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Knowledge, Skills, and Practices of Triage among Emergency Nurses in Jordan

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ABSTRACT

Purpose: The importance of knowledge, skills, and practices of nurses makes abridge for a higher quality of care provided to patients. This study purposed to assess the levels of knowledge, skills, and practices of patient triage among emergency nurses in Jordan.
Methods: A cross-sectional, descriptive correlational, observational design was utilized to assess the levels of knowledge, skills, and practices of patients' triage among emergency nurses working in triage at emergency departments in Jordan. A convenience sample of 125 registered nurses were recruited from triage units of three health sectors in the middle region of Jordan; government, educational, and private.
Results: The findings revealed that 88.8% of nurses had sufficient knowledge of triage, 84.8% had moderate triage skills, and 88.8% demonstrated good triage practices. There was a statistically significant positive association between triage knowledge, emergency experience, and triage training course. A significant positive association was found between triage skills, emergency experience, triage experience, and triage training course. Also, triage practices had a significant positive association with triage experience and triage training course.
Conclusions: It is necessary to develop nursing policies that consider triage as a baseline training program for all emergency nurses. Also, triage training programs should be conducted and take into consideration the associated factors to enhance emergency nurses' knowledge, skills, and practices of triage in order to improve quality of care and patients' outcomes.

1. Introduction

Triage refers to assessment and classification of patients visiting emergency department (ED) to prioritize their health problems from high immediate (life-threatening) to low immediate to receive appropriate treatment [1], which is usually performed by emergency nurses [2]. Patients with life-threatening problems such as cardiac arrest, airway obstruction, and shock need to be prioritized to minimize the negative outcomes and mortality [3]. Triage's purposes are to place the patients in the right area at the right time to be given the right care and allocate the proper resources to meet their medical needs [2]. The triage area of the hospital permits the assignment of the patient to appropriate assessment and management [4,5]. Additionally, triage consists of two decisions; primary and secondary [6].

The primary decision is associated with procedures of assessment and determination of the patients for proper treatment. While, the secondary decision is related to the beginning of nursing interventions and providing comfort to the patients [6]. Furthermore, triage can be categorized into four aspects including, prioritizing needs, using guidelines, using resources efficiently, and timing [7].

Emergency nurses should have sufficient knowledge and skills of triage to provide quick assessment and appropriate categorization of patient diagnosis to take the proper decisions and implements good practices and effective care to emergency patients in various healthcare institutions [6]. Previous studies, that it is classic in nature, reported mixed results about the levels of triage knowledge and skills among emergency nurses ranging from poor to high [1,8–12]. The differences in these findings can be related to many challenges in implementing triage system, including availability of basic resources and equipment including, thermometers, glucometers, pulse oximeters, pain scales,

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blood pressure machines, triage assessment forms, and triage guidelines [1]. Additionally, many factors are correlated with triage knowledge and skills. Previous studies documented that there was a relationship between triage knowledge, training experience, training courses [8,12], and years of experience [11]. Additionally, there was a relationship between triage skills and working experience [8]. Literature recommended that emergency nurses need to have triage training courses to make accurate decisions in prioritizing and categorizing emergency patients according to their needs [5,13,14]. Unfortunately, the duration and experience in ED may not enough to prepare the nurses to work as triage nurses. Thus, the emergency nurses should receive continuously updated triage educational programs in addition to other related training courses to implement accuracy in triage [15].

Unfortunately, there is a lack of studies about triage knowledge, skills, and practices and their relationships with other factors such as demographic among emergency nurses in Arab countries, including Jordan. In Jordan, there are studies about patient safety culture among emergency nurses [16,17], thus, this study discussed areas of triage that are not addressed earlier in Jordan. Such study will contribute to providing baseline data for policy-makers and healthcare administrators and professionals to develop interventions and training educational programs to improve emergency nurses' knowledge, skills, and practices of triage to enhance the triage system that can affect the quality and timeliness of health care in healthcare institutions.

2. Purpose and research questions

This study purposed to assess the levels and correlating factors of knowledge, skills, and practices of triage among emergency nurses in Jordan and factor. Also, the following research questions have guided the study:

1- What are the levels of knowledge, skills, and practices of triage among emergency nurses in Jordan?
2- What are the associations between selected demographic factors and knowledge, skills, and practices of triage among emergency nurses in Jordan?
3- What are the challenges of implementing triage among emergency nurses in Jordan?

