**ANNALS OF MEDICINE & SURGERY**

OPEN

# Triage knowledge, perceived skills, and associated factors among nurses working in adult emergency departments of selected public hospitals in Addis-Ababa, Ethiopia, 2023: multicenter cross-sectional study

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**Background:** Triage is an essential function in the emergency department. Knowledge of nurses working in triage has been cited as an influential factor in triage decision-making. As there are increased numbers of clients with life-threatening traumatic injuries and medical patients in the emergency department in Addis-Ababa, triage knowledge and skill are essential competencies required for the nurses working in the emergency department.

**Objective:** To assess nurses' knowledge and perceived skills towards triage and associated factors among nurses working in the adult emergency department of selected public hospitals in Addis-Ababa, Ethiopia, 2023.

**Methods:** A multicentre cross-sectional study design was used. Three hospitals were purposefully selected. A census sampling technique was used to obtain the required sample size. Data was collected by an open data kit (ODK) version 2022.1.2. Then, it was exported to SPSS version 27 for final analysis. Bivariate analysis at a $P$-value of 0.25 and multivariable analysis at a $P$-value of 0.05 were applied. Results were presented using tables, figures, and texts.

**Results:** A total of 384 participants were included in this study. The proportions of poor triage knowledge and perceived poor triage skills among nurses were 58.1 and 50.3%, respectively. Educational level, triage experience, training experience, and the availability of triage equipment were significant predictors of triage knowledge and perceived triage skill, respectively.

**Conclusion and recommendation:** The triage knowledge and skill levels were found to be low. As nurses' knowledge about triage is a key tool in triage decision-making, there is a need to improve nurses' knowledge and skills in triaging at the ED.

**Keywords:** emergency nurse, triage knowledge, triage skill, triage

## Introduction

Twenty-four hours a day, the emergency department (ED) typically offers quick lifesaving therapy for many kinds of emergency conditions. The fluctuating numbers of patients who visit the ED

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### HIGHLIGHTS

- Overall, the majority of the respondents (62%) stated that the equipment essential for triaging activities in the triage room was available in the hospitals.
- The presence of a triage assessment form (95.6%), a triage sheet (95.1%), and pulse oximetry (94.4%) were stated by the nurses as the most available resources in the triage room.
- More than half of the participants (58.1%), with a 95% CI (51–65.3), had poor triage knowledge scores, with a mean score of 7.02 ($\pm$2.025).
- The majority of the respondents (62%) defined triage correctly.
- These nurses with triage working experience of 3 years and below were less likely to have good triage knowledge than nurses with more than 3 years of working experience (AOR = 0.275; 95% CI: 0.137–0.550).

have a variety of diseases, many of which lack a clear diagnosis, urgency, or severity. Priority should be given to treating patients who are experiencing life-threatening situations such as cardiac arrest, airway blockage, and shock as soon as possible to save their lives.

However, by transferring resources intended for patients who require emergency care to others who may have less urgent requirements, the overcrowding of clients coming to EDs might affect the quality of care[1]. Many agree that triage is a crucial step in the ED's efficient system for minimizing wait times and ensuring that each patient receiving care there is given the right care[2].

In emergency care, triage is the procedure of gathering relevant patient data and starting a decision-making process that sorts and ranks the requirements of patients requesting treatment. The ability of a registered nurse to perform the duties of a triage nurse may not be sufficiently assured by a certain quantity of training and experience in emergency care. Registered nurses should complete a triage-specific educational program as well as other pertinent courses and certifications to perform triage with a high degree of accuracy and competence[3].

When a patient arrives at the emergency room for emergency care, the triage nurse is the first person they will see. The knowledge and expertise of triage nurses have influenced decisions in the triage process[2,4]. According to research that looked at emergency rooms, nurses who had no formal training in triage managed about 43.3% of emergency departments in the United States of America[5]. In Australia, 44% of emergency room nurses did not offer unit-based orientation training on triaging, even though the majority of them (89%) considered it to be essential[6]. The early triage and treatment of patients in emergency departments is one of the weakest links in the health systems of underdeveloped nations[7].

According to a survey carried out across Tanzania, more than half (52%) of the nurses included in the study missed assigning patients to the appropriate triage category. Of the respondents, 58%, were unaware of the waiting times for the various patient triage categories[4]. Similarly, more than half of the study subjects in an Indonesian study (58%) had low triage knowledge scores, and the majority (65.4%) thought that the total triage skill was low[8].

