

Nurses' Performance Regarding Triage in Emergency Unit: Suggested Guideline

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Abstract

Background: A hospital's emergency department (ED) is the first contact point in the healthcare system. Triage system is the vital structure by which all incoming emergency patients are prioritized using a standard triage rating scale based on urgency. **Aim of study:** The study aimed to assess nurses' performance regarding triage in emergency unit. **Design:** A descriptive exploratory research design was utilized to achieve the aim of this study. **Setting:** The study was conducted in three emergency units at Ain Shams University Hospital; Surgical emergency unit, medical emergency unit and new emergency care unit. **Study subjects:** A convenient sample of 100 nurses who represent all available nurses in the previous mentioned setting. **Data collection tools:** I- Nurses' Knowledge Assessment Questionnaire which included; demographic characteristics, hospital emergency unit data and nurses' knowledge II- Nurses' Triage Competencies Observational Checklists. III- Nurses' Attitude Measuring Scale. **Results:** The study showed that, the mean age of the studied nurses was 30.98 ± 8.22 years, 77.0% of nurses were female, 46.0% of them graduated from technical nursing institute and 53.0% of them had 5-<10 years of experience. Regarding level of knowledge and practice, 56.0% of the studied nurses had unsatisfactory level of knowledge, 51.0% of them had incompetent level of practice and 54.0% of the studied nurses had negative attitude related to patients' triage in the emergency unit. **Conclusion:** The study findings concluded that, more than half of studied nurses had unsatisfactory level of knowledge, incompetent level of practice and negative attitude related to patients' triage in the emergency unit. Also, there was a significant positive correlation between total level of knowledge and level of practice and attitude. **Recommendation:** On-going and regular in-services educational programs regarding evidence-based guidelines should include the nurse performances regarding triage in emergency unit.

Keywords: Nurses' Performance, Triage, Emergency Unit, Suggested guideline.

Introduction

A hospital's emergency department (ED) is the first contact point in the healthcare system. It is a vital component of hospitals and extremely complicated systems, providing emergency treatment 24 hours a day, seven days a week. Improving the effectiveness of emergency departments in hospitals has been identified as a key aim of health policy-making in delivering the care that needy patients require (Sabir & Mustafa, 2023).

Triage system is the vital structure by which all incoming emergency patients are prioritized using a standard triage rating scale

based on urgency. The purpose of a triage system is to ensure that the level of emergency care provided is corresponding with clinical criteria. Two of the most widely adopted scales are the Manchester Triage Score (MTS) and Canadian Triage & Acuity Score (CTAS) (Joseph et al., 2023).

Triage systems are inherent to the functioning of emergency services, establishing a hierarchy of care based on clinical risk. Thus, it is essential that emergency services that serve children and adult adopt validated models and are applied by properly trained and certified staff (Viana et al., 2023).

Triage is a basic step in managing major incidents properly. It is not differ from bioethics, but it is looking from a different focus to make the best to the whole community. It has no fixed rules, and the triage officer must look for different aspects of resources and patients as well as the situation to make the best triage decision leading to most benefits for all stakeholders (**Bakr & Badawi, 2022**)

The emergency nurse must initially have all the core competencies to function within the emergency department such as Basic Life Support, CPR and Pediatric Advanced Life Support and also, she must have completed a unique triage program. For the first assessment as the patient arrives, the nurse has the initial set of eyes to identify the signs of a patient in distress. For this reason, the emergency nurse who-denoted to making triage decisions must have a diverse knowledge base and strong physical assessment skills. There are many factors that affect emergency nurses' performance (**Hu et al., 2022**).

Those factors may be job regulation related factors or nurses related factors, so human resources policies need to focus on overcoming the factors that may affect negatively on the nurses' performance. Also, it is important to develop nurses' knowledge and skills, so efforts should be directed towards enhancing creativity among nurses and access to update information and continuous educational opportunities (**Ahmed et al., 2019**).

Significance of the study

Triage is a highly important activity and solves many problems of emergency services, such as overcrowding by patients and improves the quality of health outcomes cost-effectively (**Faheim et al., 2019**).The rate of ED visits was more than 400 per 1, 000 population; over 85 percent of ED visits involved patients who were treated and released from the ED (**Audrey et al., 2021**).

In emergency departments nurses make triage but without triage knowledge and with defect in performing process of triage (**Bahlubi et al., 2022**). Based on the pervious studied and

observation during clinical experience of the investigator, nurses are in need to increase/improve their performance including KAS related to triage. If the triage is activated in the emergency department, it might lead to save life of a lot of patients using of minimum time and providing effective management for patients in priority. Therefore, this study was conducted to assess nurse's performance regarding triage in emergency units and develop a suggested guideline.

Aim Of The Study

This study aims to assess nurse's performance regarding triage in emergency unit.

Research questions:

- 1.What is nurses' knowledge regarding triage in emergency unit?
- 2.What is nurses' practice regarding triage in emergency unit?
- 3.What is nurses' attitude regarding triage in emergency unit?
- 4.What are developing a suggested guideline regarding triage in emergency unit?

