PATIENTS TRIAGE EDUCATIONAL PROGRAM AND ITS EFFECT ON STAFF NURSES' PRACTICE AND ATTITUDE

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Abstract

Background Triage is a key principle in the effective management of major incidents and is the process by which patients are prioritized on the basis of their clinical acuity. Therefore, nurses need to educate about triage to improve practice and attitude has a significant impact on patients' outcomes. This study aims to assessing the effect of educational program regarding patients triage on nurses' practice and attitude. **Design:** A quasi-experimental study design was used. **Setting:** The study was conducted at emergency Hospital at Ain shams University Hospitals. **The sample included** 56 nurses who worked in emergency departments. **Tools for data collection:** 2 tools are used to collect data mainly: Triage observational checklist and Attitude questionnaire, **Results:** more than two third (66.1%) of studied nurses were in the age group <30 years with mean age was 29.46±8.54 years. slightly more than half (51.8%) of studied nurses were male and more than one third (42.9%) had diploma. Additionally, slightly more than three quarter (76.8%) were years of experience 1-<10 years., there were improvement of practice regarding triage about nurses in post and follow up program than preprogram. The highest mean score in post program (93.48±10.69) followed by follow up (91.23±10.22) compared to preprogram (75.13±4.66). There were highly statistically significant differences (p<0.001) throughout program phases. Total nurses' attitude regarding triage through the three phases of the program., more than one third (35.7%) of nurses' positive attitude in preprogram. It marked improvement of nurse positive attitude of triage (85.7%) in post program phase and the (85.7%) in follow up phase of program. There were highly statistically significant differences throughout program phases, with p-value (p<0.001). **Conclusion**: According to the current study results, there were improvement of practice regarding triage about nurses in post and follow up program than preprogram, and it marked improvement of nurse positive attitude of triage in post program phase. There was statistically significant improvement. **Recommendations:** Conduct training program and workshops periodically for nurses about patient's triage in all critical care units to improve practice and attitude of nurses and designing a guideline about roles and responsibilities of triage nurse in emergency departments.

Keywords: Emergency Departments, Nurses, Triage Training Program.

INTRODUCTION

The triage principle of prioritizing care to large groups of people has been adapted from its military origin for use in the civilian context of initial emergency department care. Triage is a fundamental component of emergency care. In most settings, triage consists of an algorithmic system by which providers can prioritize patients based on their anticipated acuity and resource needs. This is critical in situations where demands for emergency care outstrip system capacity **(Tran, et al., 2021).**

Triage means sorting, presents the way of selecting patient based on their life threatening. Usually, it was used in war then was adopted in hospital cause of most mass casualties brought at hospital. In triage practice there some principles that you have to use and follow eight like levels and colors: RED: immediate patient whom necessity resuscitation, GREEN means minor injury (walking wounded), YELLOW: delayed, people who can wait and BLACK: dead **(Belt, et al., 2020)**. Triage is the gateway to the emergency department. The main responsibilities of a triage nurse include: the medical treatment prioritization of patients in order of urgency; the initiation of first aid treatment; observation and reassessment of patients waiting for medical consultation **(Rob et al., 2020).**

The goal of an effective triage system is to provide appropriate and rapid therapies for life-threatening conditions and ensure that all patients receive emergency check-ups based on the severity of their clinical conditions. Correct triage and prioritizing of the patients are essential skills in nursing care, and sickness, and illness severity of the patient doubles the importance of this process. Nurses are the first people in the triage department that take care of patients. Knowledge and experience of the emergency nurses are highly valuable in the appropriate decision-making. Triage nurses should be able to make appropriate decisions in a relatively short time, usually in an unknown and emotional situation. Nurses are one of the most important health care provider groups for patients **(Jan., 2023).**

Skills of nurses greatly influences the functional efficiency of emergency department because making the right decision can save the precious time allocated to each patient and more importantly many lives depend on immediate action of medical staff. Moreover, right and timely decision of an experienced nurse can lead to a justifiable distribution of emergency resources to the patients. The significance of a proper distribution of resources becomes tangible in the times of crisis and massive referral to the emergency department **(Martin, et al., 2021).**

Significance of the study:

