

Effect of Educational Program on the Nurses' Triage Competency for Emergency Patients

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Abstract

Background: Triage is a dynamic and ongoing process that is performed to allocate the patient in the right place at the right time to receive the right level of care along with the allocation of appropriate resources to meet the patient's emergent medical needs. **Aim of the study:** The study aimed to evaluate the effect of educational program on the nurses' triage competency for emergency patients. **Research design:** A quasi-experimental research design was utilized. **Setting:** The study was conducted in the emergency department, Benha University Hospital. **Subject:** Purposive sample of 50 nurses of both sex who providing care in the emergency department. **Tools:** Two tools were used, tool **I:** Self-Administered Questionnaire, composed of three parts; (1) Demographic characteristics of nurses (2) Nurses' Knowledge Assessment Questionnaire (3) Nurses' attitude regarding triage and tool **II:** Nurses' practice observational checklists. **Results:** The total mean of nurses' knowledge, attitude, and practice improved from 18.54 ± 5.86 , 51.48 ± 15.58 , and 177.2 ± 34.54 respectively pre-educational program implementation to 31.82 ± 2.34 , 78.08 ± 5.34 , 344.7 ± 37.59 respectively post educational program implementation with significant difference at $p = <0.001$. **Conclusion:** Total nurses' knowledge, attitude and practice improved post educational program implementation with a significant difference and positive correlation between the nurses' knowledge and practice, knowledge and attitude, as well as between their practice and attitude post educational program implementation. **Recommendations:** A designed and developed Nursing Protocol between the Ministry of Health and Population and the Ministry of Higher Education to provide regular practical courses related to triage such as annual competency among the team in ED.

Keywords: Educational program, Emergency patients, Nurses' triage competency.

Introduction

A hospital's Emergency Department (ED) is the first contact point in the healthcare system. It is a vital component of hospital and extremely complicated system, providing patients with emergency treatment 24 hours a day, seven days a week. Improving the effectiveness of ED in hospitals has been identified as a key aim of health policy-

making in delivering the care that needy patients require (Sabir & Mustafa, 2023).

More than half of Emergency Department (ED) visits are non-urgent and do not require emergency care. The increasing numbers of patients visiting the ED led to crowdedness, more long waiting time and a negative impact on patients' satisfaction. Yet, more importantly, it results in unnecessary costs

and wastes the resources of the institution and the time of physicians and nurses that would be otherwise directed to more serious cases. Also, it can cause delayed treatment, therefore it can lead to the risk of death and disability. Thus, emergency nurses need to follow a systematic approach in order to prioritize the care of patients based on their level of clinical urgency (Elbaih et al., 2021) & (Antara et al., 2023).

Triage is a dynamic and ongoing process that is performed to allocate the patient in the right place at the right time to receive the right level of care along with the allocation of appropriate resources to meet the patient's emergent medical needs. Patients with varying degrees of severity present at the same time in the ED, necessitating the employment of successful decision-making and proper patients' allocation to reduce morbidity and mortality rates (Elsayed et al., 2023), (Shawah'en et al., 2024) & (Oh & Jung, 2024).

Triage competency is a vital aspect in treating patients in ED. It extends beyond mere triage accuracy to include, i.e., knowledge, attitude, and skills in categorizing patients according to the emergency type and level by considering the facilities, human resources, and patient probability. In this process, emergency nurses assess the urgency of care and become primary decision-makers in patient care planning (Rahmad et al., 2021) & (Oh & Jung, 2024).

Triage is an autonomous nursing role that is vital to patient security and the efficient delivery of emergency care. On an emergency care journey, the triage nurse is often at the forefront of hospital service who are considered the main anchors of triage in hospitals ED. Nurses need different skills based on the conditions of their workplace. The emergency department requires more

diverse and extensive clinical skills for nurses due to the speed of change and unexpectedness of the environment, time limit and critical conditions of patients in performing procedures (Bakr & Badawi, 2022), (Gholami et al., 2023) & (Saeedi & Panahi, 2023).

