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Effect of an Educational Training Program for Nurses Regarding Triage System Working Competency

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Abstract
Background: *The term "triage" means sorting out. Medically, it's a process used to prioritize who needs emergency medical attention first, whether injured or sick people or disaster survivors.* ***Aim:*** *The current study aimed to evaluate the effect of an educational training program for nurses regarding Triage System working competency.* ***Design:*** *Quasi experimental research design was used in this study.* ***Setting:*** *The study was conducted at Ain-Shams Specialized Hospital.* ***Subject:*** *Consist of a convenience sample (50) of emergency nurses.* ***Data collection:*** *three tools were used in this study as 1st tool: Self-administered Questionnaire that consisted of two parts, part 1: nurses' demographic data, part 2: Self administrated sheet for nurses' knowledge about triage system. 2nd tool: Nurse's Observational checklist.3rd tool: Nurse's communication and interpersonal relationships Observation Checklist.* ***Results:*** *The majority of nursing personnel had good level of knowledge regarding triage system in post program and slightly decline at follow up as compared with preprogram phase and there were statistical significant differences between pre- training program implementation and immediately, as well 2 months post training program implementation among the studied nurses regarding total level of practice at P-value ≤ 0.05 also the majority of them had satisfactory level of communication skills practice post educational training program implementation.* ***Conclusion:*** *The study concluded that there was highly statistically significant positive correlation between total knowledge among the studied nurses and total nurse's performance regarding triage system.* ***Recommendations:*** *Continuous training programs or sessions must emphasize on all aspects of triage system for nurses, increasing and applying for the triage training program, information and research findings should be disseminated online.*

Key words: *Triage system skills, Nurses & Training program*

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I. Introduction

Emergency medicine in Egypt began in 1966. Egyptian law was issued to establish ambulance emergency service for patient transportation and initiation of urgent first aid. By 1999, a presidential declaration of instigation of Air Ambulance service has ensued. This decree was followed by the establishment of the Egyptian Ambulance Organization in 2009. The roles and responsibilities of emergency staff are clarified. It embroiled the situation and incident location through observation and witness statements; assess the patient and the situation; diagnose the complaint or injury; offer first aid, and transfer the patient to necessary health service safely and quickly **(Japan International Cooperation Agency, (JICA) 2020).**

The emergency department (ED) is a highly stressful and tense environment owing to the pressures faced by ED nurses from the urgency and acuity of the presenting patients and their families. Without organization and efficient processes, the ED can be easily overwhelmed by vulnerable and sick patients, especially during pandemics, disasters, and accidents. Triage plays an important role in ensuring that patients are prioritized according to the urgency of the need for treatment, that flow across the ED is unhampered with patients being discharged to appropriate areas within short waiting times and that resources are allocated judiciously based on patients' needs. Since ED nurses often take on the triage role, their knowledge and practice of triage concepts need to be in an acceptable level in order to be able to effectively perform their roles. **(AlShatarat, et.al, 2022).**

Nursing is an active and interpersonal problem-solving process. The nursing process is a systematic, rational method of planning, problem-solving approach, and decision-making **(Almeida, et.al, 2019)** It helps to assess patients' health status and needs to determine actual or potential health problems and give specific nursing interventions to meet those needs. The patient may be an individual, a family, a community, or a group **(American Nurses Association, 2020).**

The nursing process is a standardized applicable characteristic used as a framework for nursing care plans in all healthcare settings with patients of all age groups **(Goncalves, et.al., 2020).** Standards of nursing

practice include six phases of the nursing process: assessment, diagnosis, outcome identification, planning, implementation, and evaluation **(American Nurses Association, 2020)**. The assessment-based nursing intervention improves the life quality of patients **(Zhang, et.al., 2018)** by the organization, validation, and documentation of data. It depends on the accurate and complete collection of data through all phases of the nursing process to evaluate outcomes achievement **(Lorini C., 2018).**

II. Significance of the Study

The Egyptian healthcare system is struggling to respond to the increasing patient numbers, while the dedicated resources to healthcare are very limited. Public hospitals are limited compared to patient load. Statistics in 2015 show that there are on average 1.57 beds and 5.75 physicians in public hospitals for every 1000 patients. The Egyptian healthcare system faces many challenges including Low financial support: approximately 5.2% of the total state budget in the fiscal year 2015–2016. And the over crowdedness of public hospitals. According to the official records, Egypt has a total number of 660 publics and 1002 private hospitals serving a total population of around 91 million ***(Central Agency for Public Mobilization and Statistics, 2017)***

On the other hand, the educational system for preparing emergency nurses is still insufficient compared with the growing demand for emergency services. Previous studies revealed that triage was not implemented at the emergency room due to insufficient knowledge, insufficient nurses, and a lack of motivation in inpatient care. In upper Egypt, particularly in the study settings, there was no statistical report about the incidence of the implementation of triage services. Based on our observation, there are 63 nurses distributed to work on the three shifts. About 20-25 emergency nurses offer services to 50-80 patients per shift. The ratio of emergency nurses in a triage room to patients each shift is 1:35–40, approximately. This study aimed to support our local community in university hospital with the appropriate training in emergencies and evaluate the effect of triage training on nurses' performance in those departments after implementation of the training. Program. **(Mostafa, et.al., 2023).**

III. Aim of the study

The aim of this study is to evaluate the effect of an educational training program for nurses regarding Triage System working competency. Through:

- Assess nurses' level of knowledge regarding Triage System working competency.
- Assess nurses' practice level regarding Triage System working competency.
- Design an educational training program for nurses regarding Triage System working competency.
- Implement an educational training program for nurses regarding Triage System working competency.
- Evaluate an educational training program for nurses regarding Triage System working competency.