3. Methods

3.1. Design

A cross-sectional, descriptive correlational, observational design was adopted in the current study.

3.2. Setting, population, and sample

The current study sample included all emergency nurses who work in triage at ED among three health sectors; government, educational, and private. The convenience sampling method was used to select participants. The sample size was calculated using G-power 3.0.0 on power 0.80, moderate effect size (0.30), level of significance (0.5), and 2 df by Chi-square (Goodness-of-Fit tests: contingency tables), so the required sample size was 108 and increased to 150 to avoid drop out. The eligibility criteria included nurses who: a) were registered nurses (RNs), b) had at least 6 months or more experience in ED to be oriented on the department and process of triage in it, and c) were willing and approving their participation in the current study. The exclusion criteria were RNs who were working in administrative positions.

The ethical approval to conduct this study was obtained from the institutional review board (IRB) at (Mention Al-Zaytoonah University of Jordan), the Ministry of Health, Jordan University Hospital, and three private hospitals.

3.3. Study measures

A structured questionnaire was used and consisted of the following measures.

- **Demographic Data**. It includes age, sex, educational level, duration of working experience in ED, duration of working experience in triage, triage training course, duration of triage training course, and other training courses.
- **Triage knowledge.** It was assessed using the Triage Knowledge Questionnaire (TKQ) that was developed by Fathoni et al. [8]. It consists of 13 questions that evaluate triage knowledge. This tool consists of three parts; the first part concerning the definition of triage (1 question), the second one regarding the time for treatment according to colors (4 questions) and the third one includes 8 questions about classifications of the situations according to priorities. One score was given to the correct answer for each question and zero for an incorrect answer. The total score of this questionnaire ranges from zero to 13. The total score was calculated as follows: the total score of < 60 % indicates insufficient triage knowledge, and ≥ 60 % reflects sufficient triage knowledge [8]. The TKQ had good validity and reliability, using test-retested, the correlation coefficient was 0.99 [9].
- **Triage Skills.** It was evaluated using the Triage Skills Questionnaire (TSQ), which was developed by Fathoni et al. [8]. It compromises 37 statements to assess the level of triage skills. This questionnaire consists of three aspects involving rapid assessment (27 questions), patient categorization (4 questions), and patient allocation (6 questions). The answers were responded on a 5-point Likert scale, where 1 indicates need improvement, 2 reflects poor, 3 indicates fair, 4 reflects good, and 5 indicates very good. The total score of the questionnaire ranges from 37 to185. The total score was converted to a percentage and interpreted as follows: < 60 % poor triage skills, 60–80 % indicates moderate triage skills, and > 80 % reflects high triage skills [8]. This instrument had good validity and reliability, in which Cronbach's alpha reliability coefficient was 0.93 [8].
- **Triage Practices.** These practices were assessed using the Triage Skill Observational Checklist that was developed by Aloyce et al. [1]. This checklist was used to assess triage practices for nurses in ED through observing the nurses when they perform triage activities and consists of 11 items with responses of yes or no**.** The total score was calculated as follows: the total score of < 60 % indicates bad practices, and ≥ 60 % reflects good practices [1]. It has acceptable validity and reliability [1].
- **Challenges of Implementing Triage.** Equipment's Review Guide (ERQ), which was developed by Aloyce et al. [1] was used to assess the challenges of implementing triage by assessing the presence of equipment, facilities, and recourses that helps nurses in carrying out patients' triage such as triage scale and acuity rating, color code, Electrocardiogram (ECG) monitor, pulse oximetry, and blood pressure measure [1]. It has acceptable validity and reliability [1].

Because the English version of this questionnaire was adopted and for cultural considerations, a pilot study was conducted on a group of registered nurses ($N = 20$) who working in ED but not working in the selected hospitals. Findings indicated that the questions were clear and the questionnaire took between 15 and 20 min. The internal reliability of this questionnaire was assessed using Cronbach's alpha on study sample and were as follows: 0.85, 0.95, and 0.82, respectively.

3.4. Data collection procedure

After getting approval from the recruited hospitals, the data collection process was conducted in two methods; self-structured questionnaire and observation. At the beginning, the researchers contacted head nurses of ED to facilitate the process of data collection by providing the

researchers with a list of eligible nurses and arranging the time and place for filling the questionnaires by emergency nurses. Additionally, facilitate the researchers' role in the process of nurses' observation during their clinical practice.

