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Effectiveness of applying obstetric triage protocol on health care providers' knowledge and performance in emergency unit

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Abstract

The aim *of this study was to evaluate the effectiveness of applying the obstetric triage protocol on health care provider's knowledge and performance 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 Maternity Hospital, Ain Shams University.* ***Study Sample:*** *A convenience sample of (70) health care providers (nurses, paramedics and physicians). Data collected for a period of eight months from April to November 2018.* ***Three tools*** *were used for data collection:* ***Tool I:*** *A structured interviewing questionnaire of Health care providers which consisted of three parts,* ***Part I****: To assess knowledge's of Health care providers regarding Obstetric triage protocol application.* ***Part II****: To assess performances' of Health care providers regarding Obstetric triage protocol application.* ***Part III****: To assess responses' of Health care providers regarding Obstetric triage protocol application.* ***Tool II:*** *Adapted Obstetrical triage acuity scale (AOTAS) which adopted from* ***Smithson et al. (2013).*** ***Tool III:*** *An observational checklist designed and prepared by the researcher to assess reported performances (recording and procedures) of health care providers "in Emergency unit.* ***The Result:*** *the finding of this study reveal that there are Lack of health care providers' knowledge and performances related to obstetric triage protocol application, lack of a single standardized tool for triage system in emergency unit at Maternity Hospital, incomplete nursing role at emergency unit. And the effectiveness of the obstetric triage protocol application on health care providers ' knowledge, performance and responses' in emergency unit with highly statistical significant difference between pre and posttest educational training sessions.* ***Conclusion****: The study proved that the effectiveness of applying obstetric triage protocol on health care providers' knowledge, performance in emergency unit at Maternity Hospital. Also the educational and training sessions had positive impact on health care providers' knowledge, performance (recording and procedures), and responses regarding obstetric triage protocol application in emergency unit.* ***Recommendations:*** *Application a standardized obstetric triage protocol to improve performance of health care providers in emergency unit. Continuous training sessions, and standardization of assessments to improve staff competency. Development of obstetric triage protocols in accordance with the rules and regulations.*

Key words: *obstetric Triage protocol, health care providers, knowledge, performance, Emergency unit.*

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I. Introduction

The definition of triage system is management and sorting of patients according to an assessment of medical need, prioritization, and evacuation, by the use of a sorting system or algorithm. Also triage seeks to provide the greatest benefit to the largest number of casualties in order to minimize morbidity, mortality and described as one of the key factors in patient management in disaster situations **(Debacker, 2012)**. Global triage involves assessing a patient upon arrival at the emergency unit. 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) **(Ebrahimi, 2016).**

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 . The obstetric (OB) triage units were created for various reasons, some of which include increased patients volume in obstetrics, more effective utilization and productivity of staff and resources, need for heightened assessment of fetal and maternal surveillance, and assessment of labor**.** However triage system has two categories; triage during disasters and Non disaster triage **(Balki, 2017).**

John **(2015)** reported that the two categories of triage system are ; 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 natural disasters around the globe, more than 100,000 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 in the wake of such devastation. The key to successful disaster management is 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 .Also there are various types of triage systems **(*Fakari, 2019).***

Types of triage systems: as it occurs in medical emergencies, including the pre hospital setting, disasters, and emergency unit treatment. Another type, Simple triage systems including: (Tags triage, Advanced triage, Reverse triage, Under triage and Telephone triage).In addition outcomes triage types: as 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 .All this triage system with different tools of triage **(McCoy, 2013)**.