Subjects And Methods

The study was portrayed under the four main designs as the following:

- I. Technical design.
- II. Operational design.
- III. Administrative design.
- IV. Statistical design.

I. Technical design:

The technical design includes research design, setting, subject, and tools of data collection.

Research design:

A descriptive exploratory design was be utilized to answer the research questions.

Setting:

This study was conducted three emergency units at Ain Shams University Hospitals; Surgical emergency unit, medical emergency unit and new emergency care unit.

Subject:

A convenient sample of 100 nurses who represent all available nurses in the previous mentioned setting.

Tools of data collection:

Data were collected using the following tools:-

Tool I: Nurses' Knowledge Assessment Questionnaire:

This tool was developed by the investigator in simple Arabic language based on extensive review of relevant and recent literatures (Ahmed & Ally, 2019, Duko, et al., 2019 and Gebire et al., 2019). It included the following parts:

- **First part:** It was concerned with demographic characteristics of the nurses under the study.

- **Second part:** It was concerned with data of hospital emergency unit.

- **Third part:** It was concerned with the assessment of nurses' knowledge regarding triage in emergency unit. It consisted of 73 closed ended questions under eight main domains.

Scoring system

The total score of studied nurses' knowledge ranged from 0-73 degree which equal 100%. A score of one was given for each correct answer and a zero for each incorrect answer or don't know. These scores were summed up and converted into a percentage score and categorized as follow:

- **Satisfactory** if total score $\geq 85\%$
- **Unsatisfactory** if total score $< 85\%$

Tool II: - Nurses' Triage Competencies Observational Checklists:

This tool was developed by the investigator after reviewing of the related recent literature (Kerie et al., 2018, Society of Trauma Nurses, 2019, Advanced Trauma Life Support, 2020 and Thomas, 2020). It aimed to assess nurses' practice regarding triage

in emergency unit. It included 191 items under four main domains.

Scoring system

The total score of studied nurses' practices was 191 degree which equal 100%. Each item observed to be done was scored one and each item that was not done or not applicable was scored zero. These scores were summed and converted into a percentage score and categorized as follow:

- **Competent** if total score $\geq 90\%$.
- **Incompetent** if total score $< 90\%$.

Tool III: -Nurses' Attitude regarding Triage Measuring Scale: -

This tool was developed by the investigator after reviewing of the related recent literature (Hemmatipour & Shahvali, 2018 and Reisi et al., 2018). It included 49 items aimed to assess nurses' attitude regarding triage in emergency unit.

Scoring system

The grading score for the positive statements were scored agree=3, natural=2 and disagree=1. While, the score for the negative statements were scored agree= 1, natural=2 and disagree=3. These scores were summed and converted into a percentage score and categorized as follow:

- **Positive** if total score $\geq 85\%$.
- **Negative** if total score $< 85\%$.

II. Operational design:

The operational design included preparatory phase, content validity and reliability, pilot study and field work.

A- Preparatory phase:

It includes reviewing the recent related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals, magazines in order to develop and modify the data collection tools.

B- Tool's validity and reliability:

- **Validity:**

The face and content validity was done through a panel of 7 experts from Medical Surgical and Critical Care Nursing Department, Faculty of Nursing, Ain Shams University. Their opinions were regarding comprehensiveness, accuracy, clarity, relevance and appropriateness of the study tools. Minor modifications were done based on expert's judgment and the final form was developed.

● **Reliability:**

Reliability of tools was tested statistically using Cronbach's Alpha which is a model of internal consistency and its normal range between 0 and 1 (value more than 0.5 acceptable reliability). Nurses' knowledge questionnaire was reliable at 0.81, observational checklist was reliable at 0.85 and nurse's attitude questionnaire was reliable at 0.81.

C- Pilot study:

The pilot study was carried out on a group of 10 nurses who represent 10% of study sample to test the clarity, applicability, feasibility and relevance of the study tools and to determine the needed time for the application of the tools. The subjects who were included in the pilot study were excluded from the study sample as minor modification was done after conducting the pilot study.

D- Field of work:

A written informed consent was obtained from each participant prior to the data collection after explaining the aim of the study. Data collection started and completed within six months from the beginning of June 2022 to the end of December 2022.

Data collection was done at the previous mentioned setting four days per weeks (from Sunday to Wednesday) in the morning shift (9 AM – 1 PM) and afternoon shift (2 PM – 7 PM).

Each nurse took about 80 -195 minutes; Tool (I) which filled by the nurses took about 30-45 minutes, Tool (II) which filled by the investigator took about 30:120 minutes and Tool (III) which filled by the nurses took about 20-30minutes.

A suggested guideline for improving nurses' performance in (surgical, medical and new emergency care units) regarding applying triage system was developed by the investigator based on needs assessment.

Ethical Considerations:

Approval to conduct the study was obtained from the ethical committee in the Faculty of Nursing, Ain shams University before starting the study. The investigator explained and clarified the study aim and conducting way to the participants before taking the consent of participation. The investigator assured maintaining anonymity and confidentiality of data of subjects included in the study. The participants were informed about their right to withdraw from the study at any time without giving any reason.

