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DEPARTMENT OF EMERGENCY MEDICINE

KNOWLEDGE AND SKILL OF TRIAGING WITH ASSOCIATED FACTORS AMONG NURSES WORKING IN ADULT EMERGENCY DEPARTMENTS OF SELECTED ADDIS ABABA PUBLIC HOSPITALS 2017 GC.

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A THESIS SUBMITTED TO ADDISABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE DEPARTMENT OF EMERGENCY MEDICINE FOR PARTIAL FULFILLMENT OF THE REQUIREMENT FOR MASTERS DEGREE IN EMERGENCY MEDICINE AND CRITCAL CARE NURSING.

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ACRONYMS

CPR CARDIOPULMONARY RESUSCITATION

ED EMERGENCY DEPARTMENT

ENA EMERGNCY NURSING ASSOCIATION

EDT EMERGENCY DEPARTMENT TRIAGING

GCS GLASCO COMS SCALE

ICU INTENSIVE CARE UNIT

MCI MASS CASUALTY INCIDENT

PT PATIENT

RBS RANDOM BLOOD SUGER

TKQ TRIAGE KNOWLEDGE QUESTIONNAIRE

TSQ TRIAGE SKILL QUESTIONNAIRE

ABSTRACT

***Background**; Emergency Department triage is a small but vital part of health care. It is the initial phase of Emergency patient care, regardless of mode of arrival and point of care where the triggers make independent decisions regarding patients that have limited information. These decisions influence the entire patient visit in the department which is often made autonomously and under time constraints. ED triage is mostly performed by nurses. Nurses' knowledge and skill has been cited as influential factor. But there has been no study conducted in Ethiopia with this area. So the purpose of this study was to asses knowledge and skill of nurses towards EDT and identifying factors affecting it among selected public hospital adult EDS of Addis Ababa, Ethiopia.*

***Objective; To** assess knowledge and skill of triaging with associated factors among nurses working in selected adult emergency departments of three public hospitals in Addis Ababa, Ethiopia from Dec 2016-June 2017GC.*

***Method and materials;** Both descriptive cross sectional and observational study design were used and data were collected using structured questioners, observational checklist, and equipment review guide. The study populations were all nurses who were (employ) working in adult emergency department of Tikur Anbesa Specialized hospital, AaBET trauma center and Alert specialized hospital. Data were analyzed by simple frequency, Bivariet and multiple logistic regressions using spss version 24 computer software.*

***Result**; response rate of the study were (98%). majority of the respondents were male 61(46.2%). more than three fourth (84.1%) of the respondents had BSC degree while the rest of them were diploma holders. nearly three fourth (72%) of respondents had poor knowledge with the mean score of (18.2, SD=3.8). More than half (67.4%) of respondents perceive their overall skill as good with the mean score of (mean=111, SD=9.4) and among the three hospitals observed two had nurses assigned for triage. Among the observed nurses blood pressure measurement, pulse rate and oxygen saturation was assessed by all nurse but respiratory rate was not assessed by (95%). breathing pattern, chest movement and pulse status was not assessed by majority of nurses. At Alert specialized hospital it was difficult to say there is triage in comparable with the other two. Because there is no nurse specifically assigned for triaging .in spite of this patient are categorized in priority group but they are not assigned to respective area. Triage skill had significant association with training experience and ED work experience.*

***Conclusion and recommendation** in conclusion the participants of this study had significance knowledge deficit with reliable skill. In addition the observational analysis shows gap among those selected hospital. To minimized and solve knowledge and skill gap and increase nurses competency the investigator recommend continuous training and refreshing courses followed by supportive supervision is important.*

CHAPTER: ONE

INTRODUCTION

1.1. BACK GROUND OF THE STUDY

Emergency department(ED) is one of the most important components of the health delivery system. EDs throughout the world are reportedly serving increasing numbers of patients who have a range of problems with variable urgency, from life-threatening to mild. Studies have found that around half of ED visits are for non-urgent reasons, leading to unnecessary costs and multiple adverse consequences. such as diminished patients satisfaction, reduced productivity of care, and lowered morale of medical staff (1,2).Furthermore a large portion of patients bombard EDs with lesser acute complaints, sometimes occupying the time and resources of medical staff, and delaying the management of more acutely ill patients (3). There is consensus that triage is an essential procedure in emergency departments and is an effective system for reducing waiting times and ensuring that all patients visiting an emergency department receive appropriate treatment (4).