The emergency nurse must initially have all the core competencies to function within the emergency department such as Basic Life Support (BLS), cardio pulmonary resuscitation (CPR) and Advanced Life Support (PALS) and also, she must have completed a unique triage program. Education program is a program principally engaged in the provision of nursing education and acquisition of knowledge and practices and helps nurses to positive attitude properly in emergency department including job training, career and technical education (Baltaji et al., 2023).

Significance of the study

The application of Triage within emergency departments has a vital role in decreasing the mortality rate among patients within emergencies. Based on the literature review, lack of knowledge and application of triage increases the cost of care provided, work Overload, and patient outcomes (Abdel Aleem et al., 2024).

According to World Health Organization (WHO) injury claim the lives of about 3.16 million people every year and 10 million people suffer non-fatal injuries each year which lead to emergency department, more than 90% of deaths occur in low- and middle-income countries (WHO, 2024).

Based on the statistical analysis of the World Health Organization between 2011-2020, Egypt reported the highest incidence of Road traffic accidents with an average of 12,295 deaths every year (30% Females, 70% Males). Moreover, Egypt reported almost

154,000 injuries related to road traffic accidents. There are many factors for the high incidence of mortality rates, one main factor is the failure to accurately apply triage within Emergency departments (WHO, 2022).

According to the records of the statistical office, Benha University Hospital, the total numbers of emergency cases during the year 2020 were around 3742 case and about 6673 cases during the year 2021 that were admitted in the emergency department (Statistical Office at Benha, Qalubia University Hospital, 2023).

Based on the previous studies, nurses are in need to increase /improve their competencies related to triage. Therefore, this study was conducted to determine the effect of the educational program on nurses' competencies of the patients' triage at the emergency department.

Aim of the study

The study aimed to evaluate the effect of educational program on the nurses' triage competency for emergency patients.

Research hypothesis:

To fulfill the aim of the study, the following hypotheses were formulated:

- H1:** There is supposed a significant improvement in the nurses' knowledge after implementing an educational program of triage.
- H2:** There is supposed a significant improvement in the nurses' attitude after implementing an educational program of triage.
- H3:** There is supposed a significant improvement in the nurses' practice after implementing an educational program of triage.
- H4:** There is supposed an association between the nurses' knowledge, skill, attitudes and their demographic characteristics post implementing educational program of triage.

Research design:

A quasi-experimental research design was utilized to fulfill the aim of this study.

Setting:

The study was conducted at the emergency department, Benha University Hospital, Egypt.

Subjects:

A purposive sample of 50 nurses from a total number of 57 nurses of both sex who providing care in the ED were willing to participate in the study.

Inclusion Criteria

Nurses included in this study who being 21 years of age or older and not less than one year of experience.

Exclusion criteria

Nurses were excluded from this study who attend any previous courses about triage and were on vacation during the study.

Tools for data collection:

Two tools were used to collect data for this study as the following:

Tool I: Self-Administered Questionnaire:

It was developed by the researchers through reviewing the recent relevant literatures and scientific references. It includes: -

Part 1: Demographic characteristics of nurse. It included 6 questions (Qs) as age, gender, social status, educational level, years of triage experience in the emergency department and working hours/ week.

Part 2: Nurses' Knowledge Assessment Questionnaire: It was adapted from **Malak et al., (2022); Bahlibi et al., (2022)** and aimed to assess the emergency nurses' knowledge regarding the triage process. It was consisted of 36 MCQs questions including the concept of triage, preparing for triage system, principles of applying triage system, role of nurses in the triage process, role of nurses in the rapid assessment process and role of nurses in the process of patient categorization and allocation.

Scoring System:

The correct answer scored 1 and the incorrect answer scored 0. The total score was 36 marks equal to 100%, and was summed up and converted into a percentage, and categorized as the following:

- A score of >85% referred to a good level of knowledge.
- A Score of 65%- 85% refers to a fair or enough level of knowledge.
- A score of <65% referred to a poor level of knowledge.