Nurses are the first people in the E R department that take care of patients experience of the emergency nurses are highly valuable in the appropriate decision-making. Nurses working of ER should be able to make appropriate decisions regarding patients care in a relatively short time, usually in an unknown and emotional situation. **(Martin, et al., 2021).** An inaccurate triage system wastes resources and results in delayed admission and treatment of patients, patients' dissatisfaction and undesirable consequences; whereas an accurate triage system can be beneficial for determining the treatment trend of patients and facilitating patient's admission and stabilization processes **(Tobias, et al., 2022)**. So, this study aims to assessing the effect of educational program about patients triage on staff nurses' practice and attitude.

Aim of the study

This study aims to assessing the effect of educational program about patients triage on staff nurses' practice and attitude.

Through:

1. Assessing staff nurses' practice regarding Patients Triage (pre, post and follow up).

2. Assessing staff nurses' attitude regarding Patients Triage (pre, post and follow up).

Research question

1. What are staff nurses' practice regarding patients' triage.

2. What is effect of educational program on attitude of staff nurses.

SUBJECTS AND METHODS

Research design

Quasi-experimental, one group pretest- posttest research design was utilized in conducting this study...

Setting

This study was conducted at emergency Hospital (medical& surgical departments) that affiliated to Ain Shams University Hospitals. Total bed capacity (66 beds).

Study Subject:

All available staff nurses (56-nurse) who working in aforementioned settings will be included in the study.

Tools of Data collection:

The Data for this study was collected by using two tools

1- Observational Checklist of Practice Triage:

This tool consists of three parts

Part I: Personal and Job Characteristics: This part focus on collecting data pertaining to personal and job characteristics of staff nurses including age, gender, marital status, educational qualification, years of experience in emergency departments and training related to patients' triage.

Part II: aimed to assess the triage area infrastructure, equipment, supplies, medications and records.it developed by *Mostafa (2021)* and modified by the investigator. It consists of 39 items categorized under five dimensions (infrastructure requirement, (4) items, availability of equipment (9) items, availability of supplies (11) items, availability of medication (8) items and availability of records (7) items.

Scoring system:

This part was assessed through two responses that are present or not present

Part III: aimed to assess staff nurses' practice regarding patients' triage, it developed by *Shaalan et al., (2008), Ahmed, (2015), Mohamed, (2017)* and modified by the investigator after review of related literature *(Parenti et al., 2018)*.

It consists of sixty-three items grouped into six dimensions of triage practice, identifying patient (2) items, assessment of chief complains of patient (18) items, nursing diagnosis (2) items, nursing planning (2), nursing implementation (24) items and evaluation of the triage process (15) items.

Scoring system:

The scoring system ranged from done (1), or not done (0), or not applicable for each dimension. The scores of the items were summed-up and the total divided by the number of the items, then means and standard deviation were calculated. These scores were converted into a percent score. The practice was considered adequate if the percent score was equal 60% or more and inadequate if less than 60% **(Mohamed, 2017).**

2- Attitude Questionnaire

This questionnaire was used to assess the attitude of staff nurses regarding triage. It developed by **Varghese, (2012)** and modified by the investigator, it consists of twenty items grouped into two main dimensions (attitude regarding importance of triage 9 items and attitude regarding triage process 11 items).

Scoring system:

The scoring system in form of 5-point Likert scale ranged from 'strongly disagree'. disagree'. 'uncertain'. 'agree 'and 'strongly agree. Each item given score ranged from 0, 1, 2, 3, and 4respectively. The negative items were given reverse score. The total maximum score was 80. Nurses attitude was considered positive if the total scores equal 60% or more and negative if less than 60% (**Varghese, (2012).**

Ethical Considerations

The ethical research considerations in this study were included the following:

- The research approval was obtained from Scientific Research Ethical committee at Faculty of Nursing at Ain Shams University before starting the study.

- An official permission was obtained from director of target hospital in which the study will be conducted.

- The researcher clarified the objective and aim of the study to staff nurses included in the study.

- The researcher assured maintaining anonymity and confidentiality of the subject data.

- Nurses were informed that they are allowed to choose to participate or not in the study and that they have the right to withdraw from the study at any time.