Then, the ethical principles and purposes of the study were discussed with the recruited nurses. Each participant was given a questionnaire in a closed envelope including an instructions paper and purpose of the study. Informed consent was obtained from participants after assuring them that their participation was fully voluntary and the results were not shared with the head nurses or hospital administrators, as well their participation did not affect their job anymore. The participants were asked to fill out the questionnaire within one week and write their names and telephone numbers, then the closed envelopes were collected by the researchers. After that, nursing schedule was obtained from head nurses to conduct observation of triage nurses' activities for agreed participants. A checklist was used to assess triage practices for each nurse individually while he/she performed triage activities. One of the researchers took the responsibility of observation during the morning and afternoon working hours. The observation was made for each participant for two hours (fifteen minutes per hour). The data were collected during the period from September 2019 to January 2020.

3.5. Data analysis

Statistical Package for the Social Sciences (SPSS) version 22.0 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.) was used to generate descriptive and inferential statistics. Descriptive statistics (frequencies, percentages, mean, standard deviation, and range) were used to describe the main study variables. Bonferroni correction Chi-square residual analysis test was utilized for measuring the association between the independent variables (gender, educational level, training experience, training courses in triage, duration of training triage course, and working experience in ED) and dependent variables (triage knowledge, skill, and practices). Also, point-biserial (p.b) correlation was used to examine the correlation between age and dependent variables. The level of significance was set at $p \leq 0.05$.

4. Results

One hundred and fifty questionnaires were distributed., and 135 questionnaires were returned with a response rate of 90 %. However, 10 questionnaires not entered into the analysis because there were incomplete. Our findings found that the participants' mean age was 30.83 years (SD = 4.14) and more than half of the participants were male (53.6 %). Almost 94.0 % had a bachelor's degree, 31.2 % had 5 to<10 years of experience in emergency, 33.6 % had one and less than three years of triage experience, and the vast majority (71.2 %) did not have a triage training course. For more details, depict Table 1.

Table 2 shows that most of the participants had a sufficient level of triage knowledge (88.8 %), moderate triage skills level (84, 8 %), and good practices level (88.8 %). Regarding the triage knowledge among emergency nurses, findings explained that the questions "How long should a patient with the following red color code wait for treatment in the casualty or emergency unit", "How long should a patient with the following green color code wait for treatment in the casualty or emergency unit", "How long should a patient with the following orange color code wait for treatment in the casualty or emergency unit" had the highest percentages, where 78.4 %, 77.6 %, and 76.8 % of the participants answering correct answers, respectively. However, the question "Adult patient with skin moderate pale, cool, and dry, reacts to voice, respirations of 28/min, pulse rate of 110/min, and systolic blood pressure of 90 mmHg" had the lowest percentage, in which 39.2 % of participants providing the correct answer (Supplementary1).

Concerning triage skills, the following items: "Assess internal and external bleeding", "Perform bag-valve-mask ventilation", "Assess the temperature of the patients", and "Allocate make a decision to allocate to the patient with priority in the right place (Ambulatory in ED) correctly" had the highest percentages of good and very good responses, whereas 62.4 %, 60.0 %, 60.0 %, 60.0 % of the nurses answering these responses, respectively. On the contrary, the following skills: "Perform clear airway by correct position with jaw trust and head tilt" and "Assess of the capillary refill "had the lowest percentages of good and very good responses, whereas 40.8 %, 41.6 % of participants answering these responses, respectively (Supplementary 2).

Moreover, concerning the level of triage practices among emergency nurses, the findings revealed that the questions "Does the nurse actually triage the patients?" and "Is there a nurse assigned for patients' triage?" had the highest percentages, where 98.4 %, 97.6 % of participants answering correct answers, respectively. However, the questions "Does circulatory status assessment include Capillary refills", and "Does respiratory status assessment include listen for breath sound" had the lowest percentages were 52.8 %, 56.0 % of the participants answered

Table 1
Demographic characteristics of the participants (N = 125).