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 tools 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, 2017).**

All modifiers scores within each OTAS category are derived from the Modified Early Obstetric Warning System (MEOWS) **(London Health Sciences, 2017).** MEOWS (Modifier score) for all Obstetrical patients which the patient's stated complaint determines the initial OTAS score, and this score may be modified after a more detailed

assessment of the patient. Modifiers are used to support or increase the acuity level from that which would be assigned based on the complaint alone, Vital signs are an important parameter in determining acuity, either a descriptive modifier (e.g. shock) or specific vital signs (e.g. systolic BP <90, heart rate >120 beats/minute) may be used to increase the acuity. The four acuity modifiers are: Hemodynamic stability, Respiratory distress, Fetal well-being and Cervical dilatation . The Obstetric Triage Acuity Scale (OTAS), 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 which adapted to four levels by the researcher to 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 includes; 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 dilation, and vital pregnancy-specific parameters. In addition the tool covers hemodynamic stability as shock signs, and abnormal vital signs **(Smithson, 2013).**

The triage system had major advantages 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. Also recognizing active labor, discharging the pregnant patient in false labor, 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 **(Lampi et al., 2018).**

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 in emergency unit, they seek to improve the quality of care by using the available resources as effectively and efficiently as possible**(Iserson,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, 2017).**

An efficient emergency unit has to provide care not only to patient admitted in labor but also to patients admitted in various emergency situations. These may be simple like vomiting, urinary infection or serious conditions like eclampsia, antepartum hemorrhage or unscheduled visits of obstetric patient with problems. Risks in emergency unit, represented that medical care might lead to adverse consequences like delay in providing care, compromise in privacy and confidentiality, poor physician-patient communication, failing to provide the necessary care altogether. These consequences challenge the ethical quality of emergency care so standards of care must be maintained to preserve the safety of both patients and providers **(Sun and Hsia 2016).** However, patient care policies around this issue should be flexible, not overly specific and avoid treatment delays. The

decision-making process changes from field triage, which is a procedure based on guidelines to apply routine triage in the hospital **(Magnone, 2019)**.

Correct triage system is critical for the wellbeing of a woman and her newborn. In accordance with the Emergency Medical Treatment and Labor Act (EMTALA), recommended that all pregnant patients presenting to a hospital for care must receive a medical screening exam. Worldwide, this important role has been vested in health care providers but little known about how they are prepared with obstetric triage. The beneficence of obstetric triage application to improve health care providers' knowledge and performance that reducing the waiting time actually reduces the hospital stay time, lowers the treatment cost, and saves hospital resources **(Otten, 2016).**

The role of health care providers (HCPs) especially nurse in EU are important role in applying the triage system and provide care for patients with mild colds to extreme injuries. This role require triage nurse to make quick decisions about the priority of admittance as a means of deciding the order in which patients will receive treatment **(Bayliss,2017).** The primary role of a triage nurse is to make a first assessment on any incoming patient to the emergency room. Emergency Nurse with additional Education and training sessions performs triage protocol in the assessment room with follows AOTAS and using nursing diagnoses of conditions and resolves them with nursing treatment until a physician is able to initiate a treatment plan **(Tuyishime, 2020).**

Significant of the study: Maternal mortality is a 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 obstetric causes, The treatments for those obstetrical complications are well known and appropriate emergency obstetric care should prevent most of these deaths **(WHO 2017).** Also there is a gap between the evidence and reality of practice on the international level, 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, 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 evaluate the effectiveness of applying obstetric triage protocol on health care providers' knowledge and performance in emergency unit at Maternity Hospital **(Sharma, 2015).**

Aim of the Study: was to evaluate the effectiveness of applying obstetric triage protocol on the health care provider's knowledge and performance in emergency unit at Maternity Hospital. This aim was achieved through:

-Assessing knowledge' of health care providers about obstetric triage protocol application.

- Assessing performances' of health care providers about obstetric triage protocol application.

- Assessing responses' of health care providers about obstetric triage protocol application.

- Evaluating the effectiveness of obstetric triage protocol application on health care providers' knowledge, performances and responses in emergency unit at Maternity Hospital.

Research Hypothesis:

Application of obstetric triage protocol will increasing the health care providers' knowledge in emergency unit at Maternity Hospital.

Application of obstetric triage protocol will affect positively on the health care providers' performances and response in emergency unit at Maternity Hospital.

II. Subjects and method:

Study Design: a quasi- experimental design was used to achieve the aim of the study.