A process used to determine the severity of illness or injury and to prioritize patients according to the needs for medical care, irrespective of their order of arrival or other factors including gender, age, and socioeconomic status is known as triage (1).To use the term triage three conditions has to be meet;1);Existence of at least modest scarcity of resource ,2) The scarcity may vary from modest to dire;3) Existence of triage officer who asses patients medical needs usually based on brief examination of physiological and assessment finding. There is a range of categories of triage that include ED triage (Emergency room), inpatient triage (ICU, pediatric, Surgery and Outpatient etc), incidence triage (accidents, fire, air crashes etc), military triage (battlefield), disaster triage (mass casualty incidents, bomb last), and telephonic triage (over the phone, referral services). (5)

ED triage is a type of triage that emergency nurses perform daily which is a formal process of immediate assessment of all patients who present to the department with the goal of identifying the most severe patients who are in need of immediate care (6). ED triage is a small but vital part of ED care. It is the initial phase of ED patient care, regardless of mode of arrival.

In addition it is the point of care where the triggers make independent decisions regarding patients that have limited information .These decisions influence the entire ED visit which is often made autonomously and under time constraints (7).

ED triage decision is composed of primary triage decisions and secondary triage decisions. Primary triage decisions are related to the procedures of the primary assessment and the allocation of treatment resources to the patients most in need. Secondary triage decisions are related to the initiation of nursing interventions, and involve the provision of comfort to patient. Primary triage decisions' is relate to the establishment of a chief complaint , the allocation of urgency determined by objective clinical and physiological indicators and assigning a triage code having three possible outcomes, **'Under-triage'** in which the patient receives a triage code that is lower than their true level of urgency. This decision has the potential to result in a prolonged waiting time to medical intervention for the patient and risks an adverse outcome **'Correct (or expected) triage decision'** in which the patient receives a triage code that is commensurate with their true level of urgency). This decision optimizes time to medical intervention for the patient and limits the risk of an adverse outcome. **'Over-triage** in which the patient receives a triage code that is higher than their true level of urgency. This decision has the potential to result in a shortened waiting time to medical intervention for the patient; however, it risks an adverse outcome for other patients waiting to be seen in the ED because they have to wait longer. (5)

To maintain the effectiveness of ED triage emergency nurses require in-depth Triage knowledge and skill which are among the key elements of supervision in emergency department, if it is not carried out at standard level; the outcomes of clinical care of patients and efficiency of emergency departments get compromised (8). Ethiopia is one of the developing countries with limited resource and infrastructure. Despite this the number of patient seeking emergency service increases due to multiple reasons resulting in overcrowded ED .To alleviate this using ED triage is the key. But ED triage has recent history only in decades and mostly performed by nurses. So assessing the knowledge and skill of nurses with associated factor is important to improve the triaging process and to decrease ED overcrowding.. In general, the purpose of the this study was to assess knowledge and skill of triaging with associated factor among nurses working in adult emergency departments of three selected public hospitals in Addis Ababa, Ethiopia.

1.2. STATEMENT OF THE PROBLEM

Triage nurses usually have advanced training in decision-making. They have been shown to have the necessary skills to make appropriate triage decisions and provide a highly effective service to ED patients in health care settings. Many patients arriving at the ED have complex problems that need several investigations, procedures or consultations. Triage nurses can validly and reliably estimate the complexity of such cases and guide ED workflow. (1)

Triage in emergency care is a process of collecting pertinent patient information and initiating a decision-making process that categorizes and prioritizes the needs of patients seeking care. A specific amount of time and experience in emergency care alone may not ensure that a registered nurse is adequately prepared to function as a triage nurse. To perform triage with a high level of accuracy and competence, registered nurses should complete a triage-specific educational program, as well as other appropriate courses and certifications. (9).According to study conducted in US across emergency departments to assess the educational preparation of triage nurses, found that 43.3% of the emergency departments were run by nurses who had no educational preparation on triage (10).

A study conducted in Pakistan to asses knowledge of triaging reveled that majority of respondents (69%) have poor knowledge (11).In line with this a study conducted at Iran to asses knowledge and skill of triaging among emergency nurses found that knowledge of triaging were 42.07% and skill of triaging were 50.44% (12).