Administrative design

Official permission to conduct the study were obtained from Director of the target Hospital through letter from the Dean of Faculty of Nursing, Ain Shams University. The investigator met director of the target hospital, and explained the purpose of the study to obtain cooperation and support during the study.

Statistical design:

The collected data was revised, coded, tabulated and statistically analyzed using the statistical package for social sciences, version 22.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage of mean± standard deviation (SD). The following tests were used, chi-square (x^2) test of significance was used in order to compare proportions between qualitative parameters.

Paired sample t-test of significance was used when comparing between related sample. Pearson's correlation coefficient (r) test was used to assess the degree of association between two sets of variables, multiple linear regressions: It was used to test and estimate the dependence of a quantitative variable based on its relationship to one or more independent variables. The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following: Probability (P-value)

- P-value $\leq$0.05 was considered significant.

- P-value $\leq$0.001 was considered as highly significant.

- P-value >0.05 was considered insignificant.

Tools Validity:

After the construction of data collection tools, the knowledge questionnaire, observational checklist and Attitude questionnaire   were tested for validity (Face and Content) validity through distribution of the tools to a jury of five Experts in the field of Nursing Administration.

The Jury consisting of (one professor from Helwan University. one professor from Benha University, one professor from Ain Shams University and two assist professors from Ain Shams University. Modifications were done in the light of their recommendation.

Pilot Study

Pilot study was done during February 2022 to assess clarity of language, applicability & feasibility of the tools, estimation of time needed to fill the study tools and detect any obstacles that may be encountered during data collection. It was conducted on 10% of the study subjects representing six nurses who were selected randomly.

The practice of the nurses was observed by the investigator through using the observation checklist to observe their actual practice related to triage, the time consumed to complete this tool was ranged from 25-30 minutes. Then, Attitude Questionnaire sheet was distributed to nurses in their workplaces.

The time consumed for filling the questionnaire was ranged from 10 -15 minutes. Based on the results no modifications were done. So, the nurses of the pilot study were included in the main study subjects.

Field Work

The field work of the study consumed six months from beginning of March to the end of August 2022. It was done through the following phases, assessment phase, implementation phase, evaluation phase and the following phase were adopted to achieve the aim of the current study.

Assessment phase:

- This phase involved assessing infrastructure and presence of supplies in the departments included in the study this was done at a rate of ten times for the internal medicine and surgical departments and assessing study staff nurses' practice and attitude regarding triage using data collection tools. The investigator visited the hospital included in the study to explained the purpose and nature of the study to the departments administrators and obtain their approval to carry out the study. Then, the investigator visited the previously mentioned study settings 2 days/week from 9 Am to 1 pm in morning and nurses who working in night shift when return back to morning shift. And nurses who working in afternoon shift from 5 Pm to 7 pm. The investigator met (5 -6 nurses /day) to introduced herself to them and explained the aim of the study and invited them to participate to assessing staff nurses practice and attitude before the program planning.

- Before distributed the attitude questionnaires, Components of the tool were explained to the participants in the study settings. Attitude questionnaire distributed to the study subjects during the morning shift and afternoon shift. The investigator was present to clarify any questions and prevent any knowledge contamination. Each participant took approximately 10-15 minutes for the attitude scale. The filled forms were handed backs to the investigator who checked them for completeness, each nurse answer the attitude questionnaire three times (pre, post and follow up).

- The staff nurses were then observed individually by the investigator using the observation checklist to assess the actual nurses' practice related to triage. Each nurse was observed three times (pre, post and follow up). The observation lasted 25-30 minutes for each nurse. And there some items were not applicable in some specific units. The average of the three observations was used in the statistical analysis.

Implementation of educational Program:

- The educational program was implemented to staff nurses working in the study setting. It was conducted in the training room of (medical & surgical departments), which affiliated to Ain Shams University Hospitals. The educational program was implemented to the participants consisted of 56 nurses divided into three groups, Hence, the program was implemented through three weeks for each group, first and second group consists of 20 nurse and last group include 16 nurses. The educational program consisted of (10) sessions distributed as theoretical sessions (7) hours and practical sessions (3) hours. The duration of each session was one hour. The sessions started from 11 A m: 12 P m (3 days \ week). Each session contains theory or practice

content and including time for discussion, which helped to attract attention and concentration of the attendant. In the first session the investigator explained the aim of the program, objectives, plan, content outlines and method and schedule of the program.