Research hypothesis

To fulfill the aim of this study the following research hypothesis were formulated:

At the end of the study, studied nurses who will attend the educational training program regarding triage system will have high score of knowledge and practice competency than before as measured by (part II Tool 1 & tool two).

Research question

The study will be designed to answer the following question:

Does the educational training program improve nurses' knowledge, practice regarding triage system?

IV. Subjects and Method

Research design:

Quasi experimental research design with one group pre and posttest assessment was utilized to conduct this study.

Study Setting:

The study was conducted at Ain-Shams Specialized Hospital affiliated to Ain-Shams University and localized in the region of A'basia, Cairo, Egypt. Furthermore, the hospital provides different services as (Nursing office; In-patient; Out-patient, Intensive care unit for adults and pediatric and neonate, Dialysis, and Emergency). Also, the study conducted in the emergency department, which has 3 rooms in emergency department, room 1 (ER room) had 7 beds, room 2 observation room had 4 beds, room 3 triage room had 2 beds.

Study Subjects

The study subject included all the available nursing personnel (n= 50) in Ain-Shams Specialized Hospital who was presented at the time of data collection

Type of sampling

Convenience sample was used to select the study subject.

Tools of data collection

Two tools were used to collect necessary data: Three tools were used to collect necessary data:

1st tool: **Knowledge assessment questionnaire:**

Part 1: Personal Characteristics Sheet:

This part includes personal characteristics as (gender, age, qualification in nursing education, years of work experience, attending training program about triage, working hours per week).

Part 2: Knowledge assessment questionnaire components:

This Questionnaire adopted from Salem (2006) and modified by the researcher based on the reviewing of the literature; Carlson and Almond (2009), Johansen and Forberg (2011), Pollak et al (2011), Atzema (2012), Davis (2012), Vankipuram (2012), Dewit and Kumagai (2013), Sole and Mosely (2013), Veenema (2013). This tool was used to assess and evaluate nurse's knowledge about triage process in the ED and it was used pre, immediately and post program implementation.This tool included 35 multiple- choice questions divided into triage safety (3 questions), triage process (6 questions), across the room assessment (2 questions), primary assessment (14 questions), secondary and focused assessment (10 questions). Concerning Triage safety questions, it consists of assessment of the environmental hazard at the ED, and maintaining patients and families' safety. Triage process questions: concerning with triage process for emergency patients and triage category according to the urgency of the patient's condition (immediately life threatening, imminently life threatening, potentially life threatening, potentially serious and less urgent categories). Across the room assessment questions: concerning with identifying obvious life threatening conditions and it include a critical look of the patient's general appearance and assessment of the patient's airway, circulation and work of breathing. Primary assessment questions: it includes assessment of the patient's airway, breathing, circulation, neurological disability and expose all areas of the body to identifying life threatening injuries. Finally, Secondary and focused assessment questions include a detailed assessment (head to toe examination). **Responses** were measured on 2-points (0 = incorrect) and (1= correct).

Scoring system of knowledge assessment questionnaire:

each question had a group of answer points, each correct answer had (one grade), while, no or wrong answer had (zero). Total score for all questions was 35 scores. The total score was classified into three categories as follow: poor knowledge 20.9 (<60%), good knowledge 21-26.21 (60%-74.9%), and very good knowledge 26.25-35 (75%-100%).

2nd tool: Nurse's Practice observational checklist:

This tool was developed by the researcher based on the reviewing of the literature; Hurme (2007), Juan (2009), Vankipuram *(2012),* It was used to assess and evaluate the competency level of nurse's performance in triage process.

Total competencies for the checklist was (70). It was distributed as the following: triage safety (10), triage process (7), across the room assessment (1), primary assessment (21), secondary and focused assessment (31). The checklist covering the following: Concerning Triage safety competencies, it consists of assessment of nurses competencies in performing triage safety. It includes (infection control measure, emergency equipment, environmental hazard, safety measure of the staff members). Triage process competencies concerning with assessment of nurses competencies in performing triage process and triage category according to the urgency of the patient's condition (immediately life threatening, imminently life threatening, potentially life threatening, potentially serious and less urgent categories). Across the room assessment competencies consisting of assessment of nurses competencies in identifying obvious life threatening conditions through observation of the patient's (general appearance, assessment of breathing and circulation).

Also, primary assessment competencies concerning with assessment of nurse's competencies in performing primary assessment. It includes assessment of the patient's airway patency and maintain cervical spine stability, assess breathing, circulation, assess the patient's disability by using AVPU scale (Alert, Verbal stimuli, Painful stimuli, Unresponsive). and expose all areas of the body to identity life threatening injuries. Secondary and focused assessment competencies concerning with assessment of nurse's competencies in performing a detailed assessment (head to toe examination).

