Application of Triage Protocol to Improve Quality of Care in Emergency Unit at Maternity Hospital

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Abstract

Background: the obstetric triage system is more specialized than general and trauma triage, as it involves assessing labor condition, fetal well-being, preparing tests and interventions for obstetric problems**. aim of this study** was to apply the triage protocol to improve quality of care in emergency unit at Maternity Hospital. **The study design:** A quasi-experimental study design was used**. Setting:** The study was conducted in the Emergency unit at the Maternity Hospital Ain Shams University**. Study Sample:** It was a convenience sample of (70) health care providers (nurses, physicians, paramedics) working in the Emergency Unit at Maternity Hospital. Data collected for a period of eight months from April to November 2018. **Four tools** were used for data collection: **Tool I:** A structured interviewing questionnaire to assess health care providers' knowledge among triage protocol application. **Tool II:** Adapted Obstetrical Triage Acuity Scale (AOTAS) adopted from **Smithson et al. (2013). Tool III**: An observational checklist Designed and prepared by the researcher to assess Health care providers 'performances in Emergency unit. **Tool IV:** A structured interviewing questionnaire to assess Patients' satisfaction which reflect the influence of triage protocol application in the emergency unit of patients' Satisfaction Scale: It will be adapted from **Elliott scale (2017)**. **The Results:** this study reveals that there was lack of a single standardized tool for triage system in emergency unit at the maternity hospital. Lack of health care providers' knowledge and performances related to triage protocol, incomplete nursing role at emergency unit. **Conclusion**: Triage protocol application after educational and training sessions had positive, efficient in improving health care providers' knowledge and performances. **Recommendation:** Application standardized triage acuity scale to improve quality of care, improve outcomes with increase patient satisfaction. improving staff competency through continuous educational protocol. Development of clinical protocols in accordance with the rules and regulations.

Key words: Triage protocol, Quality of Care, Emergency unit.

Introduction

Triage system in emergency care is a process of collecting patient information and initiating a decision-making process that categorizes and prioritizes the needs of patients seeking care **(Bond, 2018).** In addition, triage system is of strategic importance in the organizational structure of Emergency Units (EU). Global triage involves assessing a patient upon arrival at the EU; this is done by a nurse through a series of steps: assessment upon arrival, data collection, interview plus physical examination and assessment of vital signs, assignment of a priority code, color code, and reassessment. There are 4 priority codes: 1- Red (very critical), 2- yellow (moderately critical) 3-green (not very critical) 4-white (not critical) **(Christ,et al., 2017).**

John,et al., **(2015)** reported that the triage system has two categories; Triage

during disasters and non-disaster triage. Non-disaster triage, including the pre hospital setting, disasters, and emergency unit treatment, along with their limitations and ethical considerations. Triage system during disasters, as in natural disasters around the globe, more than100, 000 people are killed and millions are injured or disabled, as the catastrophic earthquake that struck Haiti in 2010 and the destructive tsunami in the Indian Ocean in 2004 are recent examples that show the difficulties in providing medical care. The key to successful disaster management is a Correct triage system to provide care to those who are in greatest need first and in multi casualty/disaster, to provide the most effective care for the greatest number of patients (***Carr and Jensen, 2015).*** In addition, the types of triage systems: are various types of triage systems as it occurs in medical emergencies, including the pre hospital setting, disasters, and emergency unit treatment, along with their limitations and ethical considerations. Another type, Simple triage systems, including: (Tags triage, Advanced triage, Reverse triage, Under triage and Telephone triage).