Part 3: Nurses' Attitude Assessment Questionnaire:

It was adapted from **Faheim et al., (2019)** and aimed to assess the emergency nurses' attitude towards nursing intervention concerning the patients' triage including the primary triage area, the secondary triage area, and the final triage area in the emergency unit.

Scoring system:

The nurses' attitude questionnaire included 30 statements. The grading scores for the attitude statements were classified into 3=agree, 2=natural, and 1=disagree. The score for the negative attitude statements was 1=agree, 2=natural, and 3=disagree. The total score was 90 grades. It was summed up and categorized as follows:

- $\geq 80\%$ was considered positive nurses' attitude.
- $60\% - < 80\%$ was considered moderate or neutral nurses' attitude.
- $< 60\%$ was considered negative attitude.

Tool II: Nurses' practice observational checklists:

The tool was adapted from **Eaid, (2021); AlShatarat et al., (2022)** and aimed to assess the emergency nurses' triage skills level to support and act as a coordination within the medical care system. It includes rapid assessment (primary and secondary surveys), patient categorizations, and patient allocations.

Scoring system:

Each skill was assigned a score according to sub items. The total score of nurses' practices was 105 degrees. The nurses were observed to respond to each item using a rating scale 1= poor, 2= need improvement, 3= fair, 4= good, 5= very good. These scores were summed up and were converted into a percentage score. It was classified as follows:

- Low level triage skill if total score < 65%.
 - Moderate level score if the total score 65-85%.
 - High level score if total score > 85%.

Validity and Reliability

Tools validity: The face and content validity of the tools were checked by a jury consisting of five experts in the field of medical-surgical nursing from the faculty of nursing, at Benha University. The experts reviewed the tools to check the questions' relevancy, simplicity, clarity, comprehensiveness, and applicability. The consensus among experts regarding the questionnaire was 98 %, and the observational checklist and patients' health outcomes assessment sheet were 99 % for most items. Also, a designed program that covered all items related to triage based on recent current literature was revised by the same experts then all required modifications were done consequently and the final form of the tools was used for data collection.

Tools Reliability: The reliability of the study tools was tested using Cronbach's alpha coefficient Reliability. The reliability scores of the tools of the knowledge and attitude questionnaire and practice checklist were as follows :

Knowledge	0.783	36
attitude	0.902	30
practice	0.974	78

Ethical considerations:

- The study approval was obtained from the ethical committee of the nursing faculty

before initiating the study work (REC. MCN.P. 91).

- The researchers clarified the purpose and aim of the study to nurses who confirmed the study before data collection.
- Verbal and written consent was obtained from the nurses to participate in the study.
- The researchers were assured of maintaining anonymity and confidentiality of data.
- The nurses were informed that they were allowed to choose their participation in the study and have the right to withdraw from the study at any time.

Educational Program Handout:

The educational program was designed by researchers through a review of related literature to meet the nurses' learning needs regarding triage knowledge, skills, and attitude. It included the theoretical and practical parts.

Method:

I- Administrative design:

Official permission to conduct the study was obtained from the hospital director, nurse supervisor and head nurse of the Emergency department at Benha University Hospital by the submission of a formal letter from the dean of the faculty of nursing at Benha University.

II-Preparatory phase:

This phase included reviewing of literature on various aspects of this study to develop the appropriate tools for data collection according to supervisors' guidance and experts' opinions. The researchers developed a booklet in Arabic language. During this phase, the researchers also visited the study setting to be acquainted with the personnel and the setting.

Pilot study:

It was conducted on 10% (5 nurses) of the study subjects to test the clarity and applicability of the study tools and the program, and estimate the time required for

each tool to be filled by the nurses and researchers as well as to identify any possible obstacles that may hinder data collection. Based on the results of the pilot study the necessary modifications were done for more applicable tools to collect data. The nurses selected for the pilot study were excluded from the study subjects. The pilot study was done two weeks before starting the study.

III- Fieldwork:

The data collection process was performed over a period of seven months, started from the beginning of December 2023 to the end of June 2024. The study was conducted through the following four phases:

Assessment phase: During this phase, the researchers assessed the nurses' demographic characteristics, knowledge, and attitude. As well as, the nurses' practices observed by the researchers using tools of data collections.