The lack of a designated, well-developed emergency center (EC), the lack of human and material resources to care for injured or acutely ill patients, the lack of medical training on principles of triage and emergency management, and the lack of sustenance all contribute to the high burden of noncommunicable diseases and injuries that result from urbanization and way-of-life changes among Addis-Ababa residents[9]. As a result, people who would benefit the most from early intervention are frequently made to wait, and others who do not need immediate treatment may be treated first.

It is vital to evaluate emergency nurses' triage knowledge and skills, as well as related issues, because there is limited study in Addis-Ababa hospitals for nurses in the emergency rooms. Therefore, the purpose of this study was to evaluate the triage knowledge and skills of nurses in the three adult emergency rooms at public hospitals in Addis-Ababa. Evaluating the knowledge and skills of nurses gives insight into the learning needs of the nursing curriculum, on-the-job training, and workshops. In addition, the identification of associated factors helps address the problem by recommending it to the respective body. Furthermore, the findings may serve as baseline data for policymakers and researchers.

## Methods and materials

### Study setting and period

This study was conducted in the adult emergency departments of chosen governmental hospitals in the city of Addis-Ababa, Ethiopia, between 15 March 15 and 15 April 2023. Addis-Ababa has 41 hospitals (13 public and 28 private). Of the 13 governmental hospitals, three public hospitals were specific areas of the study. The hospitals were purposely selected because these are major trauma centers with high patient flow from different corners of the country and other Addis-Ababa hospitals for specialty care. These hospitals are tertiary-level hospitals following a triage system called the five-level emergency triage system (ETS), which was introduced in 2015.

With an organized emergency department and staff, the emergency rooms are labeled red, orange, yellow, and green. This study was registered at www.researchregistry.com with Research Registry UIN: research registry.\…\Desktop\research registry. doc and reported according to strengthening the reporting of cohort studies in surgery (STROCSS) criteria[10].

### Study design

A facility-based multicenter cross-sectional survey was carried out.

### Population

All nurses employed in the adult ED of the three chosen governmental hospitals in the city of Addis-Ababa were the source population, while nurses who were employed in the adult emergency rooms of the three chosen governmental hospitals in the city of Addis-Ababa and who fulfilled the selection criteria were the study population for this study. All nurses who were employed and worked in the adult emergency centers of those three selected public hospitals in Addis-Ababa were included in this study. Whereas these nurses who did not finish their trial period (45 days) were excluded from this study.

### Sample size determination and sampling procedure

To determine the sample size, one population proportion formula was employed. Based on a prior study, it was found that 51.5% of the participants had poor triage knowledge[11] at a 95% confidence level, with a desired degree of precision of 5% ($d = 0.05$). The sample size was 384.

All nurses from the emergency departments of selected public hospitals were taken as study participants. From a total of 13 public hospitals, three were purposely selected because these are major trauma centers with high patient flow from different corners of the country and other Addis-Ababa hospitals for specialty care. These hospitals are tertiary-level hospitals with an organized emergency department and staff. A census sampling technique was used to obtain 384 study participants.

### Data collection instruments and procedures

The emergency department nurses are attending the national integrated emergency medicine training participant manual, and some of them have graduated with an MSc in emergency and critical care nursing and operation of the triage system. Staffing by senior emergency medicine and critical care residents (Doctors) and second-year emergency and critical care MSc students (Nursing) are involved in the triage.

Data was collected using a standardized, self-administered questionnaire. Three BSc nurses' data collectors and one MSc nurse supervisor were recruited. The supervisor assigned and supervised the data collectors. The study's participants were chosen using a census sampling technique. The data were collected using a self-administered tool adapted from a previous study[4,11]. The data collection tool includes sociodemographic information, triage evaluations of knowledge and skill questions, and a checklist to assess the availability of equipment, all of which aid in nursing triage. The sociodemographic and triage knowledge questionnaire consisted of 17 questions. The 37 triage skill questions are divided into three categories: quick assessment, patient classification, and patient distribution. Respondents were given a scale of 1 to 5, with 1 indicating a need for improvement, 2 indicating poor, 3 indicating fair, 4 indicating good, and 5 indicating very good. The overall scores could have ranged from 37 to 185. In addition, the checklist for assessing equipment availability included 13 questions. The data was collected using the ODK version 2022.1.2 software and stored on the Kobo Toolbox server. Finally, nurses who met the selection criteria were asked to complete the questionnaire.