Also Outcomes triage types : Palliative care evacuation, Alternative care facilities, secondary (in-hospital) triage and specific systems as: Practical applied triage scoring systems, S.T.A.R.T. Model, JumpStart triage **(Debacker, 2012).**

The different tools of triage system as: Australia, New Zealand, Canada, Finland, France, Germany, Hong Kong, Japan, Singapore, United Kingdom -United States, United States military, Swiss Emergency Triage Scale (SETS), The Emergency Severity Index (ESI), Obstetric Triage Acuity Scale (OTAS) and Maternal Fetal Triage Index (MFTI) **Gratton, et al (2016).** This triage tool with the color Codes or emergency codes were developed to alert relevant healthcare personnel in a hospital to a critical situation, while not alarming patients and visitors. When a code is called, a pre-designated team of physicians, nurses and other personnel respond quickly and efficiently, based on their training **(Butti, et al., 2017).**

The Obstetric Triage Acuity Scale (OTAS), this scale was originally designed by **Smithson et al (2013)** based on the Canadian Triage Acuity Scale (CTAS). The OTAS system consists of five levels: critical, emergency, urgent, semi-urgent, and non-urgent. Adapted to four levels by the researcher, enables the registered nurse to triage patients, according to the type and severity of their presenting signs, symptoms or complains and also facilitates the assessment with the acuity, this acuity is color coded. The assessment items in this scale include; the onset of labor, rupture of fetal membranes, bleeding, hypertension, and fetal assessment. Also, this tool covers major pain complaints, abdominal trauma, infection, symptoms, substance abuse, psychological problem, respiratory distress, fetal wellbeing, cervical dilatation, and vital pregnancy-specific parameters. In addition the tool covers hemodynamic stability as shock signs, and abnormal vital signs **(Smithson,et al., 2013).**

The major advantages of triage system that provides an ethical analysis of "routine" EU triage and involve patient safety concerns these includes, but are not limited to assess in a timely manner, appropriate complete evaluation and documentation. Reco- gnizing active labor and discharging the pregnant patient in false labor **(Baird and Troiano, 2017).**The ultimate goal of triage is to preserve and protect endangered human lives as much as possible by assigning priority to patients with an immediate need for life-sustaining treatment, this is implementing through the principles of triage system **(Anderson,et al., 2015).**The Principle of triage system: or biomedical ethics are respect for autonomy, beneficence, no maleficence and justice which provide the starting point

and help us to identify the ethical challenges of emergency unit triage. Health care providers in the EU have an ethical obligation to attempt and provide benefits to the patients by taking their complaints seriously and by managing their problems according to prevailing standards of care. By applying a system of triage, they seek to improve the quality of care by using the available resources as effectively and efficiently as possible **(Iserson and Moskop, 2015).**

Emergency units across the globe follow a triage system in order to cope with overcrowding, to improve the emergency care and to prioritize cases in terms of clinical urgency. During the last decade, the issue of pandemic triage has entered the triage system, the emerging infectious disease like Severe Acute Respiratory Syndrome (SARS) and Pandemic Influenza have alerted emergency units to the need for contingency plans **(Kenyon,et al., 2017).** Risks in the emergency unit, represented that medical care might lead to adverse consequences like delay in providing care, compromise in privacy and confidentiality, poor physician-woman communication, failing to provide the necessary care altogether. These consequences challenge the ethical quality of emergency care, standards of care must be maintained to preserve the safety of both patients and providers **(Sun,et al.,2016).** Standard workflows and acuity indexes benefit the nursing profession by creating standards and expectations. The patient care is elevated through measuring, monitoring and the practice of the health care providers (HCPs). Disseminating patient care quality indicators, metrics, and working to continuously improving patients' outcomes **(Frykberg, 2017).**

The role of (HCPs) especially nurse in the EU are important role in applying the triage system and provide care for patients with mild colds to extreme injuries. This role requires the triage nurse to make quick decisions about the priority admittance as a means of deciding the order in which patients will receive treatment **(Bayliss,et al., 2017).**

Significance of the problem:

Maternal morbidity and mortality are major public health problem, especially in West Africa, where maternal mortality ratios are still very high, most maternal deaths occur during or few hours after delivery. Hemorrhage, hypertension, obstructed labor and sepsis are the major direct emergency obstetric causes, The treatments for those obstetrical complications are well known and appropriate emergency obstetric care should prevent most of these deaths **(WHO, 2015).**