Planning phase: The patients' booklet developed by researchers regarding patient triage. The researchers set up a teaching plan covering general and specific objectives to be implemented using various methods of educational strategy and media. The program resources and facilities were allocated as printed material and the location or site of the sessions that best served the learner. The researchers determined the timetable of sessions with the nurses for starting program sessions.

Implementation phase: The program implementation was carried out in the emergency department and was conducted in 4 sessions, two theoretical sessions and two practical sessions. Each session lasted about 30-45 minutes and included 4-5 nurses. Each session included periods of discussion according to the nurses' progress and feedback and the booklet was given to them to guide them in triage process. **Evaluation phase:** The posttest was done by using the same study tools of the pretest for nurses immediately for knowledge and practice, and

done 1st and 3rd month after implementing the educational program for knowledge and practice, and attitude to determine the effect of implementing the educational program regarding patient triage.

Statistical analysis:

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using numbers and percentages. The Shapiro-Wilk test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard deviation, median, and interquartile range (IQR). The significance of the obtained results was judged at the 5% level.

Results

Table (1): Shows the frequency and percentage distribution of the studied nurses according to their demographic characteristics. It reveals that (52%) of studied nurses were in the age category 30 – < 40 years with a mean age of 33.02 ± 5.26 , and (80%) were female. Also, (62%) of them were married and (58%) had Bachelor degree in Nursing, and (46%) had from 5 to less than 10 years with a mean of 10.50 ± 5.64 and (50%) had worked more than 45 work hours/week.

Table (2): Shows the mean score, standard deviation and significant difference of the studied nurses' knowledge of triage pre and post educational program implementation. It reveals that the mean score of the total knowledge pre-educational program implementation was 18.54 ± 5.86 . On the other hand, this score was improved immediately post-educational program implementation to 31.82 ± 2.34 regarding the same items, and then decreased slightly in the average follow up period (1st & 3rd month) post-educational program implementation to

29.06 ± 3.29 with significant difference at $p = <0.001$.

Table (3): Shows the frequency and percentage, mean and standard deviation of the studied nurses according to the level of their attitudes regarding triage pre and post educational program implementation, it revealed that the total mean score of the nurses' attitude was improved from 51.48 ± 15.58 pre-educational program implementation to 78.08 ± 5.34 post-educational program implementation (average follow up period).

Table (4): Shows mean score, standard deviation and significant difference of the studied nurses' practice regarding triage pre and post educational program implementation. It reveals that the mean score of the total practice pre-educational program implementation was 177.2 ± 34.54 . On the other hand, this score was improved immediately post-educational program implementation to 344.7 ± 37.59 regarding the same item, but this score slightly declined in the average follow up period (1st & 3rd month) post-educational program implementation to 333.5 ± 39.65 with significant difference at $p = <0.001$.

Table (5): Shows the relation between studied nurses' knowledge, practice and attitude with their demographic characteristics pre and post educational program implementation. It revealed that there was a statistically significant relation between nurses' knowledge with their age at $p \leq 0.05$ pre and post educational program implementation. on the other hand, there was a statistically significant relation between years of experience and their level of practice pre and post educational program implementation at $p \leq 0.05$.

Table 1: Frequency and percentage distribution of the studied nurses according to their demographic characteristics (n = 50).

Demographic characteristics	No.	%
Age (years)		
21 – < 30	17	34
30 – < 40	26	52
40 – < 50	7	14
Mean ± SD.	33.02 ± 5.26	
Sex		
Male	10	20
Female	40	80
Social status		
Single	12	24
Married	31	62
Divorced	4	8
Widower	3	6
Education level		
Diploma	3	6
Nursing technician	9	18
Bachelor degree in nursing	29	58
Postgraduate studies	9	18
Years of triage experience in ED		
1 –< 5 year	6	12
5– <10 years	23	46
≥10 years	21	42
Mean ± SD.	10.50 ± 5.64	
Work hours/week		
35– < 40 hours	12	24
40 – ≤ 45 hours	13	26
More than 45 hours	25	50

Table 2: Mean score, standard deviation and significant difference of the studied nurses' knowledge regarding triage pre and post educational program implementation (n = 50).