Scoring system of Nurse's Practice observational checklist:

each item of nurse's performance scored on the bases of "Not done": (zero) or "Done" {Incompetent (incomplete and incorrect): (1 point) and Competent (done complete and correct): (2 point)}. The total competencies for the observation checklist was (70), it was scored out of 140 (100%). It was classified into two categories: un satisfactory <105 (<75%), and scores ≥105 (≥ 75%) a satisfactory**.**

3rd tool: "Nurse's Communication and interpersonal relationships Observational checklist"

This tool adopted from **Salem (2006)**, **Hurme (2007)** and modified by the researcher based on the reviewing of the literature; **Hegazy et al., (2010), Petruniak (2013).** This tool was used to assess and evaluate studied nurse interpersonal and communication skills when performing triage process.

Scoring system: each item of nurse's performance scored on the bases of "Not done": (zero) and Done" {Incompetent (incomplete and incorrect): (1 point) and Competent (complete and correct): (2 point)}. The total competencies for the observation checklist was (20), it was scored out of 40 was classified into the two categories: It was classified into the following categories: un satisfactory <30 (<75%), and scores ≥30 (≥75%) a satisfactory.

Validity of the tools:

Validity of the tools was done namely face validity and content validity. Tool was translated into Arabic and tested by a group of five experts specialized in nursing administration from Helwan University 5 professors through an opinionative sheet to measure validity of the tools and the necessary modifications were done accordingly.

Reliability of the tools

Reliability for the utilized tools was tested to determine the extent to which the items of the tools are inter-correlated to each other. The Cronbach's alpha model is one of the most popular reliability statistics in use today and considered as a model of internal consistency that used to estimate of reliability of test scores. Reliability of knowledge questionnaire regarding triage system by Cronbach's alpha was (0.820). While Reliability of Retrospective audit checklist of patient's records by Cronbach's alpha test was (0.981). and Reliability of Nurse's Communication and interpersonal relationships Observational checklist by Cronbach's alpha test was (0.850).

V. Ethical considerations

The research approval was obtained from Faculty of Nursing ethical committee of Helwan University before starting the study, an approval was obtained from the director of Ain shams specialized Hospital. Participants in the study (nursing personnel) were informed about the purpose and process of the study and that the study is harmless and their participation is voluntary and they have the right to withdrawal from the study at any time without reason. They also were assured that, anonymity and confidentiality will be guaranteed, as well as gathered data will be used for the research purpose only. Ethics, values, culture and believes was respected.

VI. Pilot study

The pilot study was carried out on (10%) of the total sample size (5 nursing personnel) to test applicability and clarity of tools and time needed to complete it. Total time needed to complete both tools was ranged between (50:85) minutes. No modifications were done so participants in the pilot study were included in the study sample.

VII. Field Work

Field work started actually at the beginning of Data collection of the study was started at the beginning of November 2023 and was completed by the end of April 2024. After securing the official approval from the hospital for conducting the study, the researcher met the nursing director of the hospital to determine the suitable time for data collection. The researcher collected data by herself through meeting nursing personnel and was presented at all time during fulfilling the questionnaire forms to answer any questions. Also, the researcher checked the completeness of each filled sheet to ensure the absence of any missing data. Knowledge assessment questionnaire sheets were distributed and completed by nursing personnel. The researcher was present all the time during fulfilling the forms to answer any questions.

Process of training program

The training program of this study was conducted on four phases: assessment, designing, implementation, and evaluation. First Phase: Assessment, assess studied nurse's knowledge regarding triage system before providing training sessions, assess nurse's practice regarding triage system before providing training sessions, assess nurse's communication and interpersonal skills regarding triage system before providing training sessions

Firstly, the researcher began with knowledge assessment questionnaire (pre-test) to assess nursing personnel 'knowledge regarding triage system before implementing training program. Secondly the researcher uses practical observational check list (pre-test) to assess performance of nursing personnel regarding triage system before implementing training program. Thirdly the researcher uses communication and interpersonal skills observational checklist (pre-test) to assess communication skills regarding triage system among studied nurses.

Secondly: Designing The researcher in this phase designed training program based on knowledge assessment questionnaire regarding triage system. Based on the pre-test results, the general objectives of the knowledge assessment regarding triage system training program was to enhance nursing personnel knowledge about triage system. Knowledge assessment questionnaire regarding triage system which training program was designed to be

consistent with the studied nurse's needs. This phase started in the beginning of January 2024 to the end of February 2024 (two months).

triage system training program was conducted by the researcher divided nursing personnel into (5) groups, each group included (10) nursing personnel under supervision and support of Ain- Shams specialized Hospital nursing director considering their daily work load.

Thirdly: Implementation of training program regarding nursing documentation skills took eight weeks as following; triage system training program was taken 10 sessions / week (two months) as following: each group from the five groups of nursing personnel took (3 visits/week) to conduct the program content, two visits of them included (2 sessions), and the third visit included (3 sessions), which, took (6 hours) with 15 minutes for break time. Different teaching methods were used in conducting the training program as; lectures, group discussion and brain storming. Also media used as, power point, data show, white board and program booklet that was prepared by the researcher for nursing personnel which helped them to revise and refresh program content taken during sessions. At the end of each session nursing personnel informed about the next session time.

Immediate evaluation: after completion of the training program, Knowledge assessment questionnaire had been (post-test) to the nursing personnel (Tool I) to assess nurses' knowledge about triage system. Also, practice observational checklist (tool II). And communication and interpersonal observational check list (tool III) had been given after applying educational program to assess the nursing personnel's triage system performance. Immediate evaluation post program after each group ended.