III. Administrative design:

An official permission was obtained by submission of a formal letter issued from the Dean of Faculty of Nursing, Ain Shams University to the director of each of the previously mentioned setting. An official agreement was obtained from Hospital Manager to get their approval to conduct the study.

IV. Statistical design:

The collected data were organized, categorized, tabulated and statistically analyzed using the statistical package for social science (SPSS) version 26 and Microsoft office Excel 2020. Quantitative data were presented as mean and standard deviation (SD) while qualitative data were expressed as frequency and percentage. Chi-square test and fisher exact test used as a test of significance to test relations between quantitative variables as the variables were not normally distributed. P-value was considered as the following:

- **Non-significant** at > 0.5 ,
- **Significant** at ≤ 0.5 .
- **Highly significant** at ≤ 0.001 .

Results

Table 1 shows that, 53.0% of the studied nurses were in the age group 20-30 years old with mean age 30.98 ± 8.22 years, 77.0% of them were females and 68.0% of them were married. Also, 46.0% of them had technical nursing, 53.0% of them had 5-<10 years of experiences and 41.0% of them were working at surgical emergency unit. Additionally, 76.0% of them hadn't attended courses related to patients' triage.

Figure 1 illustrates that, 56.0% of the studied nurses had unsatisfactory level of knowledge while 44.0% of them had satisfactory level of knowledge about patients' triage in the emergency unit.

Table 2 shows that, 64.0% and 51.0% of the studied nurses had competent practice regarding immediate life-saving intervention and definitive care respectively. While, 66.0% and 57.0% of them had incompetent practice level regarding secondary survey and primary assessment (ABCDE) respectively.

Figure 2 illustrates that, 51.0% of the studied nurses had incompetent level of practice while, 49.0% of them had adequate level of practice related to patients' triage in the emergency unit respectively.

Figure 3 illustrates that, 54.0% of the studied nurses had negative attitude while 46.0% of them had positive attitude regarding patients' triage in the emergency unit.

Table 3 reveals that, there was a significant statistical relationship between total level of knowledge of the studied nurses and their educational qualification and years of experience at P-value 0.057 and 0.038

respectively. While, there was no significant statistical relationship between total level of knowledge of the studied nurses and their age, gender, marital status, department and attending courses related to patients' triage at P-value 0.787, 0.093, 0.369, 0.126 and 0.241 respectively.

Table 4 shows that, there was a significant statistical relationship between total level of practice of the studied nurses and their age, educational qualification and years of experience at P-value 0.058, 0.005 and 0.049 respectively. While there was no significant statistical relationship between total level of practice of the studied nurses and their gender, marital status, department and attending courses related to patients' triage at P-value 0.120, 0.115, 0.961 and 0.353 respectively.

Table 5 demonstrates that, there was no significant statistical relationship between total level of attitude of the studied nurses and their age, gender, educational qualification, years of experience and attending courses related to patients' triage at P-value 0.595, 0.634, 0.158, 0.345, 0.958, 0.138 and 0.203 respectively.

Table 6 shows that, there was statistically significant correlation between nurses' knowledge and practice ($r=0.678$, $p=0.042$). There was statistically significant correlation between nurses' knowledge and attitude ($r=0.663$, $p=0.034$). There was statistically significant correlation between nurses' practice and attitude ($r=0.749$, $p=0.058$) regarding patients' triage in emergency unit.

Table 1: Frequency and percentage distribution of demographic characteristics of the studied nurses (n=100).

Demographic characteristics		N	%
Age (in years)	20-30	53	53.0
	>30-40	40	40.0
	>40	7	7.0
	Mean ± SD	30.98 ± 8.22	
Gender	Female	77	77.0
	Male	23	23.0
Marital status	Unmarried	32	32.0
	Married	68	68.0
Educational qualification	Diploma of Nursing	34	34.0
	Technical Nursing Institution	46	46.0
	Bachelor of Nursing	16	16.0
	Post graduate	4	4.0
Years of experience	<1	5	5.0
	1-<5	13	13.0
	5-<10	53	53.0
	≥10	29	29.0
	Mean ± SD	8.55± 2.58	
Department	Medical emergency unit	37	37.0
	Surgical emergency unit	41	41.0
	New emergency care unit	22	22.0
Attending courses related to triage	Yes	24	24.0
	No	76	76.0

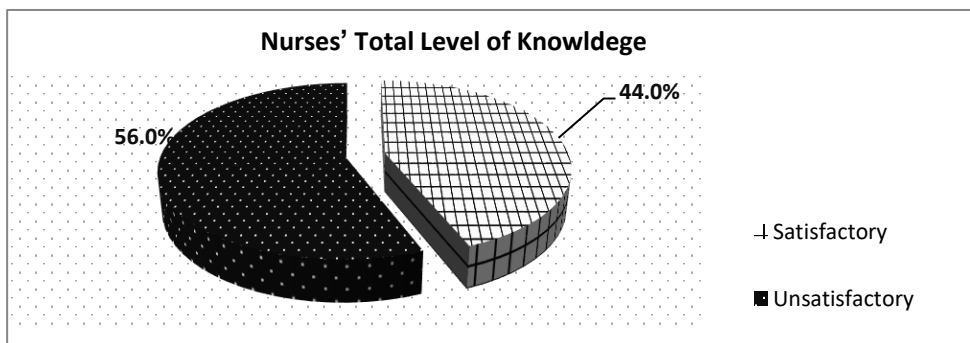


Figure 1: Nurses 'Total level of knowledge about patients' triage in the emergency unit among the studied nurses (n=100).