Characteristic	n (%)	M (SD); Range
Age		30.83 (4.14) Range = 23–44 years
Sex		
Male	67 (53.6)	
Female	58 (46.4)	
Level of education		
Bachelor	118 (94.4)	
Postgraduate (Higher diploma, Master)	7 (5.6)	
Emergency experience		
> 6 months to < 1 year	9 (7.2)	
≥ 1 and < 3 years	28 (22.4)	
≥3 and < 5 years	34 27.2)	
≥ 5 and < 10 years	39 (31.2)	
≥10 years	15 (12.0)	
Triage experience		
> 6 months to < 1 year	31 (24.8)	
≥ 1 and < 3 years	42 (33.6)	
≥ 3 and < 5 years	22 (17.6)	
≥ 5 and < 10 years	24 (19.2)	
≥ 10 years	6 (4.8)	
Triage training course		
Yes	36 (28.8)	
No	89 (71.2)	
Duration of triage training course		
< 1 month	0 (0.0)	
≥ 1 month	36 (100.0)	
Other training courses		
Basic Life Support (BLS)	122 (97.6)	
Advanced Cardiac Life Support (ACLS)	81 (64.8)	
Advanced Trauma (AT)	4 (3.2)	
Basic Trauma (BT)	13 (10.4)	
Others	36 (28.8)	

n: number; %: percentage; M: Mean; SD: Standard Deviation.

Table 2
Levels of triage knowledge, skills, and practices among emergency nurses (N = 125).

Variable	n (%)
Triage knowledge	
Insufficient (<60 %)	14 (11.2)
Sufficient (≥60 %)	111 (88.8)
Triage skills	
Poor (<60 %)	19 (15.2)
Moderate (60–80 %)	106 (84.8)
Triage Practices	
Bad (<60 %)	14 (11.2)
Good (≥60 %)	111 (88.8)

n: number; %: percentage.

incorrect answers, respectively (Supplementary 3).

As shown in Table 3, findings revealed that there was a statistically significant positive association between triage knowledge, emergency experience ($X^2 = 20.740$, $p < 0.05$), and triage training course ($X^2 = 6.377$, $p < 0.05$). Moreover, a significant positive association was found between triage skills and emergency experience ($X^2 = 10.275$, $p < 0.05$), triage experience ($X^2 = 14.766$, $p < 0.05$), and triage training course ($X^2 = 9.063$, $p < 0.05$). Also, triage practices had a significant positive association with triage experience ($X^2 = 9.164$, $p < 0.05$) and triage training course ($X^2 = 6.377$, $p < 0.05$).

Regarding the challenges faced by emergency nurses during implementation of triage interventions, findings demonstrated that nurses in all recruited hospitals reported no equipment in ED assisting them in performing triage assessment such as urine analysis strips and ABGs machines. Most of the triage units had a stethoscope (72 %). Nearly half of the participants (52 %) reported that their facility had no observational chart including the level of illness severity and pain assessment scale in the triage (Table 4).

5. Discussion

In the current study, the results of demographic characteristics represented the Jordanian emergency nursing population, in which the majority of emergency nurses were male, had bachelor's degree, and attended basic training courses in clinical areas.

Our results demonstrated that triage knowledge was sufficient among emergency nurses, which is consistent with earlier cross-sectional studies among healthcare professionals including emergency nurses [11,18,19]. On the contrary, the current study findings are higher than previous cross-sectional studies revealed that triage knowledge among emergency nurses was low [1,8,9,20,21] and one quasi-experimental study demonstrated that emergency nurses had poor knowledge before triage educational program [13]. This study result might be related to effect of training courses nurses attended during their clinical practice, which enhanced their knowledge about emergency situations including triage [9,20]. Also, it could be related to the characteristics of this study sample, in which emergency nurses had an experience of three years and more in ED and triage, also, they had attended other training clinical courses related to life support skills that could be helpful in enhancing their knowledge about triage.

This study demonstrated that the highest knowledge was related to color code wait for treatment in the casualty or emergency unit. Emergency Nurses Association [22] demonstrated that the high ranking for these items might be related to recurrent use of these codes in most medical and nursing interventions in emergency situations.

The current study reported that skills of triage had a moderate level among emergency nurses. This result is in line with the findings reported by Fathoni et al. [8], Duko et al. [9], and Kerie et al. [23], which indicated that emergency nurses reported moderate triage skills. On the contrary, this current result is higher than a study conducted by Aloyce et al. [1] reported insufficient triage skills among emergency nurses and lower than Awwad and colleague's study [21] demonstrated high skills of triage among emergency nurses. This study's result could be related to the effectiveness of triage training programs and other clinical training programs in improving emergency nurses' skills, in addition to availability of procedures-specific guidelines for management of patients in emergency units [1,13,24]. In this study, nurses had training courses in BLS, ALS, and others, in addition to triage. Furthermore, the hospitals apply specific treatment guidelines and triage assessment during providing care for patients visiting emergency.