Follow up post program: reassessment was done after three months' post conducting the program. The same tools (tool I &tool II) that used in immediate evaluation post program were given to the nursing personnel. Follow up evaluation post program was started on the beginning of March 2024 to the end of April 2024 (two months).

VIII. Statistical design

Data entry and analysis were performed using SPSS statistical package version 25. Categorical variables were expressed as number and percentage while continuous variables were expressed as (mean ±SD). Chi-Square (x2) was used to test the association between row and column variable of qualitative data. Pearson correlation was done to measure correlation between quantitative variables For all tests, p-value ≤ 0.05 was considered statistically significant P-value ≤ 0.01 was considered highly statistically significant. While p-value > 0.05 was considered not significant.

IX. Results

Table (1): Distribution of the studied nurses according to their demographic data (n=50).

Demographic data	N	%
Age (in years)		
20-30 years.	30	60.0
>30- 40 years	12	24.0
40-50 years	8	16.0
Mean ±SD	**30.8±5.06**	
Gender		
Male	9	18.0
Female	41	82.0
Marital status		
Single	28	56.0
Married	18	36.0
Divorce	2	4.0
Widow	2	4.0
Educational level		
Diploma of nursing	7	14.0
Technical nursing institute	31	62.0
Bachelor in Nursing	12	24.0
Years of working experience in emergency:		

1 - <5 years	28	56.0
5- 10 years	15	30.0
>10 years	7	14.0
Working hours per week		
35 - < 40 hours	33	66.0
40 - < 45	17	34.0
45 hours and <	0	0.0
Previous triage training in emergency:		
Previous education	16	32.0
Practiced triage in an ED setting	34	68.0

Table (1) shows the personal characteristics of studied nurses. As regard to age, more two thirds (60.0%) had 20-30 years old, while the minority (8%) of them had 40-50 years old, with a mean age of (30.8 ± 5.06). Pertaining to gender, the majority (82%) of them were females. Regarding qualification in nursing education, about two third (62%) of them graduated of Technical Nursing Institute while, only (7%) of them had Diploma degree.

As concerning, attended triage training course. More than two third (68.0%) of them no previous attending training program about triage.
As regards years of work experience among the studied nursing personnel, more than half (56%)of them had an experience lasting for less than 5 years to equal to one year and more than half (66 %) of them had weekly working hours from 35 –< 40 hours. Moreover.

Table (2): Frequency distribution of studied patients according to their total level of knowledge about triage in the emergency department pre, immediately post and after two month of guidelines implementation (n=50).

Total level of knowledge	**Pre program**		**Post- program**				**MH Test (1) & P-value**	**MH Test (2) & P-value**
			Immediately		**2 Months**			
	N	**%**	**N**	**%**	**N**	**%**		
Poor	34	68.0	8	16.0	9	18.0	23.745& **0.000***	19.239& **0.000***
Average	11	22.0	13	26.0	15	30.0		
Good	5	10.0	29	58.0	26	52.0		

Table (2) shows that, more than two thirds (68.0%) of the studied nurses had poor level of knowledge pre educational training program implementation, while (58.0%, and 26.0%) of them had good and average level of knowledge immediately post educational training program implementation but after two months there was a slight decline in these results. Also, there were statistical significant differences between pre- training program implementation and immediately, as well 2 months post training program implementation among the studied nurses regarding total level of knowledge at P- value ≤ 0.05.

Table (3): Frequency distribution of studied nurses according to their performance in relation to patient safety pre, immediately post and after two month of educational training program implementation (n=50).

Patient Safety		Pre program		Post- program				McNemar's Test (1) & P-value	McNemar's Test (2) & P-value
				Immediately		2 Months			
		N	%	N	%	N	%		
Ensure the safety of the patient prior to triage assessment and treatment.	Done	22	44.0	45	90.0	43	86.0	23.926& 0.004*	19.385& 0.000*
	Not done	28	56.0	5	10.0	7	14.0		
Apply all emergency department policy and procedures for dealing with aggressive behavior of patient at triage.	Done	31	62.0	47	94.0	45	90.0	14.918& 0.000*	10.764& 0.002*
	Not done	19	38.0	3	6.0	5	10.0		
Rapid identification of deterioration of patients	Done	27	54.0	46	92.0	44	88.0	12.850& 0.001*	10.86& 0.000*

	Not done	23	46.0	4	8.0	6	12.0		
Ensure provision of emergency equipment is available at triage	Done	30	60.0	47	94.0	44	88.0	12.579& 0.000*	42.717& 0.003*
	Not done	20	40.0	3	6.0	6	12.0		
Ensure the safety of the staff prior to triage assessment and treatment	Done	25	50.0	41	82.0	40	80.0	13.800& 0.011*	13.373& 0.012*
	Not done	25	50.0	9	18.0	10	20.0		
Recognize and manage violent and aggressive behavior appropriately	Done	20	40.0	45	90.0	43	86.0	12.650& 0.004*	12.37& 0.006*
	Not done	30	60.0	5	10.0	7	14.0		
Ensure safety of scene prior to triage assessment	Done	26	52.0	42	84.0	40	80.0	15.901& 0.003*	15.09& 0.005*
	Not done	24	48.0	8	16.0	10	20.0		
Recognize environmental hazards	Done	33	66.0	46	92.0	45	90.0	11.266& 0.009*	11.757& 0.011*
	Not done	17	34.0	4	8.0	5	10.0		
Apply appropriate universal standard precautions when potential exposure to blood or body fluids.	Done	20	40.0	43	86.0	41	82.0	16.242& 0.006*	16.393& 0.009*
	Not done	30	60.0	7	14.0	9	18.0		

