positively influenced the perceived level of patient safety. Nevertheless, instilling confidence in novel systems necessitates an investment of time, diverse educational approaches, and ongoing learning initiatives. Future studies can focus on assessing the effectiveness on patient outcomes and for the detection of time-critical illness of such triage models in this setting. BHED has the potential to serve as a model for similar rural emergency departments in the region and elsewhere.

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Disclosures

The authors have no financial conflict of interests to disclose.

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