STUDY PROTOCOL

Evaluating the Facilitators, Barriers, Completeness, and User-Friendliness of the Emergency Department Triage Format in Three Selected Ethiopian Public Hospitals: Study Protocol.

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Abstract

Background: When triage personnel do not follow the triage procedure and do not properly determine the triage level, patient safety is jeopardized. As a result, the involved staff's comprehension of the triage algorithm and its documentation will serve as a foundation for the triage system's proper implementation and functioning.

Objective: The aim of this study will be to assess facilitators, barriers, the magnitude of completeness, and user-friendliness of emergency department triage format in three selected Ethiopian Public Hospitals.

Method: The study design will be a quantitative ,cross-sectional, and programmatic qualitative research, with an estimated sample size of 384 cards. Systematic random sampling and criterion sampling will be applied for quantitative and qualitative parts respectively. Data will be collected using a data collection checklist. Descriptive frequency and distribution analysis of the data will be conducted by using a Statistical Package for Social Sciences (SPSS version 25). The association between relevant characteristics and triage format completeness will be examined using the binary and multinominal logistic regression analysis. To determine the significant factors, P-values of 0.05 and AOR with % CI will be applied. Qualitative data will be analyzed thematically. A focus group discussion with nurses who have used the triage chart before will be held for the qualitative component. Five FGD at the very least, or until saturation is reached.

Discussion: The primary investigator made a concept note on the observed gaps in the triage system, and a team of experts from several institutions with experience in research and publication held a follow-up meeting in addition to sub-team physical meetings and email communication. Finally, after reaching an agreement on objectives and techniques, authors were assigned separate tasks. The grant had been secured from the funder, and the institutional review board issued a permission letter. After analyzing the data, these findings will be shared with the respective facilities and published in a reputable journal.

Work plan and budget: The overall research activities will be performed based on the prepared timetable. A financial expense of 256,900 Birr will be required for the achievement of this project. [*Ethiop. J. Health Dev.* 2024; 38(2): 00-00]

Keywords: Emergency triage, facilitators, barriers, triage completeness

Background

Triage is a system of sorting patients according to their needs when resources are insufficient for all to be treated at the same time; in addition, it is a method of ranking sick or injured people according to their severity. To perform triaging, there is a need to do a brief clinical assessment that determines the clinical urgency, emergency category seated, the sequence in which they receive emergency care is decided, and lifesaving interventions are started. A comprehensive emergency triaging system comprises a visual assessment of the patient situation, taking a brief triage history, and performing a focused physical examination to determine the appropriateness of acuity. It is used as a system to manage the right patient to the right place at the right time for the right reason. Triaging has improved patient outcomes and reduced overcrowding both in developed and low-income countries, where the specialty of emergency medicine is still very young (1-5). Proper and effective triage will improve ED length of stay, help in early detection and treatment of critically ill, and improve ED mortality and morbidity as well as patient satisfaction. Patient disposition from ED is associated with the first early triage using an early warning score. However, triage systems require improvement in interpersonal reliability and performance. This was shown from the systematic review done in 2016 that a higher proportion of patients had low severity of triage score but higher mortality or were critically ill (6-9).

There are different triage scales used in different setups and contextualized based on the health facility (10). They most commonly divide patients into five categories. Representative triage scales with tested validity are the Canadian Triage and Acuity Scales, Emergency Severity Index (USA), Australian Triage Scale, and Manchester Triage Scale (UK) (11). Triage system, specifically and Emergency care, in general, ,in their infancy in comparison to other specialties in most of the world, and emergency health systems are developing throughout Africa, including Ethiopia. Ethiopia is an LMIC African nation that has committed

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to strengthening emergency care systems committing to strengthen the care (12-15).