Our study showed that triage practices were good among emergency nurses, which is consistent with previous studies [13,25]. However, a cross-sectional study found that the majority of emergency nurses had poor practices of triage [18]. This study result could be related to the effect of triage educational programs and training courses on enhancing nurses' practices in ED [13,25,26].

This study found a significant association between triage knowledge and skills and emergency experience. To illustrate, the nurses who had experience in ED for three years and more had better knowledge and skills of triage. The findings of the present study are consistent with

Table 3
Results of Chi-square test and significance of demographic variables with triage knowledge, skills, and practices.

Variable	Knowledge		Skills		Practice	
	Chi-Square	p-value	Chi-Square	p-value	Chi-Square	p-value
Gender	2.020	0.156	0.008	0.927	0.732	0.392
Level of education	2.370	0.306	1.329	0.514	0.935	0.626
Emergency experience	20.740	**0.000***	10.275	**0.036***	7.253	**0.123**
Triage experience	7.79	0.100	14.766	**0.005***	9.164	**0.05***
Triage training course	6.377	**0.012***	**9.063**	**0.003***	6.377	**0.012***
Duration of triage training course	.[a]	**.....**	.[a]	.....	.[a]	.....
	p.b. r	**p-value**	**p.b. r**	**p-value**	**p.b. r**	**p-value**
Age	−0.156	0.083	−0.120	0.183	−0.107	0.236

* Significant at < 0.05 level.
[a] : No statistics are computed because the duration of triage course and dependent variables are constants.

Table 4
Challenges of implementing patients' triage.

Challenges	Yes n (%)	No n (%)
Presence of triage guidelines (e.g. triage scale and acuity rating, color code) for rating the acuity of patients in the hospital emergency department.	125 (100)	0 (0)
Does the triage guidelines states what actions to be taken and within which duration of time?	125 (100)	0 (0)
Presence of facilities equipment in the hospital emergency department that assists nurse in performing triage assessment: thermometer.	125 (100)	0 (0)
Presence of facilities equipment in the hospital emergency department that assists nurse in performing triage assessment: pulse oximetry.	125 (100)	0 (0)
Presence of facilities equipment in the hospital emergency department that assists nurse in performing triage assessment: sphygmomanometer.	125 (100)	0 (0)
Presence of facilities equipment in the hospital emergency department that assists nurse in performing triage assessment: Glucometer and its strips.	125 (100)	0 (0)
Presence of facilities equipment in the hospital emergency department that assists nurse in performing triage assessment: stethoscope.	90 (72.0)	35 (28.0)
Presence of facilities equipment in the hospital emergency department that assists nurse in performing triage assessment: 12 lead electrocardiograph.	125 (100)	0 (0)
Presence of facilities equipment in the hospital emergency department that assists nurse in performing triage assessment: observational chart (including level of illness severity).	65 (52)	60 (48)
Presence of facilities equipment in the hospital emergency department that assists nurse in performing triage assessment: pain assessment scale.	65 (52)	60 (48)
Presence of facilities equipment in the hospital emergency department that assists nurse in performing triage assessment: ABG machine and its reagents.	0 (0)	125 (100)
Presence of facilities equipment in the hospital emergency department that assists nurse in performing triage assessment: urinalysis strips.	0 (0)	125 (100)

n: number; %: percentage.

those reported by previous studies adopted cross-sectional [8,11] and quasi-experimental [25,27] designs. This study result might be interpreted as experience in ED might significantly improve the nurses' knowledge base and skills, which enhance their abilities to perform triage in actual clinical situations [23]. Clinical experience is one of the most significant factors that enhance nursing knowledge and skills, which reflect on nursing care. Experience provides nurses with credibility and power to take the proper actions and accurate triage decisions during nursing care [28,29].

Our study demonstrated a significant positive association between triage skills and practices and triage experience. This result demonstrated that triage experience enhances the skills and practices of emergency nurses, which maximizes the quality of care in ED. This result is congruent with Kerie et al. [23] demonstrated a strong association between triage experience and triage skills among emergency nurses. Triage experience provides nurses with the guidelines and protocols should be applied with traumatic patients in ED, which reflects on better skills and practices.