### Operational definitions

Triage knowledge refers to the level of factual and procedural knowledge required for nurses working in emergency centers to perform quick assessment, patient classification, and patient distribution. It included 13 questions.

When the participants scored less than the mean of 7 (54%) of total knowledge questions as poor knowledge, those who scored greater than or equal to the mean of 7 (54%) of total knowledge questions as good knowledge[12].

Triage skill it was determined by the triage skill questionnaire (TSQ), which includes 37 questions; each question has five choices. The probable ranges for the overall score were 1 to 185. When the participants' scores were less than the mean of 149 (80.5%) of total skill questions as poor perceived skill, while those who scored greater than or equal to the mean of 149 (80.5%) of total skill questions as good perceived skill[12].

Training experience refers to the number of hours and types of previous training in triage and related topics in the past 3 years[12].

Work experience in the ED refers to the number of months in which the nurses work in the ED. The longer months of working experience reflect the higher level of experience[12].

Triage experience refers to the total number of months nurses work in a triage room.

### Data quality assurance

The data collectors, as well as the supervisor, had 2 days of training on the basics of data collection techniques and an orientation on the ODK application to ensure the quality of the data. The questionnaire was designed on the Kobo Toolbox server carefully to allow optional and mandatory questions by skip logic to minimize missing data. The tools were in English because this was the medium of communication for the study participants during their basic nursing course training.

Before the actual data collection period, the questionnaire was checked for clarity, comprehensiveness, and internal consistency reliability (Cronbach alpha=0.944) on 5% of the sample in another hospital, which was not included in the study. Finally, possible modifications were made to the questions. The supervisor evaluated and validated the obtained data for completeness and consistency during data collection, and data collectors were immediately notified if the survey forms were incomplete or incorrectly filled in.

### Statistical analysis

ODK version 2022.1.2 software was used to collect the data, along with the Kobo Toolbox server to store the collected data, and it was exported to SPSS version 27 for final analysis. Before data export, it was checked for completeness, and frequency was run to rule out any missing values. Then the data was coded and revalued on SPSS, frequency distributions were run, and further cleansing and checking for missing values and errors were done. The sample was described using descriptive statistics, and numerical data was reported as mean, SD, and percent. The relationship, or statistical association, between dependent and selected independent factors, was investigated using binary logistic regression.

The factors having a P-value below 0.25 in the bivariate regression were involved in the multivariable analysis to examine the combined impact of various factors associated with the triage knowledge and skill of nurses, after filtering for multi-co-linearity by variance inflation factor (VIF) and tolerance test, as well as testing the fitness model by Hosmer and Lemeshow models. The results were summarized by AOR and a 95% CI. A P-value of 0.05 was used as the significance level. Tables, texts, and figures were used to report the findings.

### Ethical consideration

Ethical clearance was obtained from the departmental research and ethical review committee of the Department of Emergency Medicine and Critical Care, School of Medicine, Addis-Ababa University (EM/SM/604/2015). An official letter of permission from the department was submitted to the selected hospitals to conduct the research. After informing respondents about the study's objective, data was collected by obtaining written and verbal informed consent from each participant.

Participants had the right to refuse or stop participation at any moment. Throughout the study period, information was recorded anonymously, and confidentiality was ensured. All of the gathered data was kept confidential, and only members of the research team had access to it. All paper and computer records of the study were kept in a secure place under lock and key, and any report did not include their name or any other personal information. All methods were performed under the Declaration of Helsinki.

## Results

### Sociodemographic characteristics of participants

Out of the total 384 respondents in the adult emergency rooms of selected government hospitals, with a response rate of 100%. About two-thirds of the nurses (73.7%) were aged 30 years and younger, with a mean age of 28.5 (± 3.7). Two hundred seventeen (56.5%) of the nurses were female, and the majority of them (79.4%) had a BSc in nursing, while only a few respondents (7.3%) had a diploma in nursing. Only 146 (38%) of the nurses had 3 years or less of triage working experience, and the majority

(70.8%) of them have attended either training or workshops during the past 3 years (Table 1).