There is a gap between the evidence and reality of practice on the international level of care, so there is a need to apply the triage aspect for provision of high quality Obstetric and Gynecological Nursing maternity Care, a review of literatures has shown that, the emergency unit study in Obstetric and Gynecological Nursing in Egypt is extremely limited. The problems in health care providers with triage protocol may be related to the inability to diagnose many patients at the same time and no support **(Ebrashy, et al., 2011) .** Insistent effort to make further improvements in health care systems is a key requirement for achieving the goal of sustainable development in regard to maternal mortality and morbidity. The demand for high-quality obstetric care and treatment has led to the advent and development of a field known as obstetric triage, so this study is thus carried out to apply triage protocol to improve quality of care in emergency unit **(Sharma, e al., 2015).**

Aim of the Study:

was to apply triage protocol to improve quality of care in the EU at the maternity hospital, this aim will achieved through:

- Assessing knowledge of HCPs among triage protocol application.
- Assessing performances of HCPs among triage protocol application Assessing response of HCPs among triage protocol application.
- Evaluating the effectiveness of triage protocol application on HCPs' knowledge, performances, and quality of care in the EU at the maternity hospital.

-Assess patient satisfactions which reflect the influence of triage application.

Research Hypothesis:

The triage protocol application will affect positively HCPs' knowledge, performances, and reflect positively on patients' satisfaction.

Subjects and method:

Study Design:

A quasi- experimental design was used to achieve the aim of the study.

Setting:

The study was conducted in the EU at the Maternity hospital (obstetric and gynecological hospital) Ain Shams University. This place was selected because it serves a lot of patients from all Egypt, it is considered as educational area and also it is considered as the research place of work.

Subject:

Was taken from the HCPs (Nurses, paramedics and physicians) working in emergency unit at maternity hospital and the patients were available at the time of the study in EU to investigate the satisfaction of patients in relation to the effectiveness of triage.

Size:

A convenience sample of (70)

HCPs working in the EU at Maternity hospital, (nurses, physicians, paramedics) and who are willing to participate in the study.

Tools of data collection:

Four tools were used for data collection; this tool was filled by the researcher.

The tool I: A structured interviewing questionnaire for HCPs, consisting of two parts: **Part I:** Assessing HC Ps' socio-demographic characteristics such as age, level of education, years of experiences and occupation.

Part II: Assessing HCPs' knowledge and response regarding general triage protocol (concept of triage, levels, coded colors and principles of triage protocol).

Tool II: Adapted Obstetrical triage acuity scale (AOTAS), this tool was adopted from **Smithson et al, 2013**. It will be adapted by the researcher, designed to assess HCPs'knowledges regarding to sorting patients complains according to levels of AOTA Scale (survival, emergency, urgent, not urgent level) in the emergency unit.

❖ **Scoring system of HCPs knowledge**:

Included two levels, (2) points for the correct answer and one point for an incorrect answer or don't know the answer. The total score was (0-42 degree).

Tool III: consisting of two parts.

Part I: Observational checklist designed and prepared by the researcher to assess HCPs' reported performances (recording and procedure performance) among the attending patients in the EU at Maternity hospital.

- **A scoring system of HCPs' reported performances (recording and procedures):** included two levels: (2) points for doing correctly items and (1) point for not done performances.

The score converted to a percentage (%) = (the observed score /the maximum score) x100.

The total score was 0-24 grades:

- Unsatisfactory performance when total score was <50%.

- Satisfactory performance when total score was>50%.

Part II: To assess HCPs' response among triage protocol application in the EU pre / post educational and training sessions.-

- **A scoring system of HCPs' response:**

Included two levels: (2) point for the correct answer and (1) point for an incorrect answer or does not know the answer. The total score was (0-32 grades).

- Unsatisfactory response when total score was <50%.

- Satisfactory response when total score was>50%.

Tool IV: A structured interviewing questionnaire to assess patients' satisfactory assessment which of two parts. **Part I**: To assess socio-demographic characteristics, obstetrics, gynecological history and the complaints of patients.

Part II: Patients' Satisfaction Scale: It will be adopted from **Elliotte (2017)** and adapted by the researcher after reviewing of literature. It was written in an Arabic language. It included 22 items. It was completed by interviewing of the studied patients. Patient satisfaction was measured on a 5 point Likert type question with answers varying from "very satisfied" to " not satisfied" and asked the patients to evaluate their satisfaction which reflect the effectiveness of triage application in EU.