Nurses' knowledge	Pre	Post		Relation		
		Immediate	Average follow up (1 st & 3 rd month)	F (p)	p ₁	p ₂
Total score	Mean ± SD.	Mean ± SD.	Mean ± SD.			
The concept of triage in ED	5.08 ± 2.36	9.70 ± 0.89	9.62 ± 1.29	129.501* (<0.001*)	<0.001*	<0.001*
Preparing for the triage system in the ED	1.72 ± 0.97	3.54 ± 0.50	3.36 ± 0.85	75.322* (<0.001*)	<0.001*	<0.001*
Principles of implementing triage system	2.52 ± 1.13	4.58 ± 0.50	4.38 ± 0.97	71.094* (<0.001*)	<0.001*	<0.001*
Role of nurses in the triage process	2.48 ± 0.91	3.42 ± 0.76	3.18 ± 1.10	12.684* (<0.001*)	<0.001*	0.007*
Role of the nurses regarding the rapid assessment process	3.58 ± 1.51	5.28 ± 0.93	4.38 ± 1.70	17.517* (<0.001*)	<0.001*	0.024*
The role of the nurses regarding the process of patients' categorization and allocation	3.16 ± 1.28	5.30 ± 0.71	4.14 ± 1.68	31.026* (<0.001*)	<0.001*	0.010*
Overall	18.54 ± 5.86	31.82 ± 2.34	29.06 ± 3.29	134.788* (<0.001*)	<0.001*	<0.001*

Table (3): Frequency and percentage distribution, mean and standard deviation of the studied nurses according to their attitudes regarding triage pre and post educational program implementation (n=50).

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Nurses' attitudes	Pre program							Post average follow up (1 st - 3 rd month)						
	Negative (<60%)		Moderate or neutral (60–<80%)		Positive (≥80%)		Total score	Negative (<60%)		Moderate or neutral (60–<80%)		Positive (≥80%)		Total score
	No.	%	No.	%	No.	%	Mean ± SD.	No.	%	No.	%	No.	%	Mean ± SD.
Primary triage area	35	70.0	10	20.0	5	10.0	13.84 ± 4.71	4	8.0	9	18.0	37	74.0	20.52 ± 1.99
Secondary triage area	38	76.0	7	14.0	5	10.0	17.88 ± 5.99	5	10.0	11	22.0	34	68.0	28.56 ± 4.57
Final triage area	33	66.0	11	22.0	6	12.0	19.16 ± 6.38	3	6.0	8	16.0	39	78.0	29.0 ± 1.92
Overall	34	68.0	11	22.0	5	10.0	51.48 ± 15.58	3	6.0	11	22.0	36	72.0	78.08 ± 5.34

Table 4: Mean score, standard deviation and significant difference of the studied nurses' practice regarding triage pre and post educational program implementation (n=50).

Nurses' practice	Pre program	Post		Relation		
		Immediate	Average follow up (1 st & 3 rd month)	F (p)	p ₁	p ₂
Total score	Mean ± SD.	Mean ± SD.	Mean ± SD.			
Rapid assessment	140.8 ± 27.40	273.2 ± 34.01	263.70 ± 36.05	398.851*(<0.001*)	<0.001*	<0.001*
Patient categorization	25.0 ± 5.74	48.98 ± 6.49	47.98 ± 5.51	317.203*(<0.001*)	<0.001*	<0.001*
Patient allocation	11.46 ± 2.47	22.52 ± 3.54	21.82 ± 4.42	160.511*(<0.001*)	<0.001*	<0.001*
Overall	177.2 ± 34.54	344.7 ± 37.59	333.5 ± 39.65	488.959*(<0.001*)	<0.001*	<0.001*

Table 5: Relation between studied nurses' knowledge, practice and attitude and their demographic characteristics pre and post educational program implementation (n = 50).