*P-value ≤0.05= Significant (S)
McNemar's Test (1) Comparison between Pre guidelines and immediate post guidelines
McNemar's Test (2) Comparison between Pre guidelines and 3 months post guidelines

Table (3) explains that, 60.0% of the studied nurses didn't recognize and manage violent and aggressive behavior appropriately pre educational training program implementation. While 90.0% of them had done this item immediately after educational training program implementation but after two months there was a slight decline in these results. Also, 60.0% of the studied nurses didn't apply appropriate universal standard precautions when potential exposure to blood or body fluids pre educational training program implementation. While 86.0% of them had done this item immediately posts educational training program implementation but after two months there was a slight decline in these results. Also, there were statistical significant differences between pre- training program implementation and immediately, as well 2 months post training program implementation among the studied nurses regarding all items of triage performance related to patient safety assessment at P-value ≤ 0.05.

Table (4): Frequency distribution of studied nurses according to their performance in relation to triage process and across room assessment pre, immediately post and after two month of educational training program implementation (n=50).

		Pre program		Post- program				McNemar's Test (1) & P-value	McNemar's Test (2) & P-value
				Immediately		2 Months			
		N	%	N	%	N	%		
Triage process									
Perform triage process for all patients presenting to the emergency department.	Done	31	62.0	47	94.0	45	90.0	14.918& 0.000*	10.764& 0.002*
	Not done	19	38.0	3	6.0	5	10.0		
Initiate triage system according to their urgency	Done	35	70.0	47	94.0	44	88.0	11.66& 0.001*	39.29& 0.000*
	Not done	15	30.0	3	6.0	6	12.0		
Prioritize care needs for all Patients	Done	25	50.0	43	86.0	40	80.0	5.051& 0.025*	18.62& 0.000*
	Not done	25	50.0	7	14.0	10	20.0		
Assess and reassess the patients chief complain and onset of symptom, take a brief history and assessment risk factors for serious illness or injuries	Done	20	40.0	42	84.0	40	80.0	4.013& 0.045*	24.75& 0.000*
	Not done	30	60.0	8	16.0	10	20.0		
Perform triage process in a timely and efficient manner	Done	26	52.0	43	86.0	40	80.0	20.00& 0.000*	16.87& 0.000*
	Not done	24	48.0	7	14.0	10	20.0		
Re- triaged patients in waiting area every 30 min to ensure patients status has not worsened.	Done	33	66.0	45	90.0	43	86.0	33.800& 0.000*	13.095& 0.000*
	Not done	17	34.0	5	10.0	7	14.0		
Triage documentation	Done	25	50.0	42	84.0	41	82.0	9.825& 0.002*	11.31& 0.001*
	Not done	25	50.0	8	16.0	9	18.0		
Across the room assessment									

Observation of the patient's appearance	Done	20	40.0	30	60.0	38	76.0	16.785& 0.000*	2.464& 0.006*
	Not done	30	60.0	20	40.0	12	24.0		
Assess work of breathing	Done	16	32.0	34	68.0	34	68.0	5.000& 0.025*	0.487& 0.005*
	Not done	34	68.0	16	32.0	16	32.0		
Assess circulation to the skin	Done	25	50.0	41	82.0	40	80.0	7.218& 0.007*	22.74& 0.000*
	Not done	25	50.0	9	18.0	10	20.0		

*P-value ≤0.05= Significant (S)
McNemar's Test (1) Comparison between Pre guidelines and immediate post guidelines
McNemar's Test (2) Comparison between Pre guidelines and 3 months post guidelines

Table (4) reveals that, 60.0% of the studied nurses didn't assess and reassess the patients chief complain and onset of symptom, take a brief history pre educational training program implementation. While 84.0% of them had done this item immediately after educational training program implementation but after two months there was a slight decline in these results. Also, 68.0% of the studied nurses didn't assess work of breathing pre educational training program implementation. While, 68.0% of them had done this item immediately after educational training program implementation and after two months.

Also, there were statistical significant differences between pre- training program implementation and immediately, as well 2 months post training program implementation among the studied nurses regarding all items of performance related to triage process and across room assessment at P-value ≤ 0.05.

Table (5): Frequency distribution of studied nurses according to their total level of practice pre, immediately post and after two month of educational training program (n=50).

Total level of practice	**Pre program**		**Post- program**				**MH Test (1) & P-value**	**MH Test (2) & P-value**
			Immediately		**2 Months**			
	N	**%**	**N**	**%**	**N**	**%**		
Satisfactory	18	36.0	36	72.0	41	82.0	15.697& **0.001***	27.631& **0.000***
Unsatisfactory	32	64.0	14	28.0	9	18.0		

Table (5) shows that, more than three fifths (64.0%) of the studied nurses had unsatisfactory level of practice pre educational training program implementation, while 72.0% of them had satisfactory level of practice immediately post educational training program implementation and 82.0% of them had satisfactory level of practice after two months there was a slight decline in these results.

Also, there were statistical significant differences between pre- training program implementation and immediately, as well 2 months post training program implementation among the studied nurses regarding total level of practice at P-value ≤ 0.05.

Figure (1): Distribution of studied nurses according to their total level of interpersonal and communication skills pre and post educational training program (n=50).