In developing countries initial triage and treatment of patients in the emergency departments constitute one of the weakest links in the health system. A study conducted in Malawi revealed delay in care provision among children presented to emergency department which resulted into avoidable death and disability (13)

A study conducted in Dares Salaam Tanzania to assess the knowledge and skill of triaging among 4 hospital emergency nurses found that 33 % of the respondents were not knowledgeable about triage and more than half (52%) of the respondents were not able to allocate the patient to the appropriate triage category (14).

To maintain the effectiveness of ED triage, emergency nurses require triage skill and knowledge which is centered on the decision-making ability to prioritize patients into the most correct urgency-of-care categories within a limited space of time. There are several factors related to the triage knowledge and skill of nurses working in ED, including training experience, work experience, availability of resource and other factors have also been reported, such as working environment and personal characteristics. (15)This study focused only on training experience, work experience, educational level and availability of resource as these factors were believed to be the most significant, according to the literature review.

Development of the city, urbanization, lifestyle change and the need for advanced health care from regional part of the country resulted in increasing number of patient seeking emergency care results overcrowded emergency department. In Ethiopia progressively emergency care facilities, equipment and human resource with the essential skills to support a coordinated emergency medical care system and basic infrastructure for delivering emergency care increased but still it is not sufficient (16). No national or regional guidelines exist for triage, patient delivery decisions or pre-hospital treatment plans (17).

.In Ethiopia Since triage is mostly performed by nurses to improve the quality of triage system assessing knowledge and skill of triaging among nurses and identifying factors affecting it is the first step but there are no study conducted with this problem area. So the purpose of this study is to asses' knowledge and skill of triaging with associated factor among nurses working in three selected adult emergency departments of public hospitals in Addis Ababa which were expected to provide useful information to improve triage knowledge and skill among nurses working in EDs of Addis Ababa in the future.

1.3. SIGNIFICANCE OF THE STUDY

This study was used to determine knowledge and describe skill of triaging among nurses working in adult emergency departments of selected Addis Ababa public hospitals. .In addition it helps to identify associated factors which affect knowledge and skill of triaging. Determination of nurses' level of knowledge and skill gives insight on learning needs of nursing curriculum, needs of on job training and workshops. In addition identification of associated factor helps to address the problem by recommending to the respective body. Furthermore the finding may serve as a base line data for policy makers and researchers. As to the researcher knowledge there is no study done in Addis Ababa public hospital emergency departments to assess the knowledge and skill of nurses towards triaging. So this study may serve as a base line data. Overall the finding of this study helps to improve quality of emergency department through improving triage system.

CHAPTER TWO

LITERATURE REVIEW

2.1. KNOWLEDGE OF NURSES TOWARDS ED TRIAGE

ED triage is a small but vital part of ED care. It is the initial phase of ED patient care, regardless of mode of arrival. In addition it is the point of care where the triggers make independent decisions regarding patients that have limited information .These decisions influence the entire ED visit which is often made autonomously and under time constraints (18).

ED triage decision can be primary triage decisions and secondary triage decisions. Primary triage decisions are related to the procedures of the primary assessment and the allocation of treatment resources to the patients most in need. Secondary triage decisions are related to the initiation of nursing interventions, and involve the provision of comfort to patient (5). Primary triage decisions' is relate to the establishment of a chief complaint and the allocation of urgency determined by objective clinical and physiological indicators and assigning a triage code. Currently, five-levels of emergency severity index (ESI**)** triage system is used due to the simplicity, ease of training, and a comprehensive conceptual and operational approach of the emergency departments in most hospitals in the world, particularly in developing country, In this system, patients are classified in to five priorities based on the severity ranging from immediate to delay. Moreover, in regard to the severity of the disease, ESI also considers the facilities and resources of the patient in the triage area (19).during categorizing with this triage code there will be three possible outcome 1; 'Under-triage, 2; Correct (or expected) triage, and 3; Over-triage' decision .Correct triage decision by a nurse is associated with a positive health outcome because the patient is evaluated by a doctor within a suitable timeframe. Over-triage and under-triage indicate that triage nurse allocated a triage category of a higher or lower acuity than required respectively (5).

Sound decision making and clinical reasoning are integral part of modern nursing practice and they are vital in ED triaging (20). It is fruit full if triage in ED done speedily, sympathetically, courteously and efficiently with in some arbitrarily defined patient character (11).By correctly identifying presenting patient conditions and initiating necessary and

appropriate interventions in a timely manner, triage nurses serve as the eyes and ears of the acute care system.(12).