Triage is one of the relatively older medical practices. It has been there since the 18th century, though its implementation in low-and middle-income countries (LMIC) is limited. Triaging is not only limited to routine health facility emergency service but is also being practiced in the field of disaster as well as military medicine, even though the objective and principle are slightly different (1,2). Different studies showed that knowledge, training about triage, and shortage of staff affect triage decisions by nurses, which leads to poor outcomes for patients in the emergency department (16).

A qualitative study done on triage nurses showed that barriers related to emergency triaging were those with performance, structural, and human resource management (17). The aim of triage should be to prioritize the patients in need of urgent care with increased efficiency, taking into account the health facility's resources and local disease burden (18). Apart from sorting and prioritizing patients in need of urgent care, another purpose of the triage system is to reduce the health professional's variation in order to ensure patient safety. When nurses do not adhere to the triage system and do not correctly document the triage level, Patient safety will be compromised. Apparently, all triage models are designed to prevent these errors (19). Hence, understanding the triage algorithm and its documentation by the involved staff will create a common ground for proper implementation and functioning of the triage system. In a study done at the emergency center of a tertiary teaching hospital in northern Ethiopia, it was found that less than half of the charts had a triage form incorporated, and none of the triage forms were filled compressively. Certain variables of the triage were filled less frequently than others, which may be due to the unfamiliarity of the nurses towards the triage form or a less user friendliness of the triage forms. Lack of training of physicians working in the ED was also mentioned as a barrier to the functioning of the system. The study suggested that the inconveniences of a quality emergency center triage can be addressed via intensive training programs and improved human resource management (16). Up on the assessment of the knowledge and skill of nurses working in Dar es Salaam emergency centers in Tanzania, lack of knowledge was a major factor that affected the accuracy of triage decisions. Lack of basic equipment, proper documentation, and lack of triage policies and guidelines all contributed to an ineffective triage system and delays. Here also certain sections of the triage form showed poor documentation. The authors emphasize that the problem could be overcome through the training of the nurses and the development of triage policies and guidelines that will assist the triaging process (20). Other studies that use different triage systems in ED have also shown similar problems with the implementations of established standards and guidelines as well as education. Hence, the study emphasizes the importance of documenting all

mandatory parameters and staying adherent to the regulated triage systems in order to achieve correct documentation of the triage level. It also suggests that the deficiencies in organization and education should be addressed, and organizational problems could be addressed through continuous monitoring and feedback which will ensure patient safety (19).

As it is the fact that most emergency rooms of LMIC deaths occur within the first 24 hours of presentation, many of these deaths could be prevented if very sick and injured patients were identified and appropriate lifesaving treatment started immediately upon their arrival. This can be ensured by rapid triage for all patients presenting to the hospital in order to determine whether any priority signs are present and provide appropriate emergency treatment (3-6).

The triage-related statistics are important scientific information that should be available for the constant evaluation of emergency services and continuous quality improvement of triage, morbidity, mortality, and reduced ED overcrowding. Currently, there is a paucity of evidence regarding tool completeness, facilitator barrier, and user friendliness of triage format in low and middle-income countries in general and Ethiopian context specifically. This study aimed to assess facilitators, barriers, the magnitude of completeness, and user-friendliness of emergency department triage format in three selected Public Hospitals in Ethiopia. This study could be scientific evidence for the scientific community in general.

Methods and Materials
This section has been narrated jointly for the quantitative section, followed by qualitative sections for better understanding. As this study is aimed;
1. To identify the missing components among the triage format content.
2. To identify factors associated with triage format completeness.
3. To explore the facilitator, barriers, and user-friendliness of the format. Our methods have been designed to achieve these aims.

Study Setting and Period: The data will be collected from October 1/2022 to December 31/2022, in three tertiary public hospitals: Addis Ababa Burn, Emergency, and Trauma (AaBET), Tikur Anbessa Specialized Hospital (TASH), and St. Paul Hospital millennium medical college (SPMMC)-ED. They are teaching and providing tertiary care for more than 40,000 critically sick clients per year in cumulative in their EDs (21-23).