- **Scoring system for patients' satisfaction:**

Each statement had five levels rating scale as follows: (1) very dissatisfied -(2) dissatisfied -(3) neutral -(4) satisfied and (5)very satisfied.

The total score for every question related to Patients satisfaction scale ranged from 0-5 points and categorized in two levels as followings:

- Patients Unsatisfied when total score was <55%.

- patients Satisfied when total score was>55%.The total score was from0-110grades.

Validity: It included reviewing of the current local and international related literature using books, articles and scientific magazines to develop tools for data collection.

Reliability: By using Cronbach's Alpha coefficient test and no modification was done.

II- Operational design:

Pilot study:

It was carried out with (7) HCPs working in EU to evaluate clarity, visibility, applicability and content validity of the tool.

Pilot study was carried out on patients which available at EU to evaluate the visibility and the validity of the tool. The results of the pilot study helped in the necessary modifications of the tools.

Field work:

Data collection for this study was carried out through emergency unit over a period of eight months.

Attending 3 days per week from 10 am to 2 pm to interview HCPs in EU.After introducing oneself and explain the purpose

of the study to the participant and the consent to share in the study.

Knowledge of HCPs assessment regarding to triage protocol (pretest). All tools lasted 30–35 minutes for each participant included in the study.

The educational and training sessions were developed and implemented by the researcher in the form of lectures, on job training. The theoretical part of the protocol was conducted through lectures and group discussions, using educational media as data show, poster and flyer designed by the researcher included information among triage protocol and distributed to the HCPs in EU. Practical part will be conducted by observational check list of reported performances (recording and procedures), to assess HCPs' recording and documentation to every procedure after done.

Finally follow-up for HCPs with posttest was done after implementing the educational and training sessions in EU.

III- Administrative Design:

An approval letter to conduct the study, including the aim of the study was obtained from the authorities of the faculty of nursing, Ain Shams University forward to the director of Maternity Hospital Ain shams University.

Ethical Consideration:

Informed consent was taken from the director of the Maternity Hospital and the consent was taken from each HCP participated in the study after explaining the objectives of the study. Confidentiality of the collected data was ensured and withdraw from the study at any time was accepted.

IV- Statistical Deigns:

Data was categorized, coded and was entered using excelling while statistical analysis was done. Analyzed data and results were presented in tables and graphs using frequency distribution tables. The percentages score were used in all tables. The statistical significance of observed differences was assessed by using chi square.

Results:

Table (1): reveals that 47.1% of studied HCPs were in the age group from 40-50 years and the majority of them (58.6%) were nursing diploma, and two thirds of them (45.7%) more than 20 years of experience at work. Less than thirds of them (17.1%) had (received) previous training courses about triage protocol. Additionally, (57.1 %) more than half of the studied HCPs no knowledge related to triage protocol.

Table (2): reveals that regarding to general knowledge of HCPs about the general triage protocol (concept, coded colors, principle and levels of triage scale) in EU, with the mean scores 6.6±1.56 pre educational and training sessions compared with the mean scores18.19 ± .57 post educational and training sessions and there are highly statistical significant difference between pre and post educational and training sessions with P-value<0.001.

Table (3): reveals that regarding knowledge of HCPs about the critical signs, symptoms and time of initial assessment for every level and prioritizing of patients complains according to the Adapted Obstetric Triage Acuity Scale(AOTAS) (survival, emergency, urgent and not urgent levels) with the mean score 5.00 ± 1.56 compared with the mean score 6.61 ±1.57 post educational and training sessions and there are highly statistical significant

difference between pre and post educational training sessions with P-value<0.001.

Table (4): reveals that regarding to recording performances of the HCPs among recording of reporting data, safety measures with sorting patients and recording every procedures after done with the mean score (17.34 ± 1.64), compared with the mean scores (18.00 ± 2.00) post educational and training sessions and there are highly statistical significant difference between pre and post educational and training sessions with P-value<0.001.