- At the beginning of each session an introduction about the session. Daily verbal feedback was done at the beginning of each session about the previous one and brief summary was introduced and brain storming was done about the current session regarding the content, presentation materials, and method of instruction used and time of the program.

- Etching methods used during the implementation of the educational program include; lecture, group discussion, role play, group activities for theoretical sessions and practice session, include small group activities, problem-based learning and apply group discussion, and use power point data show.

- The program sessions were: Emergency departments (vision, mission, goals and standards, Description and Requirements of emergency nurse Job, History of triage, the triage (Definition, purpose, advantage and disadvantage, Emergency requirements for triage, Levels of triage, Types of triages (advantage and disadvantage), Stages of triage, Roles and responsibilities of triage team and Patients triage according of severity of condition.

- The media used during the implementation of the program were: handout, data show for power point presentation, videos, cards with different color, adhesive. This phase started from beginning of mid- June to end of July 2022

Evaluation phase:

Immediately after completion of the educational program. The investigator evaluated the effect of educational program regarding triage on practice and attitude of nurses. A post-test was done immediately after program implementation during end of July 2022. This was done using the same data collection tools and checklist as in assessment phase.

RESULTS

Analysis of the results:

Table (1): shows that, more than two third (66.1%) of studied nurses were in the age group <30 years with mean age was 29.46±8.54 years. slightly more than half (51.8%) of studied nurses were male and more than one third (42.9%) had diploma. Additionally, slightly more than three quarter (76.8%) were years of experience 1-<10 years.

*Figure (1)***:** show that more than one third of the study sample attended training courses on patient triage.

Table (2): Reveals that, total nurses 'practice regarding triage dimensions throughout three phases of the program. It marked improvement of nurse implementation of triage domain (51.8 %) in post program phase. While minimal decreasing was occurred (48.2

%) in follow up phase of program but still more than the preprogram phase. There were statistically significant differences throughout program phases, with p-value (p<0.001).

Table (3): Reveals that, total nurses' attitude dimensions regarding triage through the three phases of the program. As simplified from the table, nearly half (48.2%) of nurses' positive attitude in preprogram regarding importance of triage domain. It marked improvement of nurse positive attitude of triage (85.7%) in post program phase and follow up phase of program. There were highly statistically significant differences throughout program phases, with p-value (p<0.001).

Figure (2): demonstrates that the total score of practice about triage, there were improvement of practice regarding triage about nurses in post and follow up program than preprogram. The highest mean score in post program (93.48%) followed by follow up (91.23%) compared to preprogram (75.13%). There were highly statistically significant differences (p<0.001) throughout program phases.

Table (4): Reveals that, total nurses' attitude regarding triage through the three phases of the program. As simplified from the table, more than one third (35.7%) of nurses' positive attitude in preprogram. It marked improvement of nurse positive attitude of triage (85.7%) in post program phase and follow up phase of program. There were highly statistically significant differences throughout program phases, with p-value (p<0.001).

Table (5): demonstrates that, relation between nurses adequate of practice regarding triage and their personal and job characteristic. There was statistically significant relationship (p≤.05) between nurses' practice regarding triage and all personal data in preprogram phase. There was statistically significant relationship between nurses' practice and their age ($\chi2=7.768$, p=0.021), years of experience ($\chi2=13.733$, p<0.001), in post program. Also, there was statistically significant relationship between nurses' practice and their Age ($\chi2=9.453$, p=0.009) and years of experience ($\chi2=8.165$, p=0.017) in follow up phase.

Table (6): demonstrates that, relation between nurses' attitude regarding triage and their personal and job characteristic, there were statistically significant relationship (p≤.05) between nurses' attitude regarding triage and all personal data in preprogram phase. There is no statistically significant relationship between nurses' attitude and their Age (years), Gender, Marital Status, Educational qualification, Years of experience & Training courses on triage, with p-value (p>0.05), in pre, post and follow up program.