To achieve this and improve ED triage emergency nurses need in-depth knowledge and skill of triaging .Despite this reality different studies done at different part of world founds that there is a gap in knowledge of nurses about triaging. To see some, a study conducted at Pakistan institute of Nursing using descriptive survey Design to assess knowledge of triage among nurses in emergency units on 100 nurses from emergency units of three local teaching hospitals found that large numbers of participants (69%) were having poor knowledge as they corrected less than 50% of the questions in the self-administered questionnaire (12). In another study conducted at IRAN using Prospective cross-sectional study design to asses' knowledge level and practice of nurses regarding hospital triage reveled that knowledge of nurses were 42.07%and skill 50.44.which is below average 12). In another study done in Tanzania Darussalam, with Descriptive cross-sectional and observational study to assess knowledge and skills of triage amongst nurses working in the emergency centers revealed that 33% of respondents were not knowledgeable about triage. Thirteen percent of the respondents reported that although they had attended workshops, there had been a lack of information on how to triage patients. More than half (52%) of the respondents were not able to allocate the patient to the appropriate triage category. Fifty eight percent (35/60) of the respondents had no knowledge on waiting time limits for the triaged categories

Generally these studies have shown that, unfortunately, there are still serious concerns over triage nurses' knowledge since triage is performed by nurses in hospitals who have not acquired related sufficient knowledge (23).

2.2. SKILL OF NURSES TO WARDS ED TRIAGE

To maintain the effectiveness of ED triage, emergency nurses require triage skill, which is centered on the decision-making ability to prioritize patients into the most correct urgency-of-care categories within a limited space of time .This Skill includes rapid assessment, patient categorization, and patient allocation. To perform this ED nurses require triage skill and experience (14).

according to a study conducted in Indonesia hospital on 266 emergency nurses working in two secondary and two tertiary public hospitals to determine the level of triage skill perceived by emergency nurses found that the mean scores for triage skill and work experience were at moderate level (mean = 75.12, SD = 11.23, and mean = 59.48, SD = 33.81, respectively (15).Another study conducted in Darussalam Tanzania shows that More than half (52%) of the respondents were not able to allocate the patient to the appropriate triage category. Fifty eight percent (35/60) of the respondents had no knowledge on waiting time limits for the triaged categories. Among the four Hospitals observed, only one had nurses specifically allocated for patients' triage. The respiratory rate of patients was not assessed by 84% of the triage nurses observed. No pain assessment was done by any of the triage nurses observed (14).In addition in study conducted at IRAN shows the triage skill of nurses were below average (22).

2.3 ASSOCIATED FACTORS AFFECTING KNOWLEDGE AND SKILL OF TRIAGING

Decision making is an integral part of modern nursing practice and its more vital in the triage context which is characterized by decision making under uncertainty (e.g., lack of relevant data in combination with limited time and resources) .To do this role emergency nurses should have good skill of triaging and good knowledge of triaging. But these things can be affected by different factors like training experience, triage experience, work experience in ED, availability of guideline, and basic equipment which assist triaging. There are studies by different experts from different part of the world which supports this. Among them a study conducted in Indonesia showed that the mean scores for triage skill and work experience were at a moderate level (mean = 75.12, SD = 11.23, and mean = 59.48, SD = 33.81, respectively).However, the mean scores for triage knowledge and training experience were found to be at low levels (mean = 55.26, SD = 13.16, and mean = 4.47, SD = 3.19, respectively). There were significant positive correlations between triage skill and the three other factors: triage knowledge ($r = .38$, $p < .01$), training experience ($r = .37$, $p < .01$), and work experience ($r = .27$, $p < .01$).this study shows there were low correlations in the relationships between the triage knowledge, training experience, work experience, and triage skill perceived by the emergency nurses(15). In addition a study conducted in Vali Asr Hospital of Fasa University during 2012 with a quasi-interventional study to assess effects of triage education on knowledge, practice and qualitative