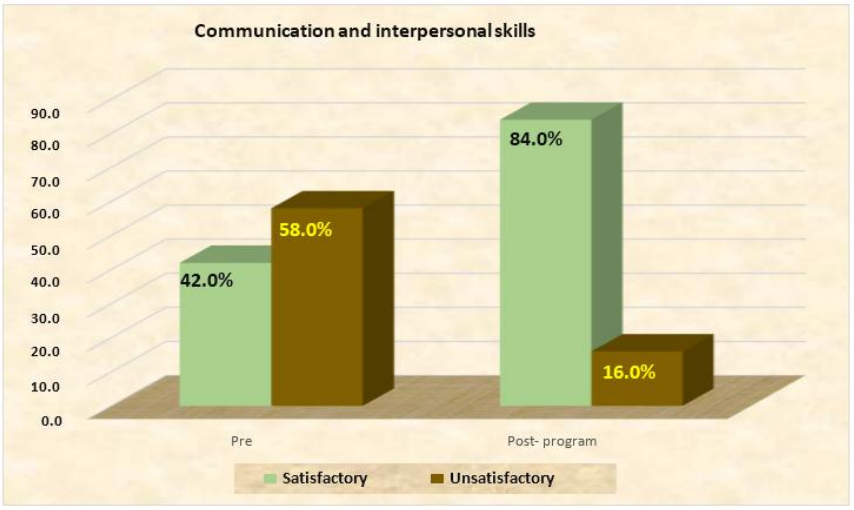

Figure (2) explains that, more than three fifths (58.0%) of the studied nurses had unsatisfactory level of communication skills practice pre educational training program implementation, while 84.0% of them had satisfactory level of communication skills practice post educational training program implementation.

Table (6): Relationship between demographic data of the studied nurses and their total level of knowledge pre, and two month post educational training program implementation (n=50).

Demographic data		Total level of knowledge pre						X2 & p-value	Total level of knowledge post 2 months						X2 & p-value
		Poor		Average		Good			Poor		Average		Good		
		N	%	N	%	N	%		N	%	N	%	N	%	
Age (in years)	20-30 years.	22	44.0	6	12.0	2	4.0	4.576 & 0.466	4	8.0	8	16.0	18	36.0	3.550 & 0.470
	>30- 40 years	7	14.0	4	8.0	1	2.0		4	8.0	4	8.0	4	8.0	
	40-50 years	5	10.0	1	2.0	2	4.0		1	2.0	3	6.0	4	8.0	
Gender	Male	5	10.0	2	4.0	2	4.0	1.890 & 0.389	2	4.0	4	8.0	3	6.0	1.607 & 0.448
	Female	29	58.0	9	18.0	3	6.0		7	14.0	11	22.0	23	46.0	
Educational level	Diploma of nursing	3	6.0	2	4.0	2	4.0	3.952 & 0.013*	1	2.0	2	4.0	4	8.0	1.815 & 0.017*
	Technical nursing institute	23	46.0	6	12.0	2	4.0		7	14.0	8	16.0	16	32.0	
	Bachelor in Nursing	8	16.0	3	6.0	1	2.0		1	2.0	5	10.0	6	12.0	
Years of experience in ER	1 - <4 years	22	44.0	4	8.0	2	4.0	5.156 & 0.027*	3	6.0	6	12.0	19	38.0	10.564 & 0.032*
	4- < 5 years	7	14.0	6	12.0	2	4.0		3	6.0	8	16.0	4	8.0	
	5 years and <	5	10.0	1	2.0	1	2.0		3	6.0	1	2.0	3	6.0	
Previous triage training in ER	Previous education	10	20.0	3	6.0	3	6.0	2.019 & 0.364	3	6.0	4	8.0	9	18.0	0.285 & 0.867
	Practiced triage in an ED Setting	24	48.0	8	16.0	2	4.0		6	12.0	11	22.0	17	34.0	

X2 test= Chi-Square test P-value > 0.05= Non-significant (NS) *P-value ≤ 0.05= Significant (S)

Table (6) shows that, there was a significant statistical relation between educational level of the studied nurses and their total level of knowledge pre, and two month post educational training program implementation at P-value=
0.013 and 0.017 respectively. Also, there was a significant statistical relation between years of experience of the studied nurses and their total level of knowledge pre, and two month post educational training program implementation at P-value= 0.027 and 0.032 respectively.

Table (7): Relationship between demographic data of the studied nurses and their total level of practice pre, and two month post educational training program implementation (n=50).