Table 2: Frequency and percentage Distribution of the studied nurses according to nurses' total levels of practices related to patients' triage in the emergency unit (n=100).

Items of practices	Competent		Incompetent	
	N	%	N	%
Primary assessment (ABCDE)	43	43.0	57	57.0
Immediate life-saving intervention.	64	64.0	36	36.0
Secondary survey	44	44.0	66	66.0
Definitive care	51	51.0	49	49.0

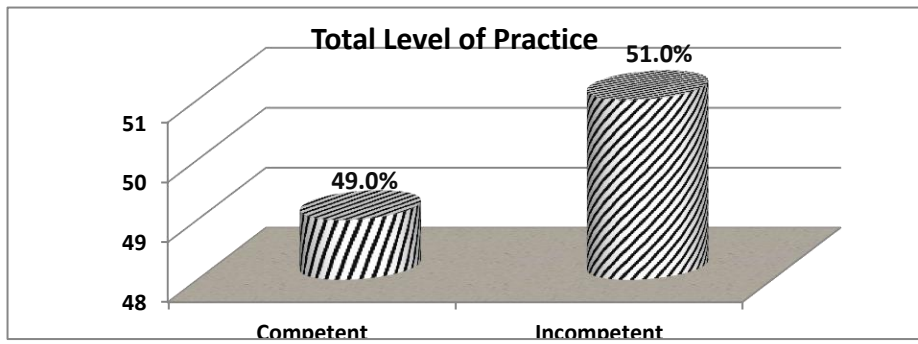
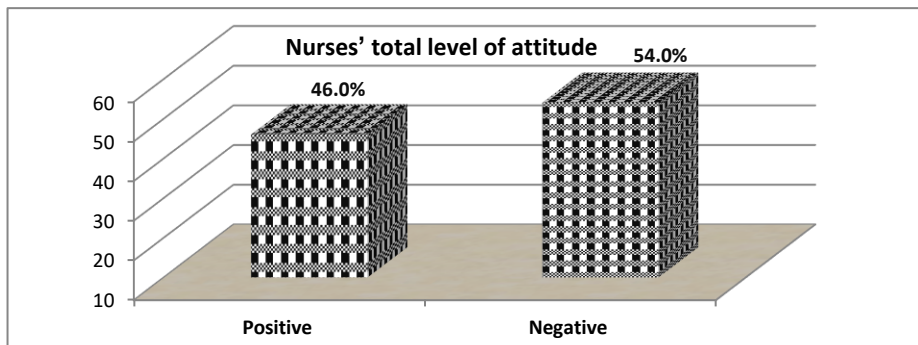


Figure 2: Nurses total level of practice related to patients' triage in the emergency unit among the



studied nurses (n=100).

Figure 3: Total level of attitude regarding patients' triage in the emergency unit among the studied nurses (n=100).

Table 3: Relationship between demographic characteristics of the studied nurses and their total level of knowledge (n=100).

Items		Total level of knowledge				X ² / FET	P-value
		Satisfactory		Unsatisfactory			
		N	%	N	%		
Age (in years)	20-30	25	25.0	28	28.0	0.480 ^{FET}	0.787 (NS)
	>30-40	16	16.0	24	24.0		
	>40	3	3.0	4	4.0		
Gender	Female	34	34.0	43	43.0	0.954	0.093 (NS)
	Male	10	10.0	13	13.0		
Educational qualification	Diploma of nursing	12	12.0	22	22.0	1.611 ^{FET}	0.057* (S)
	Technical nursing institution	22	22.0	24	24.0		
	Bachelor of nursing	8	8.0	8	8.0		
	Post graduate	2	2.0	2	2.0		
Years of experience	<1	3	3.0	2	2.0	6.670 ^{FET}	0.038* (S)
	1-5	8	8.0	5	5.0		
	5-10	17	17.0	36	36.0		
	>10	16	16.0	13	13.0		
Attending courses related to triage	Yes	18	18.0	6	6.0	12.316	0.241 (NS)
	No	26	26.0	50	50.0		

X²= Chi-Square test, FET= Fisher Exact Test, (NS) Non-significant if P-value > 0.05 and (S) Significant if P-value ≤ 0.05 *

Table 4: Relationship between demographic characteristics of the studied nurses and their total level of practice (n=100).