Part I: Personal and job characteristic of the studied nurse

Table (1): Number and percentage distribution of the studied nurses according to their personal and job characteristic (N=56)

Personal and job characteristic	No.	%
Age (years):		
< 30 years	37	66.1
30- 40 years	13	23.2
>40 years	6	10.7
Mean ± SD	29.46±8.54	

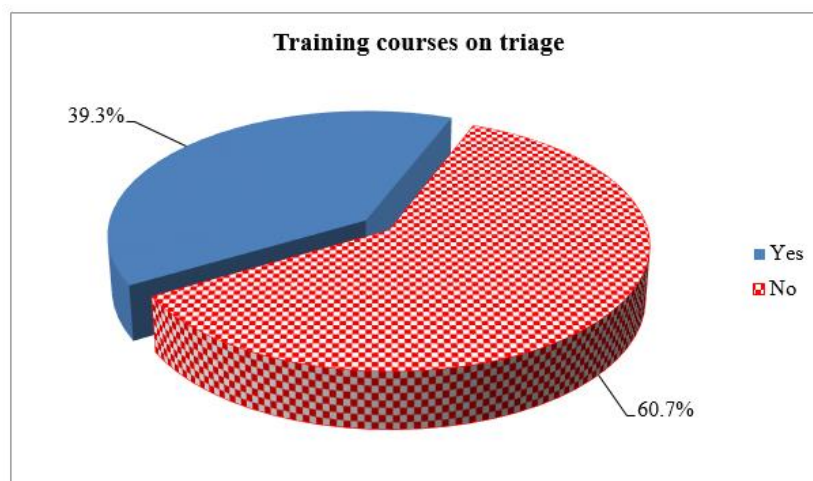| Gender:		
Male	29	51.8
Female	27	48.2
Educational qualification		
Diploma	24	42.9
Diploma above average	16	28.6
Bachelor degree of nursing	16	28.6
Years of experience		
1-<10 years	43	76.8
10-<20 years	10	17.9
>20 years	3	5.4

Figure (1): Attending training courses on triage among nurses in the study sample (n=56)

Table (2): Total nurses' practice regarding triage dimensions throughout three phases of the program (N=56)

Dimension of practice	Adequate >60%						Pre-Post		Pre-FU	
	Pre-Program		Post Program		Follow Up					
	No.	%	No.	%	No.	%	x^2	p-value	x^2	p-value
Identifying patient	11	19.6	28	50.0	26	46.4	11.303	<0.001**	9.015	<0.001**
Assessment of chief complain of patient	12	21.4	26	46.4	24	42.9	7.740	0.005*	5.880	0.015*
Nursing Diagnosis	8	14.3	25	44.6	23	41.1	12.262	<0.001**	10.142	<0.001**
Nursing planning	9	16.1	28	50.0	26	46.4	14.413	<0.001**	11.858	<0.001**
Nursing implementation	13	23.2	29	51.8	27	48.2	9.685	<0.001**	7.556	<0.001**
Evaluation of triage process	9	16.1	25	44.6	23	41.1	10.663	<0.001**	8.671	0.003*
Total	75.13±4.66		93.48±10.69		91.23±10.22		-11.778	<0.001**	-10.729	<0.001**

Table (3): Total nurses' attitude regarding triage dimension throughout three phases of the program (N=56)

| Domain of Attitude | Positive attitude | | | | | | Pre-Post | | Pre-FU | |
| | Pre-Program | | Post Program | | Follow Up | | | | | |
	No.	%	No.	%	No.	%	x^2	p-value	x^2	p-value
Importance of triage	27	48.2	48	85.7	48	85.7	17.636	<0.001**	17.636	<0.001**
Triage process	20	35.7	38	67.9	38	67.9	11.524	<0.001**	11.524	<0.001**