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

Subject: Sample was taken from the health care providers (Nurses, paramedics and physicians) working in emergency unit at Maternity Hospital.

Size: A convenience sample of (70) Health care providers working at the time of the study in Emergency unit at Maternity Hospital and who are willing to participate in the study.

Tools of data collection:

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

Tool I:A structured interviewing questionnaire for health care providers, consisting of two parts: **Part I:** Assessing health care providers' socio-demographic characteristics such as age, level of education, years of experiences and occupation.

Part II: Assessing of health care providers' knowledge's regarding to general triage protocol (concept of triage, levels, coded color, and principles of triage protocol).

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

Scoring system of health care providers knowledge: included two levels, (2) points for the correct answer and one point for incorrect answer or don't know answer.

Tool (III): consisting of two parts:

Part I: Observational checklist designed and prepared by the researcher to assess Health care providers reported performances (recording and procedures) among the attending patients in emergency unit at Maternity hospital.

Scoring system of health care providers' performances (recording and procedures): included two levels: (2) points for done correctly items and (1) point for not done performances.

Score converted to percentage (%) = (the observed score /the maximum score) x100

The total score was from 0-24grades:

- Unsatisfactory performance when total score was <50%.

- Satisfactory performance when total score was>50%.

Part II: Assessing health care providers' responses among triage protocol application in emergency unit(pre and post) educational training sessions .

Scoring system of health care providers responses: Included two levels: (2) point for the correct answer and (1) point for incorrect answer or does not know answer.

The total score was from 0-32grades:

- Unsatisfactory response when total score was <50%.

- Satisfactory response when total score was>50%.

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:

A-Pilot study:

It was carried out with (7) health care providers working in emergency unit to evaluate clarity, visibility, applicability and content validity of the tool.

B- 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 health care providers in emergency unit under inclusion criteria: After introducing oneself and explain the purpose of the study to the participant and the consent from every participant to share in the study.

Knowledge assessment was done regarding to obstetric triage protocol (pre- test). All tools lasted 30 – 35 minutes for each sample included in the study.

The educational and training sessions was developed and implemented by the researcher in the form of lectures, on job training, the theoretical part of the triage protocol was conducted through lectures and group discussions, using educational media as data show, poster and flyer designed by the researcher included triage protocol information and distributed to the health care providers in emergency unit. Practical part will be conducted by observational check list of performances (recording and procedures) this includes completion of recording procedures after done. Finally follow-up for health care providers (posttest was done after the protocol implementation), after one month from the educational and training sessions in emergency unit.

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 then the written consent was taken from each health care provider 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 were used in all tables. The statistical significance of observed differences was assessed by using chi square.

III. Results:

Table (1) reveals that 47.1% of studied health care providers 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 health care providers no knowledge related to triage protocol.

Table (1): Distribution of the health care providers (HCP) 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	41	58.6
Bachelor of nursing	5	7.1
Master of nursing	3	4.3
Bachelor of Medicine	11	15.7
Paramedics	10	13.4
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 Education	12	17.1
Training in hospital	11	15.7
Media	17	24.3
No training	2	2.9
	40	57.1

Table (2) reveals that regarding to general knowledge of health care providers about the general triage protocol (concept, coded colors, principle and levels of triage scale) in emergency unit, with the mean score 6.6±1.56 compared with 18.19 ±.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 (2): Distribution of Health care providers 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						
Don't know	20	28.6	0	0.0		
	Mean	**SD**	**Mean**	**SD**	**t****	**P value**
Total knowledge score	12.70	2.61	18.19	.57	19.62	<0.001
Knowledge regarding AOTAS score	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) reveals that regarding knowledge of health care providers about the critical signs, symptoms and time of initial assessment for every level and prioritizing of patients complains according to the acuity scale with

adapted obstetric triage acuity scale (AOTAS) (survival, emergency, urgent and not urgent levels) with the mean score 5.00±1.56 compared with 6.61 ±1.57 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): Distribution of Health care providers' knowledge regarding to *adopted obstetrical triage acuity scale (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) reveals that regarding to observational check list including recording performances of the health care providers "among (recording maternal history, obstetric history, current pregnancy medical and family history) .Applying safety measures with sorting patients and recording after every procedures with the mean score (17.34±1.64), compared with the mean score (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 (4): Distribution of health care providers' 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	0.001
Completeness of data file	59	84.3	64	91.4	0.03