Items		Total level of practice				X ² / FET	P-value
		Competent		In competent			
		N	%	N	%		
Age (in years)	20-30	30	30.0	23	23.0	0.222 ^{FET}	0.058* (S)
	>30-40	16	16.0	24	24.0		
	>40	3	3.0	4	4.0		
Gender	Female	41	41.0	36	36.0	2.416	0.120 (NS)
	Male	8	8.0	15	15.0		
Educational qualification	Diploma of nursing	21	21.0	13	13.0	3.326 ^{FET}	0.005* (S)
	Technical nursing institution	19	19.0	27	27.0		
	Bachelor of nursing	6	6.0	10	10.0		
	Post graduate	3	3.0	1	1.0		
Years of experience	<1	1	1.0	4	4.0	2.167 ^{FET}	0.049* (S)
	1-5	5	5.0	8	8.0		
	5-10	30	30.0	23	23.0		
	>10	13	13.0	16	16.0		
Attending courses related to triage	Yes	14	14.0	10	10.0	1.101	0.353 (NS)
	No	35	35.0	41	41.0		

X²= Chi-Square test, **FET**= Fisher Exact Test, **(NS)** Non-significant if P-value > 0.05 and **(S)** Significant if P-value ≤ 0.05 *

Table 5: Relationship between demographic characteristics of the studied nurses and their total level of attitude (n=100).

Items		Total level of attitude				X ² / FET	P-value
		Positive		Negative			
		N	%	N	%		
Age (in years)	20-30	22	22.0	31	31.0	1.038 ^{FET}	0.595 (NS)
	>30-40	20	20.0	20	20.0		
	>40	4	4.0	3	3.0		
Gender	Female	34	34.0	43	43.0	0.458	0.634 (NS)
	Male	12	12.0	11	11.0		
Educational qualification	Diploma of nursing	12	12.0	22	22.0	3.322 ^{FET}	0.345 (NS)
	Technical nursing institution	23	23.0	23	23.0		
	Bachelor of nursing	8	8.0	8	8.0		
	Post graduate	3	3.0	1	1.0		
Years of experience	<1	4	4.0	1	1.0	7.492 ^{FET}	0.958 (NS)
	1-5	2	2.0	11	11.0		
	5-10	26	26.0	27	27.0		
	>10	14	14.0	15	15.0		
Attending courses related to triage	Yes	12	12.0	12	12.0	0.652	0.203 (NS)
	No	34	34.0	42	42.0		

X²= Chi-Square test, **FET**= Fisher Exact Test and **(NS)** Non-significant if P-value > 0.05.

Table 6: Correlation between the studied variable, correlation between total score levels of nurses' knowledge, practices and attitude regarding patients triage in emergency unit (n=100).

Study Variables	Total Score levels			
	Knowledge		Attitude	
	r	P-value	r	P-value
Total attitude	0.663	0.034*		
Total practice	0.678	0.042*	0.749	0.058*

* P-value \leq 0.05 Significant

Discussion

EDs face escalating patient volumes, persistent crowding and patient populations with more complex disease, the need for accurate and reliable triage has intensified (**Ibrahim et al., 2020**). So, this study aimed to assess nurses' performance regarding triage in emergency unit.

Socio-demographic characteristics:

As regards to nurse's age, the current study result showed that more than half of the studied nurses were in age group 20-30 years old with mean age 30.98 ± 8.22 years. From the investigator point of view these indicate that of the studied nurses in this study were of the active-working age group and they are adult to tolerate nature of work in EDs. This result was in contrast with **Ariffin et al., (2023)** who applied study to assess knowledge and skills in triage assessment among nurses in emergency department hospital Saudi Arabia and found that highly percentages of the studied nurses were in age group 30-40 years old.

As regard to nurse's gender, the current study results found that more than three quarters of them were females. This result was supported with **Gholami et al., (2023)** who conducted study entitled " Effect of triage training on nurses' practice and triage outcomes of patients with acute coronary syndrome" and showed that highly percentage of the studied nurses were females.

Concerning to nurse's educational qualification, the current study result showed that less than half of them had technical nursing institute degree. From the investigator point of view this finding represents a particular Egyptian situation of increasing numbers of

technical nurses compared to their colleagues who are graduated from faculties. This result was similar with that of **Kerie et al., (2018)** who found that around half studied sample had secondary and technical nursing education while this result was in contrast with the study done by **Duko et al., (2019)** who found that more than two-thirds of them had a bachelor's degree in nursing.

As regards to nurse's years of experiences, the present study result showed that more than half of them had 5-<10 years of experiences and more than two fifths of them were working at surgical emergency unit. From the investigator point of view this result may be due to more than half of the studied nurses were young, less than 30 years old. These results were in contrary to **Kim & Kang, (2019)** who found that more than half of the studied nurses had less than three years of experience in emergency department. Also, **Mukhtar & Fadlallah, (2018)** who applied study entitled "Nurse's knowledge regarding triage system at emergency departments in Public Hospital at Khartoum State" and showed that more than half of the studied nurses had less than one year of experience in emergency department.

As regard to nurse's attendance of courses related to patients' triage, the present study result showed that more than three quarters of them hadn't attended courses related to patients' triage. From the investigator point of view this finding may be due to workload in the emergency unit and having no time for attending courses related to triage system.