Demographic data		Total level of practice pre				X2 & p-value	Total level of practice post 2 months				X2 & p-value
		Satisfactory		Unsatisfactory			Satisfactory		Unsatisfactory		
		N	%	N	%		N	%	N	%	
Age (in years)	20-30 years.	11	22.0	19	38.0	0.051 & 0.975	26	52.0	4	8.0	1.107 & 0.575
	>30- 40 years	4	8.0	8	16.0		9	18.0	3	6.0	
	40-50 years	3	6.0	5	10.0		6	12.0	2	4.0	
Gender	Male	2	4.0	7	14.0	0.904 & 0.342	6	12.0	3	6.0	1.748 & 0.186
	Female	16	32.0	25	50.0		35	70.0	6	12.0	
Educational level	Diploma of nursing	3	6.0	4	8.0	1.817 & 0.040*	7	14.0	0	0.0	3.576 & 0.016*
	Technical nursing institute	9	18.0	22	44.0		23	46.0	8	16.0	
	Bachelor in Nursing	6	12.0	6	12.0		11	22.0	1	2.0	
Marital status	Single	9	18.0	19	38.0	0.586 & 0.746	22	44.0	6	12.0	1.123 & 0.570
	Married	7	14.0	11	22.0		15	30.0	3	6.0	
	Divorced/ widow	2	4.0	2	4.0		4	8.0	0	0.0	
Years of experience in ER	1 - <4 years	11	22.0	17	34.0	0.841 & 0.657	24	48.0	4	8.0	0.832 & 0.660
	4- < 5 years	4	8.0	11	22.0		12	24.0	3	6.0	
	5 years and <	3	6.0	4	8.0		5	10.0	2	4.0	
Working hours	35 - < 40 hours	10	20.0	23	46.0	1.367 & 0.042*	26	52.0	7	14.0	0.678 & 0.010*
	40 - < 45	8	16.0	9	18.0		15	30.0	2	4.0	
	45 hours and <	0	0.0	0	0.0		0	0.0	0	0.0	
Previous triage training in ER	Previous education	6	12.0	10	20.0	0.023 & 0.880	14	28.0	2	4.0	0.482 & 0.487
	Practiced triage in an ER	12	24.0	22	44.0		27	54.0	7	14.0	

X2 test= Chi-Square test P-value > 0.05= Non-significant (NS) *P-value ≤ 0.05= Significant (S)

Table (7) shows that, there was a significant statistical relation between educational level of the studied nurses and their total level of practice pre, and two month post educational training program implementation at P-value= 0.040 and 0.016 respectively. Also, there was a significant statistical relation between working hours of the studied nurses and their total level of practice pre, and two month post educational training program implementation at P-value= 0.042 and 0.010 respectively

Table (8): Relationship between demographic data of the studied nurses and their total level of communication practice pre, and two month post educational training program implementation (n=50).

Demographic data		Total level of communication practice pre				X2 & p-value	Total level of communication practice post 2 months				X2 & p-value
		Satisfactory		Unsatisfactory			Satisfactory		Unsatisfactory		
		N	%	N	%		N	%	N	%	
Age (in years)	20-30 years.	14	28.0	16	32.0	0.705 & 0. 037*	26	52.0	4	8.0	1.769 & 0.041*
	>30- 40 years	4	8.0	8	16.0		12	24.0	0	0.0	
	40-50 years	3	6.0	5	10.0		7	14.0	1	2.0	
Gender	Male	3	6.0	6	12.0	0.338 & 0.561	8	16.0	1	2.0	0.015 & 0.902
	Female	18	36.0	23	46.0		37	74.0	4	8.0	
Educational level	Diploma of nursing	2	4.0	5	10.0	0.834 & 0.059*	6	12.0	1	2.0	1.767 & 0.013*
	Technical nursing institute	13	26.0	18	36.0		27	54.0	4	8.0	
	Bachelor in Nursing	6	12.0	6	12.0		12	24.0	0	0.0	
Marital status	Single	13	26.0	15	30.0	0.886 & 0.642	25	50.0	3	6.0	0.485 & 0.785
	Married	6	12.0	12	24.0		16	32.0	2	4.0	

	Divorced/ widow	2	4.0	2	4.0		4	8.0	0	0.0	
Years of experience in ER	1 - <4 years	13	26.0	15	30.0	2.332 & 0.312	25	50.0	3	6.0	0.344 & 0.842
	4- < 5 years	4	8.0	11	22.0		14	28.0	1	2.0	
	5 years and <	4	8.0	3	6.0		6	12.0	1	2.0	
Working hours per week	35 - < 40 hours	11	22.0	22	44.0	2.993 & 0.084	29	58.0	4	8.0	0.485 & 0.486
	40 - < 45	10	20.0	7	14.0		16	32.0	1	2.0	
	45 hours and <	0	0.0	0	0.0		0	0.0	0	0.0	
Previous triage training in ER	Previous education	6	12.0	10	20.0	0.196 & 0.058*	12	24.0	4	8.0	5.882 & 0.015*
	Practiced triage in an ER	15	30.0	19	38.0		33	66.0	1	2.0	

X2 test= Chi-Square test P-value > 0.05= Non-significant (NS) *P-value ≤ 0.05= Significant (S)

Table(8) explains that, there was a significant statistical relation between age of the studied nurses and their total level of communication practice pre, and two month post educational training program implementation at P-value=

0.037 and 0.041 respectively. Also, there was a significant statistical relation between educational level of the studied nurses and their total level of communication practice pre, and two month post educational training program implementation at P-value= 0.059 and 0.013 respectively. Additionally, there was a significant statistical relation between previous triage training of the studied nurses and their total level of communication practice pre, and two month post educational training program implementation at P-value= 0.058 and 0.015 respectively.

Table (9): Correlation between total level of knowledge, practice and communication skills pre and two month post educational training program implementation (n=50).