Table (5): reveals that regarding HCPs' responses among triage protocol application in EU with the mean score (23.41±3.09) pre education, compared with the mean score (31.07 ± 1.35) post educational and training sessions and there are unsatisfactory responses pre educational and training sessions, compared with satisfactory responses post educational and training sessions, with P-value <0.001.

Table (6): Reveals that, The effect of educational and training sessions on the total score of HCPs' knowledge,their Reported performances (recording, procedures), response and quality of care, that there are unsatisfactory knowledge pre educational and training sessions with the mean12.70 ± 2.61 compared with satisfactory knowledge with the mean score 18.19 ± 3.7 post educational and training sessions. Regarding total knowledge score of HCPs among AOTAS, there are unsatisfactory knowledge pre educational and training sessions, compared with satisfactory knowledge post educational and training sessions with P-value<0.001, Regarding total reported Performances (recording and procedures)score level there are unsatisfactory reported Performances score level pre educational and training sessions, compared with satisfactory Performances

score level post educational and training sessions with P-value <0.001.

Table (7): Reveals that the correlation among total score patients satisfaction and quality of care in EU applying triage protocol that there are 41% unsatisfied patients while 59% of patients feel satisfied among (communication, sorting their complains). About 76.5% of patients satisfied while 23.5% patients unsatisfied regarding to HCPs' response to their needs, and discharge instruction 76.5% patients satisfied while 23.5% unsatisfied patients and there are statistical significant relation between their satisfactions and quality of care in EU with P-value <0.001.

Table (1): Distribution of the HCPs according to their demographic characteristics data (n=70).

Demographic data		N	%
Age (years):	< 30	15	21.4
	30-	19	27.1
	40-	33	47.1
	50-<60	3	4.3
Level of education:	Nursing diploma	51	72.3
	Bachelor of nursing	5	7.1
	Master of nursing	3	4.3
	Bachelor of Medicine	11	15.7
Marital status:	Married	51	72.9
	Single	13	18.6
	Divorced/widow	6	8.6
Duration of work/ years:	1-	17	24.3
	10-	13	18.6
	20-	32	45.7
	30-<40	8	11.4
Previous training related triage protocol:			
	Source of knowledge	12	17.1
Education		11	15.7
	Training in hospital	17	24.3
	Media	2	2.9
	No training	40	57.1

Table (2): Distribution of HCPs' knowledge regarding to general triage protocol (concept, coded colors, principle and levels of triage scale) **(**pre and post educational and training sessions)(N=70).

Items	Pre		Post		P value*	
	N	%	N	%		
Do you know what triage is?	18	25.7	70	100.0	<0.001	
Is triage protocol applied in your hospital?	17	24.3	30	42.9	<0.001	
Does work system help you in triage application?	14	20.0	30	42.9	<0.001	
Do you know the principles of triage	11	15.7	30	42.9	<0.001	
Did you practice triage before?	16	22.9	6	8.6	0.01	
Arrangement of triage levels?	25	35.7	70	100.0	<0.001	
The color code of triage?	30	42.9	70	100.0	<0.001	
Number of triage levels	10	14.3	70	100.0	<0.001	
Trained about triage to be applied in emergency unit?	4	5.7	70	100.0	<0.001	
Meaning of triage	44	62.9	70	100.0		
triage according to severity of cases	6	8.6	0	0.0		
triage according to time management	20	28.6	0	0.0		
don't know						
	Mean	**SD**	**Mean**	**SD**	**t****	**P value**
Total knowledge score	12.70	2.61	18.19	.57	19.62	<0.001
Knowledge score regarding AOTAS	6.61	1.56	10.00	.00	18.12	<0.001

*McNamara test **Paired samples t test *P-value>0.05 NS; * P-value<0.05 S; *P-value<0.001 HS

Table (3): Distribution of HCPs' knowledge regarding to *AOTAS* (survival, emergency, urgent and not urgent levels), in emergency unit at Maternity hospital (pre and post educational and training sessions) (N=70).