This result was matched with **Phukubye et al., (2019)** in a study entitled "Assess Knowledge and practices of triage amongst nurses working in the emergency departments of rural Hospitals in Limpopo Province who found that around three quarters of them had neither formal nor in-service training in triage as compared with low percentage of them had triage training.

Nurses' knowledge assessment:

Concerning to nurses' total level of knowledge, the current study result illustrated that more than half of the studied nurses had unsatisfactory level of knowledge about patients' triage in the emergency unit. From the investigator point of view this finding may be due to that, the settings of the study do not follow any guideline or even permit attending training programs regarding triage principles or application of triage system.

This result was supported with **Pouy et al., (2019)** who applied study entitled "Comparative study on triage decision-making power in nurses and nursing students and showed that highly percentage of the studied nurses had inadequate knowledge on triage management. While this result was disagreed with **Esmaelpour et al., (2022)** who conducted study entitled "A Cross-Sectional Study to assess Nurses' Knowledge and Practice about In-Hospital Triage and found that level of knowledge regarding triage is moderate.

Nurses' practices assessment:

As regard to nurses' total level of practice, the current study results illustrated that slightly more than half of the studied nurses had incompetent level of practice while, less than half of them had competent level of practice related to patients' triage in the emergency unit. From the investigator point of view this might be due to lack of nurses' time to update their knowledge and skills, time constraints, lack of co-worker support and work commitments, especially those who are working in the ED.

This result was supported with **El-Guindy et al., (2021)** who conducted study to

"Enhance Nurse Knowledge and Practice Regarding Triage at Emergency Units" the study revealed poor nurses' triage practice before triage education. While this result was contrasted with **Khrawish & bu-Shahrour, (2021)** who studied study entitled "A cross-sectional study to assess Jordanian Emergency Nurses' Triage knowledge, skills and Associated Nurses-related Factors and found that the level of total triage skills among Jordanian emergency nurses was excellent

Nurses' attitudes assessment:

In relation to total level of attitude, the current study results illustrated that more than half of the studied nurses had negative attitude regarding patients' triage in the emergency unit. This may be due to more than half of the studied nurses had unsatisfactory knowledge and incompetent practice towards triage in emergency unit which consequently their negative attitude toward the triage.

This result was supported with **Mohey, & Al azmi (2017)** who applied study entitled "Primary Healthcare Emergency Services in Alexandria, Egypt" and found that the study revealed negative attitude regarding triage in the emergency unit.

Relation and correlation between the studied variables:

Regarding relationship between demographic characteristics of the studied nurses and their total level of knowledge, the current study results revealed that, there was a significant statistical relationship between total level of knowledge of the studied nurses and their educational qualification and years of experience. While there was no significant statistical relationship between total level of knowledge of the studied nurses and their age, gender, marital status, department and attending courses related to patients' triage. This may be explained as, increasing level of education and years of experience help the studied nurses to acquire satisfactory level of knowledge. While other demographic characteristics didn't affect level of knowledge.

The current study supported with the study conducted by **Mukhtar & Fadlallah, (2018)** who studied to assess Nurses' knowledge regarding triage system at emergency departments in public hospital; and showed that and which showed there was significant association between knowledge level and educational level. This result was in the same line with **Malak et al., (2022)** There was a significant association between triage knowledge and participants' educational level, emergency experience, while disagree in relation to training courses there was significant association between triage knowledge and triage training course.

As regard to relationship between demographic characteristics of the studied nurses and their total level of practice, the current study result showed that there was a significant statistical relationship between total level of practice of the studied nurses and their age, educational qualification and years of experience. While there was no significant statistical relationship between total level of practice of the studied nurses and their gender, marital status, department and attending courses related to patients' triage. This may be explained as, increasing age, educational qualifications and years of experience help the studied nurses to acquire competent level of practice. While other demographic characteristics didn't affect level of practice.

On the other hand, **Shawky et al., (2022)** who applied study entitled "Effectiveness of Teaching Guidelines regarding Triage Assessment and Management of Critically Ill on Nurses' Performance" and found that there was no significant differences were found between the nurses' mean scores of practices and their age, sex, level of education, working shifts and previous training on triage system. While, there was a significant difference regarding years of experience in the emergency department.

As regard to relationship between demographic characteristics of the studied nurses and their total level of attitude, the current study result demonstrated that there was

no significant statistical relationship between total level of attitude of the studied nurses and their age, gender, marital status, educational qualification, years of experience department and attending courses related to patients' triage. This may be to the studied nurses' total level of attitude was not affected by any of their demographic characteristics.

This result was supported with **Zagalioti et al., (2023)** who applied a study entitled "The first positive evidence that training improves triage decisions in Greece" and showed that there was no significant statistical relationship between working experience and working time with awareness level.

Regarding to correlation between level of knowledge and level of practice, the present study result showed that there was a significant positive correlation between total level of knowledge and level of practice regarding patients' triage in the emergency unit among the studied nurses. This means that nurses with unsatisfactory knowledge were have incompetent practice level regarding triage in emergency unit. It seems reasonable to conclude on the basis of this study finding that total level of knowledge and practice were among almost more than half of the studied subjects.