Demographic characteristics	Nurses' knowledge		Nurses' practice		Nurses' Attitude	
	Pre program	Average follow up (1 st & 3 rd month)	Pre program	Average follow up (1 st & 3 rd month)	Pre program	Average follow up (1 st & 3 rd month)
	Mean ± SD.	Mean ± SD.	Mean ± SD.	Mean ± SD.	Mean ± SD.	Mean ± SD.
Age (years)						
21 – < 30	16.47 ± 7.53	27.59 ± 3.62	179.9 ± 39.20	326.7 ± 47.05	47.53 ± 14.13	77.88 ± 6.08
30 – < 40	18.0 ± 2.74	29.46 ± 2.97	174.8 ± 33.82	334.0 ± 37.96	54.81 ± 16.40	78.35 ± 5.0
40 – < 50	25.57 ± 5.22	31.14 ± 2.12	179.7 ± 28.76	348.0 ± 23.61	48.71 ± 15.12	77.57 ± 5.38
F (p)	7.967* (0.001*)	3.667* (0.033*)	0.126 (0.882)	0.711 (0.496)	1.263 (0.292)	0.073 (0.930)
Education level						
Diploma of Nursing	16.67 ± 1.15	29.33 ± 1.15	167.33 ± 8.14	332.33 ± 29.77	48.33 ± 16.17	77.67 ± 6.66
Nursing technician	16.11 ± 9.98	27.78 ± 3.93	185.00 ± 27.92	324.78 ± 37.33	47.22 ± 15.02	80.11 ± 2.09
Bachelor degree of Nursing	18.62 ± 5.04	29.21 ± 3.32	176.97 ± 36.48	333.69 ± 45.30	54.55 ± 15.74	77.97 ± 5.71
Postgraduate Studies	21.33 ± 2.24	29.78 ± 3.03	173.67 ± 41.62	354.78 ± 26.15	46.89 ± 15.72	76.56 ± 6.13
F (p)	1.326 (0.278)	0.612 (0.611)	0.254 (0.858)	0.910 (0.444)	0.895 (0.451)	0.676 (0.571)
Years of triage experience in ED						
1 – < 5 years	17.50 ± 1.38	30.67 ± 0.82	207.2 ± 39.22	363.0 ± 15.05	52.0 ± 21.12	79.83 ± 2.32
5 – < 10 years	18.35 ± 6.59	28.70 ± 3.47	183.5 ± 20.07	340.2 ± 30.80	53.61 ± 17.30	78.70 ± 5.28
≥10 years	19.05 ± 5.95	29.00 ± 3.48	161.9 ± 39.15	317.7 ± 46.66	49.0 ± 11.92	76.90 ± 5.92
F (p)	0.179 (0.836)	0.858 (0.431)	5.594* (0.007*)	4.120* (0.022*)	0.474 (0.626)	0.985 (0.381)

Discussion

The application of triage within emergencies is one of the main procedures that promote the safety and quality of patient care. Nurses should have adequate knowledge, skills, and attitudes regarding triage to be correctly applied within healthcare settings (Abdel Aleem et al., 2024).

Emergency nurses have a vital role within emergency departments in the application of triage to maintain patient safety, provide the appropriate care, and decision making for patients. Emergency nurses who work in emergency departments deal with potentially life-threatening health conditions, that require the ability of nurses to apply advanced nursing interventions for patients to survive and recover (Curtis et al., 2023). So, this study aimed to evaluate the effect of educational program on the nurses' triage competency for emergency patients.

Regarding demographic characteristics of the studied nurses; the results of the current study revealed that slightly more than half of the studied nurses were recorded within the age group of thirty to less than forty years old with a mean age of 33.02 ± 5.26 . From the researchers' point of view this result may be due to most of the nurses included in the study who graduated more than 4 years old. This indicated that the studied nurses were within the active-working age group. So, this reflects the nurses' experience in emergency departments and the high ability to tolerate the nature of the work environment of emergency Rooms.