## Availability of equipment or resources that assist nursing triage

Overall, the majority of the respondents (62%) stated that the equipment essential for triaging activities in the triage room was available in the hospitals. The presence of a triage assessment form (95.6%), a triage sheet (95.1%), and pulse oximetry (94.4%) were stated by the nurses as the most available resources in the triage room. On the other hand, the presence of a triage acuity rating guideline (32.4%), a thermometer (31.8%), and a pain assessment scale (29.1%) were rated by the participants as the least available equipment in the triage room during the triaging of patients (Table 2).

## Triage knowledge of nurses

The total knowledge of the respondents was categorized based on the overall mean and percentage. The proportion of those who scored less than the overall mean of 7 (54%) was categorized as having poor triage knowledge. More than half of the participants (58.1%), with a 95% CI (51–65.3), had poor triage knowledge scores, with a mean score of 7.02 ($\pm$2.025). The majority of the respondents (62%) defined triage correctly (Fig. 1).

## Perceived triage skill of nurses

The total perceived skill of the respondents was categorized based on the overall mean and percentage. The proportion of those who scored less than the overall mean of 149 (80.5%) was categorized

### Table 1

**Socio-economic factors of participants at the three selected public hospitals found in Addis-Ababa, Ethiopia, 2023 ($n = 384$).**

| Variables | Category | Frequency | Percent |
|---|---|---|---|
| Age category | | | |
| | $\leq$ 30 years | 283 | 73.7 |
| | > 30 years | 101 | 26.3 |
| Sex | | | |
| | Male | 167 | 43.5 |
| | Female | 217 | 56.5 |
| Educational level | | | |
| | Diploma in nursing | 28 | 7.3 |
| | Bachelors in nursing | 305 | 79.4 |
| | Postgraduate in nursing | 51 | 13.3 |
| Working experience in the nursing profession | | | |
| | $\leq$ 3 years | 56 | 14.6 |
| | > 3 years | 328 | 85.4 |
| Working experience in the emergency department | | | |
| | $\leq$ 3 years | 62 | 16.1 |
| | > 3 years | 322 | 83.9 |
| Triage working experience | | | |
| | $\leq$ 3 years | 146 | 38 |
| | > 3 years | 238 | 62 |
| Currently working in the triage room | | | |
| | Yes | 137 | 35.7 |
| | No | 247 | 64.3 |
| Training experience | | | |
| | Yes | 272 | 70.8 |
| | No | 112 | 29.2 |

### Table 2

**Availability of equipment or resources which assists nursing triage at the three selected public hospitals found in Addis-Ababa, Ethiopia, 2023 ($n = 384$).**

| Equipment | Category | Frequency | Percent |
|---|---|---|---|
| Thermometer | | | |
| | Absent | 122 | 31.8 |
| | Present | 262 | 68.2 |
| Pulse oximetry | | | |
| | Absent | 21 | 5.5 |
| | Present | 363 | 94.5 |
| Glucometer with strep | | | |
| | Absent | 67 | 17.4 |
| | Present | 317 | 82.6 |
| Triage assessment form | | | |
| | Absent | 17 | 4.4 |
| | Present | 367 | 95.6 |
| Pain assessment scale | | | |
| | Absent | 112 | 29.2 |
| | Present | 272 | 70.8 |
| Stethoscope | | | |
| | Absent | 62 | 16.1 |
| | Present | 322 | 83.9 |
| Bag valve mask (Ambu bag) | | | |
| | Absent | 51 | 13.3 |
| | Present | 333 | 86.7 |
| Sphygmomanometer and BP cuff | | | |
| | Absent | 49 | 12.8 |
| | Present | 335 | 87.2 |
| Triage acuity rating guidelines | | | |
| | Absent | 124 | 32.3 |
| | Present | 260 | 67.7 |
| Oropharyngeal airway | | | |
| | Absent | 90 | 23.4 |
| | Present | 294 | 76.6 |
| Neck collar | | | |
| | Absent | 90 | 23.4 |
| | Present | 294 | 76.6 |
| Triage assessment tool | | | |
| | Absent | 67 | 17.4 |
| | Present | 317 | 82.6 |
| Triage sheet | | | |
| | Absent | 19 | 4.9 |
| | Present | 365 | 95.1 |
| Overall availability of triage equipment | | | |
| | Absent | 146 | 38 |
| | Present | 238 | 62 |

as having poor perceived skill. Almost half (50.3%), with a 95% CI (43–57.6) of the participants had poor perceived total triage skills, with a mean score of 149 ($\pm$24.285) (Fig. 2).