Time management to initial assessment Emergency level and color codes	pre		post		t*	P value*
	No	**%**	No	%		
Time of first level survival(blue code)	59	84.3	70	100		<0.001
Time of 2nd level emergency (red code)	**11**	**15.7**	66	94.3	11.12	<0.001
Time of third level urgent(yellow code)	**13**	**18.6**	54	81.8	24.15	<0.001
Time of fourth level not urgent(green code)	**14**	**20.0**	70	100	5.90	**<0.001**
Arrangement color coding according to emergency level	**30**	**42.9**	59	84.3	7.09	**0.05**
	Min.	**Max.**	**Mean**	**SD**		
Total knowledge score	5.00	10.00	6.61	1.56		

Table (4): Distribution of HCPs' observational checklist assessment regarding to their reported performance (recording) toward triaged patients (pre and post educational and training sessions) (N=70).

Recording, documentation and safety measures	**Pre**		**Post**		**P value***	
	N	**%**	**N**	**%**		
Woman identification	68	97.1	70	100.0	0.50	
Completeness of data file	59	84.3	64	91.4	0.03	
Documentation at file	67	95.7	70	100.0	0.25	
woman consent	66	94.3	70	100.0	0.13	
Obstetric, medical and family history	67	95.7	70	100.0	0.25	
Risk assessment of current pregnancy	66	94.3	70	100.0	0.13	
Sending woman for US	54	77.1	70	100.0	<0.001	
	Mean	**SD**	**Mean**	**SD**	**t****	**P value**
Total recording score	17.34	1.64	18.00	2.00	3.35	0.001

Table (5): Distribution of HCPs' observational checklist regarding to their practice performance (procedures') toward attending triaged patients (pre and post educational and training sessions), (N=70).

Items	**Pre**		**Post**		**P value***	
	N	**%**	**N**	**%**		
Preparing equipment	67	95.7	70	100.0	0.25	
Hand hygiene before procedures'	5	7.1	57	81.4	<0.001	
Document' Woman complains	66	94.3	70	100.0	0.13	
Document 'weight, BP and body temperature	63	90.0	70	100.0	0.02	
Abdominal and lower limb examination	19	27.1	13	18.6	0.07	
Document fetal movement and fetal kicks	13	18.6	70	100.0	<0.001	
Document 'urine sample and blood sample	54	77.1	70	100.0	<0.001	
	Mean	**SD**	**Mean**	**SD**	**t****	**P value**
Total performance score	22.04	2.49	23.56	1.18	5.96	<0.001

Table (6): Distribution of HCPs' response regarding to triage protocol application *(*pre and post educational and training sessions), (n=70).

Items	Pre		Post		P value*
	N	%	N	%	
Triage protocol not complicated	16	22.9	51	72.9	<0.001
Triage protocol not affected by number of women	15	21.4	60	85.7	<0.001
Triage by prioritize according severity cases	20	28.6	70	100	<0.001
Triage protocol no negative issues	14	20.0	53	75.7	<0.001
Triage protocol a lot of positive issues	19	27.1	70	100	<0.001
Triage protocol needs training	55	78.6	70	100	<0.001
Triage improves quality of care	51	72.9	70	100	<0.001
Triage codes are important	42	60.0	51	72.9	0.14
levels of triage are important	29	41.4	70	100	<0.001
Decrease length of stay	20	28.6	70	100	<0.001
Improves performance	21	30.0	70	100	<0.001
Importance of triage for communicable diseases	27	38.6	70	100	<0.001
provides priority according to emergency cases	36	51.4	70	100	<0.001
Needing triage specialist	45	64.3	70	100	<0.001
Triage protocol improves quality of care	54	77.1	70	100	<0.001
Helps in first aid in crises	55	78.6	70	100	<0.001
	Mean	**SD**	**Mean**	**SD**	**t****	**P value**
Total Response score	23.41	5.09	31.07	1.35	12.78	<0.001

Table (7): Relation between total knowledge scores level**,** Reported performances (recording, procedures), response scores level of HCPs and Quality of care (pre and post educational and training sessions) (n=70).