This result in the same line with **Asgari et al. (2018)** who applied study entitled "Evaluating the disaster triage knowledge of nurses' personnel in Public Hospitals" and there was significant correlation with triage knowledge and practice.

Concerning to correlation between level of attitude and level of practice, the present study result illustrated that, there was a significant positive correlation between total level of attitude and level of practice regarding patients' triage in the emergency unit among the studied nurses.

This result was supported with **Shaban & Allam, (2020)** who showed that there was a positive correlation relationship between attitude and level of nurses' practices regarding to triage and showed that there was a positive correlation

relationship between attitude and level of nurses' practices regarding to triage.

Concerning to correlation between level of knowledge and level of attitude, the current study result showed that there was a significant positive correlation between total level of knowledge and level of attitude regarding patients' triage in the emergency unit among the studied nurses. This result was contrasted with **Seda, (2020)** who found that there was statistically no significant relationship between knowledge and perception.

In summary, the results of this study revealed that, there is a need to focus on development of nursing staff knowledge, skills and attitude, so effort should be directed towards enhancing quality of care among nurses. Nurses must have access to updated information, learning resources and continuous educational opportunities. The nurses must constantly seek better ways to improve their care to patients during applying triage process through acquiring knowledge and through implementing the established standards of care which must be up dated periodically.

Conclusion

Based on findings of the current study, it can be concluded that, more than half of the studied nurses had unsatisfactory level of knowledge about patients' triage in the emergency unit. And slightly more than half of the studied nurses had incompetent level of practice related to patients' triage in the emergency unit. Also, more than half of the studied nurses had negative attitude regarding patients' triage in the emergency unit. Additionally, there was a significant positive correlation between total level of knowledge and level of practice and level of attitude regarding patients' triage in the emergency unit.

Recommendations

Based on the findings of the current study, the following recommendations are suggested:

- On-going and regular in –services educational programs regarding evidence –based guidelines should include the nurse performances regarding triage in emergency unit.

- Developing and simplified comprehensive booklet and standard nursing procedure book should be designed including guidelines about basic knowledge and skill regarding triage system in emergency unit and should be available in all hospital.

- Further study should be suggested to evaluate effect of implementing guidelines based on the studied nurse performance regarding triage in emergency unit on patient's morbidity & mortality.

- A similar study should be replicated on a large sample and other place to generalize the findings.

Reference

- Ahmed M, S., Adam, S., & Abd Elazem, H. (2019):** Assessment of Staff Nurse's knowledge and Performance Regarding Triage. *Egyptian Journal of Health Care*, 10(3), 50-63.
- Ariffin, N. A. B., Mat, S. B., & Yahya, F. (2023).** Knowledge and Skills in Triage Assessment among Nurses in Emergency Department Hospital Saudi Arabia. *The Malaysian Journal of Nursing (MJN)*, 14(3), 132-142.
- Asgari H, Omid M.R, Omid N. (2018).** Evaluating the disaster triage knowledge of nurses' personnel in Public Hospitals of Ilam. *Health in Emergencies and Disasters Quarterly*; 4(1), 37-42.
- Audrey J. Weiss, D. & Jiang, H. (2021).** Most Frequent Reasons for Emergency Department Visits, 2018 healthcare cost and utilization project [https:// www.hcupus.ahrq.gov/reports/statbriefs/sb286-ED-Frequent-Conditions-2018.pdf](https://www.hcupus.ahrq.gov/reports/statbriefs/sb286-ED-Frequent-Conditions-2018.pdf).
- Bahlbi, T., Tesfamariam, E., Andemeskel, Y., & Weldegiorgis, G. (2022).** Effect of triage training on the knowledge application