## Factors associated with the triage knowledge of nurses

After being filtered for multi-co-linearity by the variance inflation factor (VIF), which had a mean of 1.001, sociodemographic characteristics such as educational level and triage working experience of nurses were candidates for multivariable regression at a $P$-value below 0.25. Similarly, in multivariable regression, both factors, educational level, and triage working experience, were significant predictors of triage knowledge at a $P$-value of < 0.05.

Respondents who had a diploma in nursing had a lower likelihood of having good triage knowledge than these MSc holders
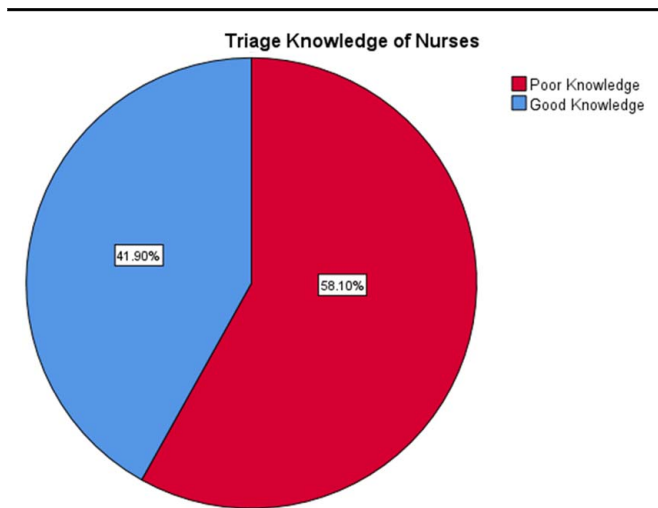
**Figure 1.** Nurses' triage knowledge in the emergency centers of selected governmental hospitals in Addis-Ababa, Ethiopia, 2023.

(AOR = 0.121; 95% CI: 0.024–0.606), and those with a BSc in nursing educational level had a lower likelihood of having good triage knowledge than these MSc nurses (AOR = 0.274; 95% CI: 0.104–0.723). These nurses with triage working experience of 3 years and below were less likely to have good triage knowledge than nurses with more than 3 years of working experience (AOR = 0.275; 95% CI: 0.137–0.550) (Table 3).

### Factors associated with perceived triage skill of nurses

After being filtered for multi-co-linearity by the variance inflation factor (VIF), which had a mean of 1.114, sociodemographic factors such as age category of participants, sex of participants, educational level, currently working status in the triage room, training experience during the past 3 years, availability of equipment used for triaging emergency patients, and triage knowledge of nurses were candidates for multivariable regression at a *P*-value below 0.25.
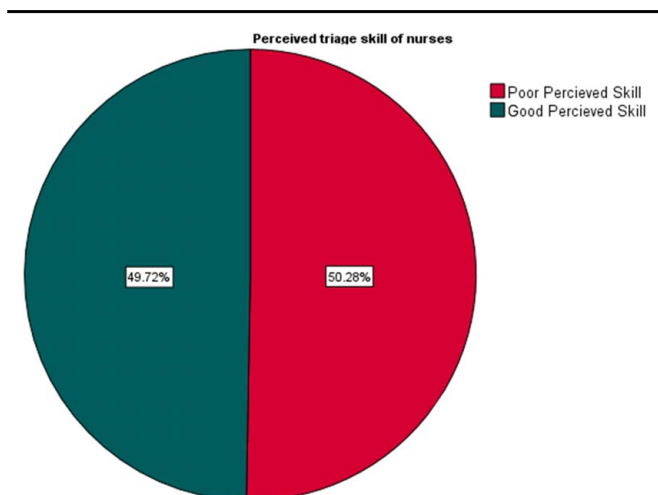


**Figure 2.** Nurses' perceived triage skill in the emergency centers of selected government hospitals in Addis-Ababa, Ethiopia, 2023.

However, in a multivariable regression, factors such as training experience during the past 3 years and availability of equipment used for triaging emergency patients were significant predictors of perceived triage skill at a *P*-value of < 0.05. Participants who had attended either training or workshops during the past 3 years had five times higher odds of having good perceived triage skills than those without training experience (AOR = 4.973; 95% CI: 2.137–11.574). On the other hand, respondents who said that equipment used for triaging emergency patients was absent had a lower likelihood of good perceived skill than those who said it was available (present) (AOR = 0.328; 95% CI: 0.152–0.709) (Table 4).