The present study found association between knowledge, skills, and practices of triage and triage training courses, which indicates that the more triage training attended, the higher knowledge, skills, and practices develop among emergency nurses. Findings of this study are consistent with the results of previous studies which revealed that triage training associated with triage knowledge and practices among emergency nurses [13,14]. Other cross-sectional studies found association between triage training and triage skills among emergency nurses [8,23]. This study result demonstrates the importance of conducting continuous triage training courses for emergency nurses, which can improve their knowledge, skills, and practices to manage stressful work situations in ED.

Regarding the challenges of implementing patients' triage among emergency nurses, the current study reported that all recruited hospitals had triage guidelines for scales, patients' acuity coding, and color codes. Also, all the recruited participants reported that their health care facility had the required equipment that assists them in performing triage assessment of temperature, blood pressure, pulse, blood sugar, and ECG. Therefore, most of the basic requirements for facilities and equipment were available. The availability of such equipment might be indicator for the nurses' knowledge, skills, and practices of triage, these health services can facilitate and improve nurses' work conditions in triaging. Along with that, all hospitals had guidelines and policies for implementing triage with many codes. A recent review of literature on the strategies that reduce the future challenges of triage suggested that applying such codes and guidelines can decrease overcrowding and treatment time in ED as well as fast-tracking cases admitted for triage [30].

6. Limitations

Regardless of the significant findings of the current study, this study has the following limitations; selection bias is one of the biggest limitations in that the researchers had people volunteer to participate who are probably different than those who did not volunteer. This is especially true when testing someone's knowledge. People don't want to participate when they know that the researchers will figure out the degree to which they lack knowledge. Thus, a random sampling method could be effective for future studies. Also, the design was cross-sectional that did not examine the effect of independent variables on dependent variables.

7. Implications in practice

This study can demonstrate the growing awareness of knowledge, skills, and practices of triage among emergency nurses in Jordan from their perspectives. As well, this study gives more attention to the challenges that face triage nurses in their daily care provision. With the intention of improving quality of care provided for the triage patients, this study explained that the emergency nurses' perception of triage skills and knowledge is considered as baseline data for evidence-based practice.

Triage training educational program that will help develop and improve emergency nurses' knowledge, skills, and practices on triaging in ED should be implemented. In-service educational departments in hospitals should prepare continuous educational programs for the emergency nurses particularly newly hired ones focusing on triage through seminars, workshops, and educational sessions. These programs provide nurses with knowledge, skills, and practices, which will decrease the upcoming challenges that might face them as well as increase quality of nursing care provided to the patients. Findings of this study can be applied in education by integrating triage concepts and application in nursing curriculum in universities because triage is considered the gate of the hospitals and the starting point of any health care services provided to patients in these hospitals.

The policy-makers and hospital administrators could highlight the strategies or standards for the triage nurses' work to improve healthcare institutions. Improving and unifying the guidelines, policies, and protocols for implementing accurate triage will improve the quality of care provided and decrease unintended consequences and complications that worsen patients' outcomes and economic burdens on the hospitals. In addition, healthcare administrators should provide the equipment necessary for implementing the best triage procedures.

8. Conclusion

Findings showed that the emergency nurses reported sufficient, moderate, and good levels of knowledge, skills, and practices of triage, respectively. The results of this study are baseline data for future studies in the field of triage among emergency nurses. Thus, training sessions and programs should be conducted and take into consideration the correlated factors to enhance emergency nurses' knowledge, skills, and practices of triage in order to improve quality of nursing care and patients' outcomes. Furthermore, experimental studies can be conducted to evaluate the effect of continuous educational programs on enhancing nurses' knowledge, skills, and practices of triage.

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Ethics approval

The approval to conduct this study was obtained from the Institutional Review Board (IRB) of Al-Zaytoonah University of Jordan, Jordan University Hospital with reference NO # 268/2019, Ministry of Health NO # 12453/2019, and selected private hospitals.

CRediT authorship contribution statement

Malakeh.Z. Malak: Conceptualization, Methodology, Software, Writing – original draft, Visualization. **Nihad Mohammad AL-Faqeer:** Conceptualization, Methodology, Writing – original draft. **Dalal Bashir Yehia:** Conceptualization, Methodology, Writing – original draft.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ienj.2022.101219.

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