index of emergency room staff with a sample of 50 members shows that triage scores were 10.7±3.1, 17.8± 1.6 and 16.1±2.3 before, 2 days and 6 weeks after training, respectively. Triage performance score increased from 48.9 ± 9.9 before training to 59.8 ± 7.6, two days after training and to 59.7 ± 8.1 six weeks later (*p=0.001*). In addition to triage training of the nurses the emergency department qualitative indices were impressively up graded. In addition there were significant positive correlation between nursing work experience, work experience in emergency ward and type of employment and performance scores 6 weeks after training (*r=0.258,p=0.032*)., The results showed that triage education influences the practice and knowledge of nurses and improves the qualitative indices of emergency department. So theoretical and practical training of triage for nurses in hospitals is recommended. (22).In addition to these according to a descriptive study conducted in three hospitals of Mazandaran University in 2014 found that 79 female (75.9%) and 25 male (24.1%). 15 (14.4%) participants had Basic Life Support training course, 17(16.3%) had Basic Trauma Life Support training course, 6(5.7%) had Advanced life Support and 84(80.7%) Triage Officer Course (28). study conducted in ,Indonesia indicate that, during the three years prior to the study, all subjects had attended the Basic Life Support (BLS) training course, 59.39% had attended the Basic Trauma Life Support (BTLS) training course, 30.83% had attended the Advanced Life Support (ACLS) training course, and 29.32% had attended the Triage Officer Course (TOC). The mean training index score for training experience was 4.47 (SD = 3.19), which was considered to be low. During the past three years, all subjects had attended several short training courses (15).

Another study in Indonesia reveals that, the three most attended courses were the Basic Life Support (BLS) training course (100%), the Basic Trauma Life Support (BTLS) training course (59.39%), the Advanced Life Support (ACLS) training course (30.83%). In addition, some were trained about TOC (Triage Officer Course), ambulance protocol, the Advanced Trauma Life Support (ATLS), ECG resuscitation, Trauma Nursing Care (TNC), but less number of nurses was trained in Emergency Care, first aid in emergency, and disaster management. More than half of subjects (51.90%) had experienced in working at ED more than five years, but most of them (82.30%) had working experience in triage room less than five years. Currently, there were only 16.20% have been working in triage room (25). Basic equipment to assess pt in triage room is one factor for triage decision delays. A study done in Australian ED of various hospitals found that the most available equipment was 12 lead ECG, Spyrometer, urinalysis strep. Only

10% of nurses had access to triage equipment, while 2.5% of nurses had no triage equipment in their triage room (26). Another study supporting this done in Tanzania among ED of four hospital indicates that plus oxymetr12 lead ECG ,triage assessment form ,triage acuity rating guide line which are essential to asses and categorize pt. were only available in one hospital. Pain assessment scale is not found at all hospital (14). In addition to the above factors triage decision can be affected by the ratio of triage nurse to patient, working environment (24) and personal characteristics (27).as sites in wardahin there are 20 to 25 nurses on duty per shift. However, they are assigned to work in several areas of the ED, such as in the triage room, the critical area, the intermediate ward, ambulatory care, the operating theatre, the intensive observation ward, and on ambulance duty. Only one to three emergency nurses per shift work in the triage room of each ED. The ratio of triage nurses to patients is 1:25–30, approximately (28).

2.4. CONCEPTUAL FRAME WORK

The conceptual framework of this study was derived from the synthesis and integration of the literature review, which was conducted in the area of emergency nursing. Triage skill in an ED was defined as the ability of emergency nurses to use their decision-making capabilities to prioritize patients into the right Categories within a limited space of time Triage skill includes rapid assessment, patient categorization, and patient allocation. The three main factors that are related to the triage skill of emergency nurses are triage knowledge training experience, work experience and resource. (4, 8, 15, 28, and 24)