### Discussion

The success of medical treatment depends on quick and accurate patient triage. Previous studies have shown that appropriate triage of injured patients has decreased deaths and enhanced resource use. The admission and stabilization processes for patients can be facilitated and the treatment trend of patients may be identified with the use of an accurate triage system[13]. Since nurses handle most triage tasks, their choices directly determine how quickly medical care is provided, and any failure to provide triage services has a significant impact.

The proportion of poor triage knowledge among nurses in this study was 58.1%, with a 95% CI (51–65.3). This is similar to studies done in Indonesia, Dar es Salaam, and Tanzania, and it is also consistent with a study conducted in Hawassa, Ethiopia[4,8,11]. This might be due to the educational status and triage experience of the participants.

However, the proportion of poor triage knowledge in this study is higher than in a study done in the USA and Sweden[5,14]. This is also greater than studies done in Tehran, Iran, and Tamale Metropolis, Ghana[15,16]. This discrepancy may be due to real differences in triage knowledge, data collection tools, national guidelines, and assessment methods.

On the other hand, the proportion of poor knowledge in the current research is less than in a study undertaken in three hospitals at the University of Medical Sciences in Sari, Iran, as well as Lahore, Pakistan[17,18]. This disparity could be due to the differences in hospital setup, national guidelines, assessment methods, and curriculum across different countries. The proportion of poor perceived skill was 50.3%, with a 95% CI (43–57.6) in the current research. This is consistent with studies carried out in Dar es Salaam, Tanzania, and Addis-Ababa, Ethiopia[4,19]. This could be because many nurses who worked in the emergency room were not given triage-related training.

However, the proportion of poor perceived skill in this study is higher than in other studies; only 34.6% of participants in a study in East Java Province, Indonesia, felt that their overall triage skill was poor, while 23.8% of the participants in Hawassa, Ethiopia, felt that their overall triage skill was poor[8,11]. This disparity might be due to a difference in national guidelines, study setting, and sample size. For example, the study conducted in Hawassa included only 101 participants versus 384 respondents in this study.

In this study, the educational level and triage experience of nurses were significant predictors of triage knowledge, as well as training experience and availability of equipment were

**Table 3**

**Socio-demographic factors associated with triage knowledge of nurses in bivariate and multivariable analyses, in public hospitals found in Addis-Ababa, Ethiopia, 2023 (*n* = 384).**

| Factors | Triage knowledge | | Crudes odds ratio (95% CI) | Adjusted odds ratio (95% CI) | Sig |
|---|---|---|---|---|---|
| | Good | Poor | | | |
| Educational level | | | | | |
| Diploma Nurse | 6 | 22 | 0.150 (0.032–0.703) | 0.121 (0.024–0.606) | **0.010**[*] |
| BSc Nurse | 120 | 184 | 0.326 (0.131–0.811) | 0.274 (0.104–0.723) | **0.009**[*] |
| MSc Nurse | 35 | 17 | 1 | 1 | |
| Triage experience | | | | | |
| ≤ 3 years | 37 | 108 | 0.305 (0.157–0.591) | 0.275 (0.137–0.550) | **< 0.001**[*] |
| > 3 years | 124 | 115 | 1 | 1 | |

important determinants of the perceived triage skill of nurses. This is consistent with a study conducted in Hawassa Specialized Hospital, Ethiopia, in which educational level and triage experience were significantly associated with triage knowledge[11].

It is also in line with a study done in East Java Province, Indonesia, on which the triage skill of nurses had a significant positive association with factors such as triage knowledge and training experience, and it is also consistent with studies conducted in Shiraz University of Medical Sciences, Iran, and a study in Addis-Ababa, Ethiopia, on which training experience was a significant predictor of perceived triage skill[8,19,20]. This is also consistent with a study done in Dar es Salaam, Tanzania, which revealed that a lack of basic equipment in triage was one of the predictors of poor triage skills[4].

This is evidenced by the fact that having triage experience, a higher level of education, and triage training status could improve nurses' knowledge and capacity in the emergency department. In addition, a lack of equipment in the triage area makes it difficult for nurses to assess patients accurately, thoroughly, and effectively. This results in poor decision-making and poor prioritization of patient care, both of which can result in avoidable disabilities or fatalities.

### Limitations of the study

One limitation of this study was that triage skill was measured using self-administered questions only. Participatory observation might be a more useful technique, as it would probably decrease any negative effects of self-reporting. The data was limited to public hospitals, restricting generalization to overall health facilities.