Study design:
A mixed study design will be implemented, for the first and second specific objectives will be designed as a quantitative cross-sectional survey. The remaining third aim will be addressed with a programmatic qualitative research design.

Source population: The source populations for the quantitative and qualitative sections of the study are, respectively, all patient charts in the hospital during the

study period, and all triage officers working in the selected institutions.

Study population:
The study population will be patient's charts served in TASH, AaBET, and SPHMMC-ED and triage personals willing to participate in FGD in the study period.

Eligibility criteria: All charts of ED-served patients during the study period will be reviewed. Patients' charts with no triage paper will be excluded from quantitative sections, and. triage personnell provided consent will be included in FGD, while none willing will be excluded.

Sample size
Since there is no research done in the same setup ,the sample size will be estimated using a single population proportion formula with the assumption of a 50% minimum prevalence of triage format completeness patients and a level of confidence of 95%, with 5 % margin of error. The following assumptions were considered in calculating the sample size. P value is taken as 50% (0.5), and 95% confidence interval, with 5% margin of error tolerated.

$$n = \frac{(Z\alpha/2)^2\, p\, (1-p)}{d^2}$$

Where,
n- Required Sample
z- Standard normal value at 95% CI,, which is 1.96
p- Estimated population proportion, which is 0.5
d- Possible margin of error tolerated, which is 0.05

For the quantitative part, produce a sample of 384 charts, and for the qualitative part, each focus group will have five participants. Until saturation is reached, we will try to have at least two focus groups at each institution, each lasting no more than 60 minutes. We will continue to assemble overall focus groups until we have achieved reasonable data saturation.

Sampling technique
In this study, a systematic random sampling technique will be rigorously implemented across three major institutions: TASH, AaBET, and SPHMMC ED. Over a year, TASH recorded 15,675 patients, AaBET attended to 13,301 patients, and SPHMMC ED handled 11,022 patients. From each institution, a cohort of 128 study participants will be meticulously selected. To achieve this, every 122nd, 103rd, and 86th patient from the Health Management Information System (HMIS) records of TASH, AaBET, and SPHMMC ED, respectively, will be included in the study. A criteria sampling technique will be used for the qualitative section.

Data collection procedures:
For this study, a data abstract checklist will be used, and subsequently, pilot testing will be conducted before the final survey starts. Changes will be made as required to enable a better understanding of the questions and the arrangement of the questions will be looked into to ensure its efficiency. Data will be abstracted by trained research assistants with a minimum of BSC in health-related fields who will take training specifically on this tool. Data will be collected with a chart review.

Teams of two team members will undertake focus group discussion: a facilitator and a note-taker, both trained in conducting focus group discussions with a minimum BSC degree in health-related fields. The interview will begin with the interviewer going through the informed consent procedures. If each participant gives verbal consent for the interview; the interviewer will proceed with the interview. If consent to be interviewed is refused, the declining participant will be asked to leave the focus group. Guides will be developed in English and translated into local languages. One person on the interview team will act as interviewer or facilitator, and the other person will act as note taker. The two-person team enables the interviewer to focus on interviewing without the distraction of taking notes. In addition, the team members debrief at the end of each interview and produce expanded field notes, which enhance the quality of the data. Focus groups will be carried out in private, safe, and secure locations.

Data quality control:
Six data collectors and authors who are experts in emergency nursing, public health, and emergency medicine will be trained by the Primary author to gather data using a data collection tool. All data collectors will receive training before beginning data collecting in order to ensure the quality of the data. It will be cross-checked that the collected data is complete and quality. On-spot corrections will be done immediately. Throughout the data collection period, authors will supervise and monitor, and support will be provided to the data collectors as needed.