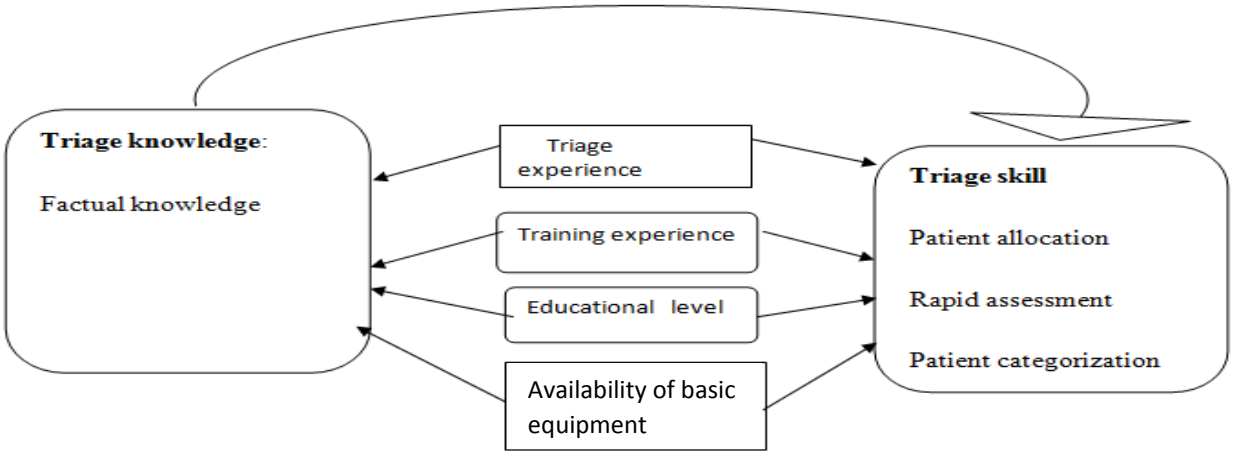


Figure 1 Conceptual Frame work

CHAPTRE THREE

OBJECTIVES OF THE STUDY

3.1. GENERAL OBJECTIVE

The general objective of this study is to assess the knowledge and skill of triaging with associated factors among nurses working in adult emergency departments of three selected public hospitals Addis Ababa 2017gc.

3.2. SPECIFIC OBJECTIVES

- To assess knowledge of triaging among nurses working in adult emergency departments of selected Addis Ababa public hospitals .
- To describe skill of triaging among nurses working in adult emergency departments of selected Addis Ababa public hospitals .
- To identify factors that affect knowledge and skill of triaging among nurses working in adult emergency deparments of selected Addis Ababa public hospitals .

CHAPTER FOUR

METHODS AND MATERIALS

4.1. STUDY AREA

This study was conducted in three selected adult emergency departments of Addis Ababa public hospitals, Ethiopia which is the capital city of Africa. Addis Ababa is the largest city in Ethiopia, with a population of 3,475,952 according to the 2007 population census with annual growth rate of 2.7 %. Its area is estimated to be 530 Km2 with altitudes ranging from 2200 to 3000 m above sea level, average temperature of 22.8°C and average rainfall of 1,180.4 mm. Addis Ababa has 41 hospitals (13 public and 28 NGO and private), 29 health centers, 122 health stations, 37 health posts and 382 modern private clinics Out of 13 public hospitals Tikur Anbesa specialized hospital, ABaTE trauma center and Alert generalized hospital were specific area of the study. Tikur Anbesa specialized hospital has established in the year 1973 and situated at the heart of the capital city on Churchill Avenue. It is largest teaching hospital in Ethiopia and provides a tertiary level referral treatment with 24 hours emergency services and AaBET trauma center is a branch of st Paulo's hospital which is organized a year back around Gojam Brenda .It provides emergency service for 24 hours and staffed with senior surgeon medical doctors ,BSC nurses. There are a total of 257 nurses among this 75 found at emergency department. Whereas Alert specialized hospital is a medical facility on the edge of Addis Ababa, specializing in Hansen's disease, also known as "leprosy". It was originally the All Africa Leprosy Rehabilitation and Training Center (hence the acronym), but the official name is now expanded to include tuberculosis: All Africa Leprosy, Tuberculosis and Rehabilitation Training Centre.

There is currently a 240-bed teaching hospital, which includes dermatology, ophthalmology, and surgery departments, also an orthopedic workshop, and a rehabilitation program. ALERT is the continuation and expansion of the leprosy hospital originally built by Dr.Thomas Lambie in 1922, which was later named the Princess Zänäbä Wärq Hospital. A memorandum to found ALERT was signed at Dec. 11, 1965 by representatives of the Ministry of Health, Addis Ababa University.

Currently it has doing expansion program to trauma center and working for 24hours.

4.2 STUDY PERIOD

This study was conduct from Dec to Feb 2017 GC.

4.3 STUDY DESIGN

Institutional based descriptive quantitative cross-sectional and observational survey was conducted to assess the knowledge and skill of triaging with associated factors among nurses working in adult emergency departments of three selected public hospitals of Addis Ababa. The Observational study design was used to assess the triage skill of nurses working in triage room while they are triaging in actual settings. A descriptive cross sectional survey was used to determine the level of triage knowledge and skill of respondents from their perspective.