x^2: Chi-square test

p-value >0.05 is insignificant; *p-value <0.05 is significant; **p-value <0.001 is highly significant
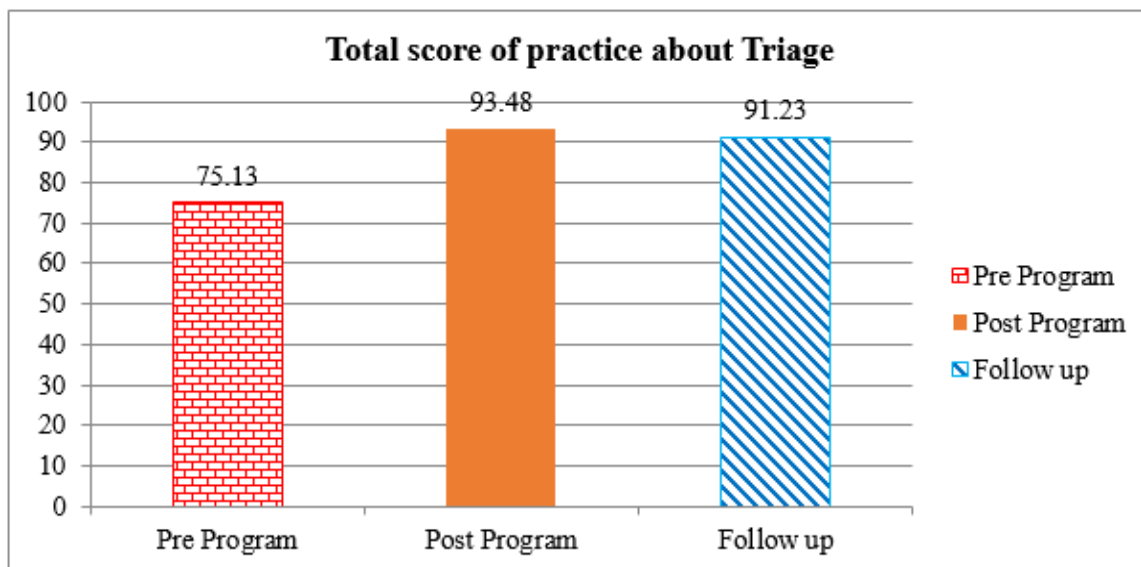

Fig (2): Mean scores of practices about assessment of triage of (pre/ post/ follow up) implementation of nursing program

Table (4): Total nurses' attitude related to triage before, after and follow up program (N=56)

| Level of total attitude about Triage | Pre-Program | | Post Program | | Follow Up | | Pre-Post | | Pre-FU | |
	No.	%	No.	%	No.	%	x^2	p-value	x^2	p-value
Positive attitude	20	35.7	48	85.7	48	85.7				
Negative attitude	36	64.3	8	14.3	8	14.3	27.289	<0.001**	27.289	<0.001**
Total	56	100.0	56	100.0	56	100.0				

x^2: Chi-square test

p-value >0.05 is insignificant; *p-value <0.05 is significant; **p-value <0.001 is highly significant

Table (5): Relation between nurses adequate of practice regarding Triage and their personal and job characteristic (N=56)

Personal and job characteristic	Pre-Program (n=56)		Post-Program (n=56)		Follow Up (n=56)	
	No.	%	No.	%	No.	%
Age (years):						
< 30 years	11	78.60%	36	72.00%	35	72.90%
30- 40 years	1	7.10%	10	20.00%	10	20.80%
>40 years	2	14.30%	4	8.00%	3	6.30%
x^2	2.741		7.768		9.453	
p-value	0.254		0.021*		0.009*	
Gender:						
Male	6	42.90%	27	54.00%	25	52.10%
Female	8	57.10%	23	46.00%	23	47.90%
x^2	0.596		0.916		0.012	
p-value	0.44		0.338		0.913	
Marital Status:						
Single	6	42.90%	27	54.00%	26	54.20%
Married	7	50.00%	21	42.00%	20	41.70%
Divorce	1	7.10%	2	4.00%	2	4.20%
x^2	1.074		1.412		1.368	
p-value	0.584		0.494		0.505	
Educational qualification						
Diploma	6	42.90%	20	40.00%	20	41.70%
Diploma above average	7	50.00%	14	28.00%	12	25.00%
Bachelor degree	1	7.10%	16	32.00%	16	33.30%
x^2	6		2.862		4.278	
p-value	0.06		0.239		0.118	
Years of experience						
1-<10 years	12	85.70%	42	84.00%	40	83.30%
10-<20 years	1	7.10%	6	12.00%	6	12.50%
≥20 years	1	7.10%	2	4.00%	2	4.20%
x^2	1.505		13.733		8.165	
p-value	0.471		<0.001**		0.017*	
Training courses on triage						
Yes	2	14.30%	19	38.00%	19	39.60%
No	12	85.70%	31	62.00%	29	60.40%
x^2	1.891		0.323		0.012	
p-value	0.072		0.57		0.911	

x^2: Chi-square test

*p-value >0.05 is insignificant; *p-value <0.05 is significant; **p-value <0.001 is highly significant*