General Characteristics Items	Knowledge score regarding triage protocol		Recording score		Performance score procedure		Response score		F*	P value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Age (years) < 30	14.67	2.79	17.47	.52	23.47	2.39	26.27	5.76		
30-	12.42	2.36	17.26	1.28	21.16	1.98	22.95	5.06	4.65	<0.001
40-	12.15	2.35	17.58	1.58	22.21	2.13	22.88	4.39		
50-<60	10.67	.58	14.67	4.93	18.67	5.13	18.00	3.46		
Education										
Nursing diploma	12.10	2.06	17.41	1.60	21.56	2.09	22.20	4.28		
nursing institution	11.00	.82	17.17	1.17	21.17	1.94	20.33	4.13		
nursing assistant	10.33	.52	15.00	4.00	18.25	3.50	16.00	.00	12.31	<0.001
Bachelor of nursing	12.20	1.64	18.60	.00	22.40	.55	26.20	2.28		
Master of nursing	15.33	2.89	18.00	.00	23.00	.00	30.00	3.46		
Bachelor of Medicine	16.36	1.96	17.55	.52	25.27	.90	29.27	2.10		
Marital status										
Married	12.24	2.29	17.27	1.90	21.57	2.36	23.06	4.54		
Single	14.77	3.03	17.46	.52	24.00	2.08	26.31	6.18	5.72	<0.001
divorced/widow	12.17	2.40	17.67	.52	21.83	2.71	20.17	4.96		
Years of experience 1-	14.53	3.04	17.00	2.12	23.29	3.46	25.41	6.15		
10-	12.00	2.42	17.23	.83	21.00	1.53	21.15	5.23		
20-	11.84	2.05	17.72	.92	22.06	1.46			5.26	0.03
30-<40	13.38	2.07	16.75	3.15	21.00	3.66	22.59	4.29		
Previous training										
Yes	15.08	1.56	17.26	1.78	22.03	2.47	26.12	3.18	3.81**	<0.001
Source of knowledge	15.00	2.49	17.55	.93	23.82	1.40	26.58	5.95		
Education										
training in hospital	13.29	2.57	17.59	.51	21.29	2.42	28.45	2.34	16.54	<0.001
Media	19.00	1.41	17.50	.71	25.50	.71	23.82	5.99		
No training	11.50	1.59	17.18	2.09	21.70	2.49	30.50	2.12		
			17.47	.52	23.47	2.39	21.50	4.01		
					21.16	1.98				

Table (8): Patients' satisfaction assessment regarding to quality of care among triage protocol application in EU (n=200).

Items	Unsatisfied patients	Satisfied patients
Reception, welcoming &communication	41%	59%
Sorting and women assessment	23.5%	76.5%
available services	23.5%	76.5%

Discussion

Regarding to the socio-demographic characteristics of health care provider (HCPs), the result of this study revealed that slightly less than two thirds of the studied health care providers especially nurses were in the age group 40-50 years because this age group working as caregiver experts in EU and will apply triage protocol in professional methods. The present study findings on the same line

with the study titled (The role descriptions of triage nurse in emergency unit), done by **Ebrahimi, et al(2016).** reported that mean age of HCPs was (38.42 ± 5.94) years old. This means that the age plays an important role in emergency unit duty.

Concerning to general knowledge of HCP among the general triage protocol, the study finding illustrated that there are highly statistically significant difference between pre/post educational and training sessions where an increase in health care providers' knowledge score level from 79% pretest to 95%, of them known post educational and training sessions, this training was beneficial in increasing and improving knowledge of the health care providers related to general obstetric triage protocol application (concept, coded colors, principle and levels of triage). This results on the same line with the study done by **Quaile (2018)** reported that implementing the educational session, giving a pretest, and followed up with completion of a posttest, this improving knowledge of the health care providers in emergency unit.