- and practice improvement among the practicing nurses of the emergency departments of the National Referral Hospitals, 2018; a pre-post study in Asmara, Eritrea. *BMC Emergency Medicine*, 22(1), 1-8.
- Bakr, A., & Badawi, M. (2022).** Effect of Educational Program on Nurses' Knowledge, Attitudes and Practices Regarding Triage in Emergency Department in Omdurman Military Hospital, Sudan, Doctoral dissertation, University of Gezira.
- Duko, B., Geja, E., Oltaye, Z., Belayneh, F., Kedir, A., and Gebire, M. (2019).** Triage knowledge and skills among nurses in emergency units of Specialized Hospital in Hawassa, Ethiopia, *BMC Research Notes*, 12(21), 1-5.
- El-Guindy, H. A., El-Shahate, M. M., & Allah, N. A. (2021).** Enhancing Nurse Interns Knowledge and Practice Regarding Triage at Emergency Units during COVID 19 Pandemic. *Assiut Scientific Nursing Journal*, 9(27), 30-40.
- Esmaelpour, N., Ahmadi, F., Zarezadeh, N., Abiri, S., & Chegin, M. (2022).** Nurses' Knowledge and Practice About In-Hospital Triage: A Cross-Sectional Study in Jahrom. *Updates in Emergency Medicine*, 2(1), 40-45.
- Faheim S., Ally, F. and Hegazy, M. (2019).** Effect of Triage Education on Nurses' Performance in Diverse Emergency Departments, *evidence-based nursing research*, 1(2), 53-56.
- Gholami, M., Fayazi, M., Hosseinabadi, R., Anbari, K., & Saki, M. (2023).** Effect of triage training on nurses' practice and triage outcomes of patients with acute coronary syndrome. *International Emergency Nursing*, 68(9), 101-288.
- Hu, Y., Zheng, B., Zhu, L., Tang, S., Lu, Q., Song, Q. & Zhong, Y. (2022).** The effectiveness of emergency knowledge training of pediatric medical workers based on the knowledge, skills, simulation model: a quasi-experimental study. *BMC Medical Education*, 22(1), 213.
- Ibrahim, A.A., Mohamed, H.S. & Mahmoud, A.P. (2020).** Assessment of Critical Care Nurses knowledge and Practice Regarding Triage System. *International Journal of Novel Research in Healthcare and Nursing*, 7(2), 428-438. Available at: www.noveltyjournals.com.
- Joseph, M., Summerscales, M., Yogesan, S. (2023).** The use of kiosks to improve triage efficiency in the emergency department. *npj Digit. Med.* 6(1), 19 <https://doi.org/10.1038/s41746-023-00758-2>.
- Kerie, S., Tilahun, A., & Mandesh, A (2018).** Triage skill and associated factors among emergency nurses in Addis Ababa, Ethiopia. *BMC research notes*, 11(1), 1-6.
- Khrawish A, & bu-Shahrour L, (2021).** Jordanian Emergency Nurses' Triage knowledge, skills and Associated Nurses-related Factors: A cross-sectional study. 65(9), 35-40. <https://www.zuj.edu.jo/wpcontent/uploads/2021/07/abstract-35.pdf>.
- Kim, H., & Kang, H. (2019).** Effects of a web-based Korean triage and acuity scale learning program on triage self-efficacy and triage performance ability for nurses in emergency department. *Journal of Korean Academy of Nursing*, 49(2), 171-180.
- Malak.Z. Malak, N., Bashir Y., (2022).** Knowledge, Skills, and Practices of Triage among Emergency Nurses in Jordan, *International Emergency Nursing*, 65(12), <https://doi.org/10.1016/j.ienj.2022.101219>.
- Mohey, A. & Al azmi S.F. (2017).** Primary Healthcare Emergency Services in Alexandria, Egypt. *Faculty of Medicine, University of Alexandria. Quality in Primary Care*, 25(5), 303-315
- Mukhtar, H. M. E., & Fadlallah, F. A. (2018).** Nurse's knowledge regarding triage

- system at emergency departments in Public Hospital at Khartoum State. In Proceedings of Researchfora 33rd International Conference, Jeddah, Saudi Arabia 15-17.
- Phukubye, T. A., Mbombi, M. O., & Mothiba, T. M. (2019).** Knowledge and practices of triage amongst nurses working in the emergency departments of rural hospitals in Limpopo Province. *The Open Public Health Journal*, 12(1), 439-448.
- Pouy, S., Ezbarami, Z.T. & Shafipour, S.Z. (2019):** The comparative study on pediatric triage decision -making power in nurses and nursing students: A cross sectional study. *Journal of Comprehensive Pediatrics*. 2019; 10(1),1–7. Available: <https://doi.org/10.5812/compreped.80846>
- Sabir, B., & Mustafa, F. (2023):** Performance-based building design: impact of emergency department layout on its functional performance efficiency-the case of Erbil hospitals. *Open House International*. 5(10),168-601.
- Seda, A. (2020):** Nurse's knowledge, perception regarding the implementation of triage system in pediatric emergency department at Gaza Strip [thesis]. Jerussalem-Palestina: Al-Quds University, 70-80.
- Shaban Z. & Allam, Z. A. (2020).** Efficacy of START Triage Algorithm Scenario-Based Education on Nursing Students' Knowledge, Attitude, Competencies, and Clinical Judgment. *IOSR J Nurs Health Sci IOSR-JNHS*, 9(1), 39-56.
- Shawky, H., El-Sayed, A., Mohamed, A., & Hasein, E. (2022).** Effectiveness of Teaching Guidelines regarding Triage Assessment and Management of Critically Ill on Nurses' Performance. *Egyptian Journal of Health Care*, 13(1), 255-266.
- Viana, J., Bragança, R., & Santos, J.V. (2023).** Validity of the Paediatric Canadian Triage Acuity Scale in a Tertiary Hospital: An Analysis of Severity Markers' Variability. *J Med Syst* 16(1),47. <https://doi.org/10.1007/s10916-023-01913-8>.
- Zagalioti, S.C., Fyntanidou, B., Exadaktylos, A., Lallas, K. & Ziaka, M. (2023).** The first positive evidence that training improves triage decisions in Greece: evidence from emergency nurses at an Academic Tertiary Care Emergency Department. *BMC emergency medicine*, 23(1), 1-8.