Table (6): Relation between nurses 'attitude regarding Triage and their personal and job characteristic (N=56)

Personal and job characteristic	Pre-Program (n=56)		Post-Program (n=56)		Follow Up (n=56)	
	No.	%	No.	%	No.	%
Age (years):						
< 30 years	17	85.0	32	66.7	32	66.7
30- 40 years	1	5.0	12	25.0	12	25.0
>40 years	2	10.0	4	8.3	4	8.3
x^2	6.148		4.065		3.463	
p-value	0.046		0.397		0.484	
Gender:						
Male	11	55.0	26	54.2	26	54.2
Female	9	45.0	22	45.8	22	45.8
x^2	0.129		1.430		0.874	
p-value	0.720		0.489		0.646	
Marital Status:						
Single	12	60.0	25	52.1	25	52.1
Married	6	30.0	21	43.8	21	43.8
Divorce	2	10.0	2	4.2	2	4.2
x^2	5.500		3.868		3.094	
p-value	0.064		0.424		0.542	
Educational qualification						
Diploma	9	45.0	20	41.7	20	41.7
Diploma above average	4	20.0	15	31.3	15	31.3
Bachelor degree	7	35.0	13	27.1	13	27.1
x^2	1.283		1.714		2.106	
p-value	0.526		0.788		0.716	
Years of experience						
1-<10 years	18	90.0	37	77.1	37	77.1
10-<20 years	1	5.0	9	18.8	9	18.8
≥20 years	1	5.0	2	4.2	2	4.2
x^2	3.595		2.685		1.682	
p-value	0.166		0.612		0.794	
Training courses on triage						
Yes	6	30.0	20	41.7	20	41.7
No	14	70.0	28	58.3	28	58.3
x^2	1.125		2.939		0.799	
p-value	0.289		0.230		0.671	

x^2: Chi-square test

*p-value >0.05 is insignificant; *p-value <0.05 is significant; **p-value <0.001 is highly significant*

DISCUSSION

Nurses are the primary anchorpersons of triage in emergency departments. Triage nurses should have the proper education and proficiency in emergency triage, decision making, and emergency nursing care. Training on triage is an integral part of emergency nursing

education. The current study aimed to assess the effect of educational programs about patient triage on staff nurses' practice and attitude, through this research hypothesis, the current study was articulated, staff nurses' practice and attitude regarding patient triage was improved after implementation of the educational program. Discussing the findings of the current study was categorized under forth main parts. The first part concerned the personal and job characteristic data of the studied nurse. The second part nurses practice regarding triage throughout program phases. The third part is about nurses' attitude regarding triage throughout program phases. The fourth part related to relation between the study variables to personal and job characteristic. The current study showed that shows, more than two thirds of studied nurses were in the age group <30 years with mean age was 29.46±8.54 years. Slightly more than half of studied nurses were male and more than one third had diploma. Additionally, slightly more than three quarters were years of experience 1-<10 years. More ever slightly less than two thirds do not attend training courses.

This result of the current study is in the same line with a study by **AlMarzooq (2020)** who studied "Emergency Department Nurses' Knowledge Regarding Triage" and found that one third of the study participants had from 31-35 years. The educational level which indicates that most of the nurses were with bachelor's degree. Whereas nurses with technical diploma in nursing constituted less than half. In relation to the training courses, more than three quarters of nurses from of nurses had undergone the Advanced Cardiac Life Support (ACLS) training. But the triage courses were only one quarter of participants undergone the triage courses. The current study indicated that practice generally low before program related to nursing planning for triage, while there is highly statistical improvement in nurses' practice in post program. There are highly statistical improvements in nurses' practice in post program regarding nursing implementation during triage (general and direct care)