Concerning to knowledge of HCPs' related to the critical signs, symptoms, time for initial assessment and prioritizing patients according to adopted obstetric triage acuity scale (AOTAS), the study finding illustrated that the majority of HCPs' had unsatisfactory knowledge among *adopted obstetrical triage acuity scale with mean(* 6.61 ± 1.56) pre educational and training sessions, compared with the majority of HCPs had satisfactory knowledge with mean(10.00 ± 2.2) post educational that highly statistically significant difference between pre and post educational and training sessions. There was an increase in HCPs' knowledge, this could be due to effectiveness of educational and training sessions. This finding results supported by study done by **Grover,et al., (2017)** reported that education and training of health care providers on obstetric triage protocol and use of an acuity tool contributes to successful implementation of triage protocol in emergency unit.

Also the study results agree with the study done by **Magnone,et al.,(2019)** reported that health care providers with education and training on obstetric triage and use of an acuity tool contributes to successful implementation of triage protocol.

In other hand the study results agree with the study done by **Wallace, et al., (2019)** titled with Standardization Of Emergency Code Calls In Oregon, and reported that Emergency codes were developed to alert relevant healthcare personnel in a hospital to a critical situation, while not alarming patients and visitors. When a code is called, a pre-designated team of physicians, nurses and other personnel respond swiftly and efficiently, based on their training among triage protocol application.

Concerning to performances (recording, procedures), and response of HCPs regarding to obstetric triage protocol application that there are highly statistically significant difference between pre and post educational training sessions with P-value <0.001. The present study results on the same line with the study done by **Scheich, et al., (2018)** reported that, Implementing an Obstetrics-Specific Triage Acuity Tool Increasing Nurses' Knowledge, Improving Timeliness of Care and The educational sessions effectively increased nursing knowledge, and improvement performances of health care providers in emergency unit.

Regarding the effect of educational and training sessions on the total knowledge, Reported performances (recording, procedures),and response of

HCPs related to obstetric triage protocol application that highly statistically significant difference between pre and post educational training sessions with P-value <0.001,this results similar with the study done by **Waldo (2009)** mentioned that the importance of continued staff education in the improvement of emergency nursing performance among the patient assessment.

Regarding relation between total performances score level (recording and procedures)of HCPs among application of obstetric triage protocol in emergency unit, the present study revealed that were no statistical significant pre educational and training sessions compared with highly statistical significant post educational training sessions with(P-value<0.001).The study results supported by the study done by **Malyon,et al., (2014)** mentioned that The application of the obstetric triage protocol has had a significant impact on the HCPs' performances particularly when combined with education sessions. The use of the obstetric triage protocol as a framework to guide documentation and triage language facilitated parallel decision-making and auditing. Also led to an improvement in health care services.

Regarding to the relation among total scores patients satisfaction and quality of care in emergency unit applying triage protocol the study finding reveals that statistical significant relation with patients satisfactions scores(76.5%) and quality of care through HCPs' communication, respect, listening and triaging patients according to their complains in EU ,this results on the same line with the study done by **Elliott (2017)** reported that incorporated satisfaction with overall management in the emergency unit, with the explanation given before management, satisfaction with the advice given after the treatment, degree of satisfaction with treatment, and satisfaction with waiting time before treatment.

Conclusion and Recommendations:

The finding of this study proved that the effectiveness of the triage protocol application which improving quality of care, improving HCPs' knowledge, performances and response in EU and increase patients satisfaction. Also there are highly statistical significant differences between pre and post educational and training sessions with P-value <0.001.

There are highly statistical significant differences were noticed on health care providers' knowledge, performances and response among triage protocol application post educational training sessions. Also appositive effect on patient satisfactions which is the main indicator of quality of care in EU at Maternity Hospital. In the present study, it can be concluded that implementing educational and training sessions to HCPs for continuity of triage protocol application and resulted in an improving the HCPs' knowledge and performances. The researcher suggests that applying triage protocol in EU that influencing positively in improving quality of care.

According to these results the study recommended that:

- Health educational and training sessions in emergency unit at Maternity Hospital must be Instituted in all communities.
- The health care providers should provide obstetric triage tool and educational posters.
- Continuous educational training protocol.
- Nurses who work at the EU should effectively utilize their roles as a care giver, triage nurse and educators.

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