This result is in the same line with a study by Oh& Jung, (2024) about "Triage—clinical reasoning on emergency nursing competency: a multiple linear mediation effect", and revealed that less than half of the nurses' ages were from thirty to thirty- nine years old with

a mean age of 33.31 ± 6.97 . while, there is disagreement with Ali et al., (2024) who studied "Investigating the Level of Knowledge regarding Triage Management among Nurses Working in Public Sector Hospital of Peshawar", and reported that the participants aged 26-30 years were higher compared to other age groups.

Regarding to gender, the current study results showed that four- fifths of the studied nurses were females. This finding is congruent with Seo et al., (2024) about "Factors influencing the classification accuracy of triage nurses in emergency department: analysis of triage nurses' characteristics" and revealed that nearly four-fifths of the studied nurses were female. But the current study is incongruent with a study conducted by Kouro & Iroko, (2024) about "Knowledge, Practice, and Perception of Triage by Staff of the Emergency Department of Ho Teaching Hospital: KPP of Triage by ED Doctors and Nurses", and showed that nearly two-thirds of the studied sample was male.

Concerning social status, the result of the current study revealed that more than three fifths of the studied nurses were married. This finding is supported by Alazaka & Mohamed, (2024) about "Perception and Satisfaction of Nursing Staff Regarding Triage Application in the Emergency Department", it revealed that more than half of the studied nursing personnel were married. This result dis-agree with Kavaklı et al., (2024) about "Investigation of Triage Knowledge of Nurses", and showed that more than half of the nurses were single.

Concerning the education level, the results of the current study revealed that less than three- fifths of the studied nurses had bachelor's degree in nursing. This finding agrees with a study by Leite et al., (2023) entitled "Relationship Between the Level of

Knowledge of Nurses About Triage with The Application of Triage at Emergency Department Hospital", and showed that more than half of the respondents from nurses working in the emergency department had a bachelor degree. This result disagrees with a study was done by **Imran et al., (2024)** about "Overview Management Triage at The Emergency Room of The Hospital at Jambi", and asserted that overall, the respondents' level of education is a Diploma in Nursing.

As regards the years of triage experience in ED, the current study showed that less than half of the studied nurses had from five to less than ten years with a mean of 10.50 ± 5.64 . This finding is consistent with a study was done by **Gholami et al., (2023)** about "Effect of triage training on nurses' practice and triage outcomes of patients with acute coronary syndrome", and it showed that half of the nurses had between 6 and 10 years of experience in the ED. This finding disagrees with a study by **Aghabarary et al., (2023)** about "Investigating the professional capability of triage nurses in the emergency department and its determinants: a multicenter cross-sectional study in Iran", which reported that the mean years of work experience as triage nurse was $4.95 \pm (4.25)$.

As regard to the work hours/week, the current study showed that half of the studied nurses had worked more than forty-five work hours per week. This finding is consistent with a study was done by **Mansour et al., (2015)** about "Effect of Implementing Triage Training Competencies on Newly Graduated Nurses Working in Emergency Hospital", and mentioned that less than three fifths of the nurses in the study group working 45 hours and more, compared to more than two thirds of them in the control group.

Regarding nurses' total knowledge scores regarding patient triage, the study revealed that the mean score of the total knowledge pre-educational program implementation was low. On the other hand, this score was improved immediately post-educational program implementation, and then decreased slightly in the average follow-up (1st & 3rd month) post-educational program implementation with a significant difference at $p = <0.001$. From the researchers' point of view, this result could be explained by the positive effect of the educational program. Also, the topic of the study is considered vital and sensitive to their work in such critical units, so the studied nurses were very interested and satisfied during educational sessions.

This finding agrees with **Ghadami et al., (2021)** about "The Effect of Triage Maneuver of Patients Referred to the Emergency Department During the Crisis on the Level of Military Nurse's Knowledge and Attitude", and showed that the mean knowledge scores were significantly improved in the intervention group after the application of triage than before with ($P < 0.05$).