4.4 POPULATIONS

4.4.1 SOURCE POPULATION

The source population for this study was all nurses working in Tikur Anbesa specialized hospital, AaBET trauma center and Alert specialized hospitals.

4.4.2 STUDY POPULATION

The study population in this study was all nurses who are working in adult emergency departments of the above mentioned hospitals.

4.5 ELIGIBILITY CRITERIA

4.5.1 INCLUSION CRITERIA

All nurses who were employed and were working in adult emergency departments of those three selected public hospitals of Addis Ababa, who were available at time of data collection and willing to participate was included in this study.

4.5.2 EXCLUSION CRITERIA

Those nurses who were giving free service, those who were not available at the time of data collection, and students who were on practical attachment in adult emergency department

of those selected hospitals was excluded from the study. In addition those nurses having less than six month ED work experience and those nurses having MSC degree were excluded.

4.6 SAMPLE SIZE CALCULATION AND SAMPLING PROCEDURE

For this study, sample size calculation was not necessary. Since the number of study population was small, all nurses from those emergency departments of selected public hospitals was taken as study subject.

4.7 SAMPLING PROCEDURE

To select the specific study area purposive sampling was used. I.e. from a total of 13 public hospitals three hospitals was selected purposely for this study, these hospitals are major trauma centers, with high patient flow since they are referral hospitals majority of cases referred from regional hospitals, Addis Ababa public and private hospitals, catchment health centers are referred to this hospitals. Then to select study subject accessible sampling was used with considering the inclusion and exclusion criteria.

4.8 VARIABLES

4.8.1 DEPENDENT VARIABLE

- Knowledge and skill of triaging among nurses working in adult ED.

4.8.2 INDEPENDENT VARIABLE

- Age
- Sex
- Educational level
- Work experience
- Triage experience
- Training experience
- Resources (no of nurses, basic equipment,)

4.9 OPERATIONAL DEFINITION OF TERMS

Triage knowledge; knowledge refers to the level of factual and procedural knowledge required for nurses working in emergency department to perform rapid assessment, patient categorization, and patient allocation. It was assessed by triage knowledge questioners (35 questions) the possible ranges of total score of triage knowledge were 0-35. The total score was converted to percentage, if the total score is less than 60% poor knowledge, more than 60% good knowledge (15).

Triage skill; the term used in this study to mean all nursing triage activity including assessing, observing, taking and recording vital sign, assigning triage category, acuity of pts Condition and documentation of all assessment finding. In addition it also includes initiation of necessary nursing intervention. It was assessed by TSQ which contain 37 questions, each question have five alternative, 1=need improvement, 2=poor, 3=fair, 4=good, 5=v.good the respondents assign their triage skill from the above alternatives. The possible range of the total score was 1-185.and it was converted to percentage; score less than 60% was assigned as poor skill, more than 60 % as good skill (15).

Training experience referred to the numbers of time and the types of previous training in triage and related topics in the past three years. (15).

Work experience in ED; referred to the numbers of months in which the nurses works in the emergency department. The longer months of working experience reflects the higher experience (15).

Associated factors; According to this study the term refers any factors or variable which affect the nurse's knowledge and skill of triaging in the adult emergency department.

Nurses According to this study the term refers professional and licensed nurse who are working in emergency department for greater than 6months.

Emergency department According to this study the term refers a place where emergency patients treated.

Triage According to this study the term refers to a place in emergency department where emergency patients sort out according to their problem priority

Public or governmental hospital; in this study the word public and governmental used interchangeably both to refer those hospitals owned by the government.

4.10 DATA COLLECTION TOOLS

Data were collected using a set of questionnaires which were adopted with some modification. The questioner was used reputedly by other researchers. (15.25, 23). Instruments consisted of the following items

1. The Demographic Data Sheet (DDS :) focused on personal characteristics, training

Experience and work experience. Training experience in the past three years was interpreted using a training index in which higher scores reflected greater training experience. Work experience was evaluated by simply using the number of months each nurses had worked in ED, where more months reflected greater experience (15)

2. Triage Knowledge Questionnaire (TKQ): consisted of 35 items. Each question had four choices. A correct answer for each item received a score of 1 and an incorrect answer received a score of 0. Higher scores indicated that the nurses had more knowledge. The possible range of the total scores for triage knowledge was from 0 to 35. The numerical scores were converted to percentages. The total score was converted to percentage, if the total score is less than 60% poor knowledge more than 60 % good knowledge (15).