At the end of each interview, the two-person interview team will debrief and write expanded field notes. The written field notes will be locked and placed in a secure location. The data collection team will meet daily to debrief, review the expanded field notes, and identify emerging concepts and themes from the interviews. The focus group discussions will be audio-recorded on encrypted devices. The recordings will be downloaded to a password protected computer and reviewed. Any missed information will be added to the field notes, and the recordings will be destroyed. These concepts and themes will be kept track of in a summarizing template.

Data analysis:
Descriptive and analytical analysis will be used. All the statistical analyses will be performed by using a statistical package for social sciences (SPSS version 25). The outcome of interest will be triaging data completeness, and the incomplete group will be non interest group. The association between relevant characteristics and triage format completeness will be examined using the binary and multinominal logistic regression analysis. To determine the significant factors, P-values of 0.05 and AOR with % CI will be applied. Qualitative data will be analyzed thematically.

Ethical considerations;
Letter of ethical clearance will be obtained from St. Paul Hospital Millennium Medical College Institutional Review Board. The study will be conducted in compliance with Ethiopian national and regional regulations and guidelines applicable to research involving human subjects. Prior to study enrolment, all research staff will be trained in the principles of human subjects' protection and management of confidential study materials. Data will not be collected directly from patients. No vulnerable populations will directly participate in the study. Those subjects who will be part of the qualitative interviews will get a verbal consent script. Consent will be informed, and participants will be allowed to refuse participation.

Paper forms used to collect study data will be stored in secure locked cabinets. Data from questionnaires and study materials will be entered into electronic databases. Both paper study forms and electronic database data will have no identifying information.

This study is of minimal risk. There is a risk of loss of confidentiality during the study, including focus group discussions. Every effort will be made to keep study participants' identifying information confidential.

All study forms will be identified with only the study ID. There likely will be no direct benefit for participating in this study. Participants will not be compensated for completing the study.

Information dissemination and utilization plan: Once we analyze these data, we will share the findings with respective facilities and publish them in a reputable journal.

Result: we collected both quantitative and qualitative data and are currently in the analysis stage.

Discussion: After the development of the concept note on the identified gaps, a team of experts from five institutions having immense experience in research and publication made three subsequent virtual meetings in addition to the sub-team physical discussion. Finally, after agreement on objectives and methodology, individual assignments as been set among authors ,forwarded assignments have been reviewed by the senior sub-team, and amendments have been made accordingly.

Declarations
Ethical considerations: St. Paul Hospital Millennium Medical College has approved this study- institutional review committee (SPHMMC-IRB-845-2022). Data of only consenting individuals will be analyzed and communicated. Informed oral consent will be obtained from each study participant. We obtained a waiver of signed consent that the signatures of participants will not be taken. This study poses minimal risk for respondents (discomfort during interviews).
Moreover, a Participant Information Sheet that explains the study objectives, potential benefits and risks, and types of data being collected was prepared to read aloud to all the respondents. Since the participants involved will be more than 18 there is having ascent is not applicable. Each participant will be informed about the objective of the study. Any participant involuntarily participating in the study will not be forced to participate. They will also be informed that all data obtained from them will be kept confidential. Data collectors trained by the principal and/or co-investigators will obtain consent. Permission to conduct this study and a support letter will be obtained from the SPHMMC, AaBET, and TASH. Participants will be approached through indexing cases and local health authorities. Filled questionnaire documents will be kept secured in a locked cupboard and electronically protected device. Participants will give their consent independently and privately for interviews.
Consent of participants for publication is not applicable.

List of abbreviations

AaBET	Addis Ababa Burn Trauma and Emergency
Chem	Chemical
ED	Emergency Department
Fx	Fracture
ICU	Intensive care unit
LMIC	Low-and middle-income countries
Neuro	Neurological
SPHMMC	St. Paul Hospital Millennium Medical College
TASH	Tikur Anbesa Specialized Hospital
V/S	Vital sign

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11. Prof Aklilu Azazh (AA) contributed to study design, and reviewed and revised the proposal and manuscript.

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