Regarding nurses' total attitude score regarding patient triage, the current study revealed that the mean score of the total attitude regarding triage pre-educational program implementation was low. On the other hand, this score was improved in the average follow-up (1st & 3rd month) post-educational program implementation.

This finding in the same line with a study by **Habibinezhad et al., (2021)** about "The effect of interactive training on emergency nurses' readiness and attitude through triage", and showed that the mean of nurses' attitude score regarding triage improved in the post-

training than before- training with significant difference ($P < 0.0001$).

Regarding nurses' total practice scores about patient triage, the current study revealed that the mean score of the total practice pre-educational program implementation was low. On the other hand, this score was improved immediately post-educational program implementation, but they slightly declined in the average follow-up (1st & 3rd month) post-educational program implementation with a significant difference at $p = < 0.001$.

This finding agrees with a study by **Shawah'en et al., (2024)** about "Triage Knowledge Level and Skills among Emergency Nurses in Jordan: A quasi-experimental Study", and showed that there was a statistically significant increase in triage skills post-administration of the triage educational program compared with the pretest scores at $p = 0.000$.

Concerning relation between studied nurses' knowledge, practice and attitude with their demographic characteristics, the study revealed that there was a statistically significant relation between nurses' knowledge with their age and between years of experience and their level of practice pre and post educational program implementation at $p \leq 0.05$.

This result is in the same line with a study by **Bista et al., (2022)** titled "Knowledge on Triage Management among Nurses in a Tertiary Level Hospital of Kathmandu", and showed that there was a significant association between knowledge level and age group. This result is in the same line with a study done by **Malak, et al., (2022)** titled "Knowledge, Skills, and Practices of Triage among Emergency Nurses in Jordan", which reported

that triage practice had a significant association with triage experience.

While this result is in disagreement with a study done by **Shawah'en et al., (2024)**, which showed that there was no significant relation between total nurses' knowledge and their age also, between total nurses' skills and their years of experience in triage before and after implementation of an educational program.

Conclusion

The implementation of an educational program on patient triage significantly enhanced nurses' knowledge, attitudes, and practices post-implementation compared to pre-. Additionally, there was a correlation between nurses' knowledge, skills, attitudes, and demographic characteristics after the educational program, which supported the study hypothesis.

Recommendations

- ❖ Further study is needed to apply the guidelines with a larger sample size and different settings to generalize the findings.
- ❖ Development of protocols and policies of the ER departments that include and highlight the importance of triage application.
- ❖ Regular evaluation on triage practices application should be performed by hospital management departments that focus on the importance of triage application in saving patient's lives and decreasing the workload of ER healthcare providers.

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تأثير برنامج تعليمي على كفاءة فرز الممرضين لمرضى الطوارئ

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الفرز هو العملية التي تضع مريض الطوارئ في المكان المناسب في الوقت المناسب لتلقي المستوى المناسب من الرعاية في العديد من أقسام الطوارئ ، أصبحت الممرضة في دور الفرز حارس البوابة للرعاية الطبية، وممرضة الفرز مسؤولة عن التخصيص الكفاء والفعال لموارد قسم الطوارئ. لذا هدفت هذه الدراسة إلي تقييم تأثير برنامج تعليمي على كفاءة فرز الممرضين لمرضى الطوارئ. وقد أجريت هذه الدراسة علي عينة هادفة من ٥٠ ممرض من إجمالي عدد ٥٧ ممرض لكلا الجنسين ويقومو بتقديم الرعاية في قسم الطوارئ وعلى استعداد للمشاركة في الدراسة. وكشفت النتائج عن انه كان هناك تحسن كبير في معلومات الممرضين وموقفهم وممارساتهم بعد تنفيذ البرنامج التعليمي وكان هناك ارتباط بين معرفة الممرضين ومهاراتهم ومواقفهم وخصائصهم الديموغرافية بعد البرنامج التعليمي. كما اوصت الدراسة الي ان هناك حاجة إلي المزيد من الدراسة لتطبيق البرنامج التعليمي بحجم عينة أكبر وإعدادات مختلفة لتعميم النتائج.