Variables		Total level of knowledge		Total level of practice	
		Pre	Post 2 months	Pre	Post 2 months
Total level of knowledge	r				
	P-value				
Total level of practice	r	0.278	0.413		
	P-value	0.051*	0.003*		
Total level of communication practice	r	0.050	0.113	0.122	0.017
	P-value	0.031*	0.033*	0.400	0.905

r= Spearman correlation coefficient P-value > 0.05= Non-significant (NS) *P-value ≤ 0.05= Significant (S)

Table (9) clarifies that, there was a significant statistical positive correlation between total level of knowledge and total level of practice among the studied nurses pre, and two month post educational training program implementation at P-value= 0.051 and 0.003 respectively. Also, there was a significant statistical positive correlation between total level of knowledge and total level of communication practice among the studied nurses pre, and two month post educational training program implementation at P-value= 0.031 and 0.033 respectively. While, there was no significant statistical correlation between total level of practice and total level of communication practice among the studied nurses pre, and two month post educational training program implementation at P-value= 0.400 and 0.905 respectively.

X. Discussion

Triage is an important component of emergency department care. It is designed to help identify and prioritize undifferentiated patients based on severity and risk into categories from emergent to non-urgent. The triage nurse in the emergency department is the first person who encounters emergency patients, thus it is an essential factor that the emergency nurse has the knowledge and experience. Moreover, triage begins upon entry to the emergency department and needs to be reevaluated as the patient waits or moves through the system, to ensure the appropriate speed and level of care is being provided reliably and safely **(Bahlibi, et.al., 2022)**

The present study showed that, two third of the studied nurses were in age group 20-30 years with mean age (30.8±5.06), more than three quarters of them were females this finding corresponds with a previous study **(Ozdemir& Tunk, 2018)** which about Gender and career: female and male nursing students' perceptions of male nursing role in turkey, which reported that, more than half of the study female students and more than half of the students' ages ranged between 20–22 years. and more than half of the studied nurses were single. Also, more than two third of them had technical nursing institute and more than half of them had (1-5) years of experience. This

finding was in agreement with previous studies **Tuomikoski, et.al, (2020)** whose paper about Nurses' experiences of their competence at mentoring nursing students during clinical practice: A systematic review of qualitative studies. who mentioned that Nurses with less than ten years of experience had the most positive perceptions.

The current study demonstrated that more than two thirds of the studied nurses had poor level of knowledge. this finding agree with a previous study **Al-qbelat, et.al, (2022)** their research was about Effect of Educational Program on Knowledge, Skills, and Personal Preparedness for Disasters Among Emergency Nurses, which supported the study hypothesis, in which nurses had higher knowledge, skills, and personal preparedness for disasters after attending an educational program as an intervention.

Effective communication is essential in enhancing the effectiveness and accuracy of the triage process. It was observed that more than three fifths of the studied nurses had unsatisfactory level of communication skills practice.

This result is supported by **Mansour, et.al., (2015)** whose thesis was about effect of implementing triage training competencies on newly graduated nurses working in emergency hospital, who found that the lower level of triage knowledge and practice of study group regarding communication skills in the preprogram implementation. While increase in the total competency score of the study group following program implementation. This may be due to lack of communication skills between health care provider. This result is supported also by **Ahmed (2011)** who found that the majority of the study nurses in ED were incompetent in performing communication process.

The current study demonstrated that, there was a significant statistical relation between educational level of the studied nurses and their total level of knowledge P-value= 0.013 respectively. In my opinion education level of the nurse affect directly their knowledge, for this reason they need continuous educational programs to rich their knowledge and improve triage practice.

According to correlation between total level of knowledge and total level of practice among the studied nurses, there was a significant statistical positive correlation between total level of knowledge and total level of practice among the studied nurses at P-value= 0.051 respectively. this result is in agreement with **Kerie, Tilahun, and Mandesh (2018)** whose paper was about "Triage skill and associated factors among emergency nurses in Addis Ababa" who found that there were a strong positive relationship was found between nurses' level of triage knowledge and skill.

Also, there was a significant statistical positive correlation between total level of knowledge and total level of communication practice among the studied nurses at P-value= 0.031 respectively. Which may be related to the nurses with competent knowledge can be easily apply good communication practice during triage.

The current study provided that, there was no significant statistical correlation between total level of practice and total level of communication practice among the studied nurses at P-value= 0.400 respectively.

This finding disagree with **Mansour, et.al., (2015)** who found that Correlation between practice score and communication score in study and control groups. This table shows strong positive correlation between practice score and communication score in study group. Increase in NGNs practice is associated with increase in their communication. No correlation between practice score and communication score in control group.

XI. Conclusion

Based on the results of the present study, the following can be Concluded that:

more than two thirds of the studied nurses had poor level of knowledge pre triage educational training program implementation, while more than three quarters of them had good and moderate level of knowledge immediately post triage educational training program implementation but after two months.

Also more than three fifths of the studied nurses had unsatisfactory level of practice pre triage educational training program implementation, while proximally three quarters of them had satisfactory level of practice immediately post educational training program implementation. According to communication skills more than three fifths of the studied nurses had unsatisfactory level of communication skills practice pre educational training program implementation, while the majority of them had satisfactory level of communication skills practice post educational training program implementation. there was a significant statistical positive correlation between total level of knowledge and total level of practice among the studied nurses. Also, there was a significant statistical positive correlation between total level of knowledge and total level of communication practice among the studied nurses.

XII. Recommendations

Based on the findings of this study, the following recommendations were suggested:

- Designing an educational handout about triage process must be provided to nurses to be used as a reference guide in their practice.
- Establishment of an accurate and available documentation system
- The ED should have a standard for facilities, equipment, and care.

- Classifying the emergency rooms according to triage categories and urgency of the patient's condition.
- Creating a triage algorithm to be applied in clinical practice.

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