The results were supported by **Al Shatarat et al. (2022)** who studied "Triage practice and associated factors among emergency department nurses." and showed a decline in nurses' practice regarding planning and implementation of triage before training program and improvement in nursing practice after the program. They added that several strategies that are aligned with the focus of the current study on improving nursing implementation during triage, indicating that targeted interventions and education can lead to enhanced nursing practices in this critical area. This broader perspective on interventions aligns with the multifaceted nature of nursing implementation during triage, which involves various aspects such as respiratory and circulatory interventions, vital sign monitoring, and maintaining a safe environment.

The current study indicated that one quarter of nurses reported adequate practice triage before the training program. While the majority of them reported adequate practice triage after and follow up the training program. This may be due to the training programs likely focus on best practices in triage, emphasizing key aspects such as patient needs assessment, planning, and general care. Implementation of these best practices in real-world scenarios leads to improved overall triage performance. Also, this may suggest the

importance of ongoing support, reinforcement, and continuous learning opportunities for nurses. Regular updates and refresher courses can help sustain and build upon the knowledge and practice gained during the initial training. Consistent with the current study **AlShatarat et al. (2022)** revealed Participants demonstrated generally high levels of triage practice. However, incorrect practice related to some aspects were noted. They added that most participants had access to their triage systems and the majority utilize triage systems on a daily basis. Half said that only professional nurses performed the triage role. Also, **Faheim et al. (2019)** showed that poor nurses' triage practice for before triage education, compared to a significant improvement after triage educational program, with a statistically significant difference among the three- implementation phases (pre, post, and one month follow up).

The current study indicated more than one third of nurses had positive attitude in preprogram. It marked improvement of nurse positive attitude of triage in post program phase and in follow up phase of program. There were highly statistically significant differences throughout program phases. In the same line with the current study, **Faheim et al. (2019)** revealed negative attitude for the studied nurses before triage education, compared to a significant improvement after triage educational program, with a statistically significant difference among the three- implementation phases (pre, post, and one month follow up). **El-Guindy et al. (2021)** studied "Enhancing nurse interns' knowledge and practice regarding triage at emergency units during COVID 19 pandemic" and revealed nurse interns' preventive behavior level regarding triage at emergency units during COVID-19 was highly statistically significant improved after the program implementation. As slightly less than three quarters of them had poor preventive behavior level, that improved to majority had good preventive behavior level post program

CONCLUSION

Based on the findings of the current study it can be concluded that there was a highly statistically significant improvement of nurses' knowledge, practice and attitude about triage between pre and post program phases and between preprogram and follow up phases. There was a statistically significant positive correlation between total mean score of knowledge, practice and attitude regarding triage in post-program and follow up, with p-value (p<0.05). The finding of this study support research hypothesis.

RECOMMENDATIONS

On the basis of the findings of the current study, the following recommendations were suggested:

For hospital administration

- Conduct training program and workshops periodically for nurses about patient's triage especially at critical care units to improve quality of care and patient safety.

- Designing an instructional guideline about triage nurse roles and responsibilities in emergency departments.

- Implementing a triage system in hospitals, which can be used effectively during emergencies and disasters.

- Establish job orientation for newly graduates' nurses to enhance knowledge, practice and attitude about triage and continuous education.

- Increase the number of highly qualified nurses in the emergency department because it was noticed that the total knowledge and practice mean scores increased with high qualifications.

- Publication and dissemination of the guideline educational program in emergency departments service to improve nurses' practice about triage for adult, pediatric, and obstetric patients...

For staff nurses

- Triage nurse roles and triage process should be included in the curriculum of Nursing Schools, Nursing Institutes and Faculties of nursing.

- The triage nurses should receive continuing education and demonstrate knowledge application into practice to rank the patient's triage acuity level successfully

- A triage nurse should be available at triage desk during all the shifts and all the time to reduce triage waiting time.

Further research's

- Identify the effect of triage training program on patient outcome.

- Determine factors affecting knowledge, practice and attitude among nurses.

- A further longitudinal study should be done to evaluate the effect of the researchers' guideline educational program on the nurses' practice toward triage in ED

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