**Table 4**

**Socio-demographic factors associated with perceived triage skill of nurses in bivariate and multivariable analysis, in public hospitals found in Addis-Ababa, Ethiopia, 2023 (*n* = 384).**

| Factors | Perceived triage skill | | Crudes odds ratio (95% CI) | Adjusted odds ratio (95% CI) | Sig |
|---|---|---|---|---|---|
| | Good | Poor | | | |
| Age in years | | | | | |
| ≤ 30 | 133 | 150 | 0.656 (0.335–1.284) | 0.715 (0.325–1.574) | 0.405 |
| > 30 | 57 | 44 | 1 | 1 | |
| Sex | | | | | |
| Male | 69 | 98 | 0.537 (0.295–0.977) | 0.552 (0.275–1.111) | 0.096 |
| Female | 122 | 95 | 1 | 1 | |
| Educational level | | | | | |
| Diploma nurse | 17 | 11 | 0.960 (0.239–3.853) | 1.061 (0.202–5.563) | 0.944 |
| BSc nurse | 142 | 163 | 0.521 (0.214–1.269) | 0.601 (0.203–1.774) | 0.356 |
| MSc nurse | 32 | 19 | 1 | 1 | |
| Currently working status in triage | | | | | |
| Yes | 61 | 77 | 0.689 (0.372–1.273) | 0.799 (0.384–1.660) | 0.547 |
| No | 130 | 116 | 1 | 1 | |
| Training experience | | | | | |
| Yes | 167 | 105 | 5.933 (2.788–12.628) | 4.973 (2.137–11.574) | **< 0.001**[*] |
| No | 24 | 88 | 1 | 1 | |
| Availability of equipment | | | | | |
| Absent | 39 | 107 | 0.203 (0.104–0.394) | 0.328 (0.152–0.709) | **0.005**[*] |
| Present | 152 | 86 | 1 | 1 | |
| Triage knowledge | | | | | |
| Poor knowledge | 99 | 124 | 0.590 (0.324–1.075) | 0.602 (0.296–1.224) | 0.161 |
| Good knowledge | 92 | 69 | 1 | 1 | |

### Recommendation

Based on this study's findings, our recommendation was forwarded to the Ministry of Health Ethiopia

1. Pieces of training and education should be given by hospitals and the Ministry of Health to improve triage skills and knowledge. Workshops and in-service training should be conducted, then emergency department nurses should regularly engage in continuing professional development to raise their level of knowledge and skill.
2. The nurse education program has to be evaluated, and postgraduate/postbasic nursing courses on emergency critical care at the certificate and diploma levels should be established. This increases one's capacity for and involvement in providing emergency treatment.

### Conclusion

The results give us a greater understanding of emergency nurses' triage knowledge and perceived skill in the city of Addis-Ababa, Ethiopia. The knowledge and perceived skills of triage were suboptimal. As nurses' knowledge about triage is a key tool in triage decision-making, there is a need to improve nurses' knowledge level and skills in triaging at the ED because the little above-average score of nurses' knowledge about triage is not impressive.

Educational level and triage experience of nurses were significant predictors of triage knowledge, while training experience and availability of triage equipment were significant predictors of perceived triage skill.

### Ethical approval

Ethical clearance was received from the departmental research and ethical review committee of the department of emergency medicine and critical care at Addis-Ababa University (EM/SM/604/2015). An official letter of permission from the department was submitted to the selected hospitals. Informed consent was obtained from each participant. Throughout the study period, information was recorded anonymously, and confidentiality was ensured.

### Consent

Written informed consent was obtained from the participants for publication and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

### Source of funding

### Author contribution

B.M. and W.B.: developed the proposal, collected and analyzed data, and designed the study, interpreted the data, and critically reviewed the manuscript; Y.B. and G.T.: assisted in conceiving the data, designed the study, supervised data collection, performed the analysis, interpreted the data, drafted the manuscript, and approved the final manuscript for publication. All the authors have read and approved the final manuscript.

### Conflicts of interest disclosure

The author(s) declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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### Guarantor

This submission for publication has been approved by all authors and all persons entitled to authorship have been so agreed.

### Data availability statement

The data sets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

### Provenance and peer review

We hereby state that this work is original, has not been published or accepted for publication, and is not under consideration for publication in another journal.

### Acknowledgement

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