	67	95.7	70	100.0		
woman consent	66	94.3	70	100.0	0.001	
Obstetric, medical and family history	67	95.7	70	100.0	0.001	
Risk assessment of current pregnancy	66	94.3	70	100.0	0.001	
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) reveals that regarding health care providers' responses among triage protocol application in emergency unit with a lot of positive issues(not affected by number of patients, prioritize cases according acuity scale, no negative issues, triage protocol needs training, improves quality of care, levels of triage are important, decrease length of stay, improves performance, triage protocol importance with contagious diseases, provides priority to emergency cases, triage protocol needing specialist for application, triage protocol helps in first aid in crises),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 (5): Distribution of Health care providers' observational checklist regarding to their practice performance (procedures') toward attending triaged patients complains 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
weight, BP and body temperature	63	90.0	70	100.0	0.001
Abdominal and lower limb examination	19	27.1	13	18.6	0.07

	13	18.6	70	100.0		
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): reveals that, total knowledge **score** of health care providers' among obstetric triage protocol application, 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 of health care providers 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 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 (6): Distribution of Health care providers' responses regarding to obstetric 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

	20	28.6	70		100	
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 responses **score**	23.41	5.09	31.07	1.35	12.78	<0.001

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

Items	**Pre**		**Post**		**t***	**P value**
	Mean	**SD**	**Mean**	**SD**		
Total knowledge about general triage protocol	12.70	2.61	18.19	5.7	19.62	<0.001
Total knowledge about AOTAS	6.61	1.56	10.00	2.2	18.12	<0.001
Total reported Performances (recording and procedures) Score	39.39	3.77	41.56	1.18	5.19	<0.001
Total response scores	23.41	3.09	31.07	1.35	12.78	<0.001

IV. Discussion:

Regarding to the socio-demographic characteristics of health care provider, 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 40-50year because this age group working as caregiver experts in emergency unit and will apply triage protocol in professional methods. The present study findings on the same line with the study titled by (The role descriptions of triage nurse in emergency unit), done by **Ebrahimi (2016)** who reported that mean age of health care providers 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 health care providers (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)** who 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 health care providers' 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 health care providers' 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 health care providers' 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 health care providers' knowledge, this could be due to effectiveness of educational and training sessions. This finding supported by study done by **Grover (2017)** who 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(2019)** who 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 & Finley (2015)** 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 obstetric triage protocol.

Concerning to performances (recording, procedures),and response of health care providers 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 (2018)** who 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 health care providers 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)** who 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 health care providers 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 (2014)** who mentioned that The application of the obstetric triage protocol has had a significant impact on the health care providers' 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.

V. Conclusion and Recommendations

The finding of this study proved that the positive effectiveness of the obstetric triage protocol application on the health care providers 'knowledge and performances in emergency unit with educational and training sessions. The study concluded results that highly statistical significant increase in the knowledge score of health care providers regarding to obstetric triage protocol application after educational and training sessions. Also there are highly statistical significant differences between pre and post educational and training sessions with (31.07±1.35), t**12.78 and P-value<0.001

in emergency unit at Maternity hospital. The researcher suggests that applying obstetric triage protocol, in emergency unit results in improving the health care providers' knowledge and performances.

According to these results the study recommended that:

- Nurses who working at the emergency unit should effectively utilize their roles as a care giver and educators to provide competency on their job in emergency unit.
- Continuous educational training sessions improving knowledge and performance of health care providers, in emergency unit at maternity hospital
- Health educational and training sessions in emergency unit at Maternity Hospital must be Instituted in all communities
- The emergency staff (health care providers') should provide obstetric triage tool and educational posters for applying obstetric triage protocol to improve health care providers' knowledge, performances and response.

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