3 Triage Skill Questionnaire (TSQ): was a 37-item questionnaire with three dimensions: rapid assessment, patient categorization, and patient allocation. Subjects were asked to respond to each item using a 1-5 rating scale: 1 = needs improvement, 2 = poor, 3 = fair, 4 =good, and 5 = very good. The possible range of the total scores was from 37 to 185.thenumerical score was converted to percentage, if the total score was less than 60% poor skill, more than 60%good skill. (15)

4. Triage skill observational checklist: was developed by modifying the TSQ from the above reference and by adding some skills from literature review.(15,14)

5. Equipment review guide: were used to asses' availability of basic equipment which assist triage activity and adopted from other researchers. (14)

4.11 DATA COLLECTION PROCEDURE

Data were collected using standardized self-administered questionnaire and observational checklist. The investigator was responsible for the overall management of the study; the development of the final questionnaire; identifying, training and assignment of data collectors and supervisors. The Data collectors were 4 trained BSC nurses who were assigned and supervised by principal investigator. Training was given to ensure that all the data collectors had the same information about the study instrument and follow the same survey administration procedures. The training was deal with the purpose of the study, confidentiality and how to approach the study participants. Observational check list were used to asses triage skills of each individual while they are triaging. The observation was participatory and done on the working days of the week (Monday-Friday) both in the morning and afternoon .each individual was observed once for 2-3 hours and it was done by the principal investigator.

4.12 VALIDITY AND RELIABILITY (DATA QUALITY ASSURANCE)

This involves careful modification of the standard questionnaires, sample selection and data collection. The tools to be used to ensure validity and reliability in this study were including scientifically selecting samples, constructing instruments (questionnaire) carefully and pretesting. Instruments for this study was developed by modifying standard questioners with great care and pre-testing were made one week prior to data collection started at Trunesh Bejing hospital. The questionnaire was checked for clarity, comprehensiveness and validity before actual data collection was started.

4.13 DATA PROCESSING AND ANALYSIS

The collected data was entered and analyzed by using computer software program running (SPSS) version 24.0. The data was cleaned for inconsistencies and missing values and modification were made as needed. Simple frequencies were used to see the overall distribution of the study subject with the variables under study. Bivariet logistic regration was used to determine the association between dependent and independent variables. Those variables which

had significant association with practice and knowledge of triaging among nurses had been entered to multivariate logistic regression analysis. Finally, results were presented in texts, graphs and tables.

4.14 ETHICAL CONSIDERATION

Ethical clearance and approval was obtained from the Ethical Committee of department of emergency medicine, College of Health Science, Addis-Ababa University. Official letters was obtained from department of emergency medicine and critical care to the selected hospitals. After explaining the purpose and possible benefit of the study, oral permission was obtained from each respondent before administering questionnaire. The confidentiality was maintained in each level of the response in this study.

The study was explained fully (i.e., the aim of the study; significance of the study) to each participant before joining the study and if the participants agree to participate then informed consent was given to sign. For the purpose of confidentiality, the names of the participants were not required instead code number were used. The study participants was informed about their rights to refuse to join, answer any question or withdraw at any particular point during data collection process without being frustrated.

4.15 DISSEMINATION OF THE RESULT

The findings of the study will be submitted and presented to Addis Ababa University department of emergency medicine as partial fulfillment of master's degree in emergency medicine and critical care nursing .and also to Federal ministry of health and those hospitals that's included in the study.

The findings are expected to present in different seminars, meetings and workshops as well as further effort will make to publish the findings on national and international peer reviewed journal. Hard and soft copies will be available in the library of AAU, for graduate students as well as for other researchers and readers.

CHAPTER FIVE

RESULLT

5.1. SOCIO DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

The overall response rate of the study was 98%. I.e. One hundred thirty two out of one hundred thirty four respondents completed and returned the questioner. Majority 75/132(55.9%) of the respondents were from AaBET trauma center, shown in the next table.

Hospitals	**Nurses available in the adult ED**	**Nurses surveyed**	**Percentage**
TASH	40	34	90%
ALART HOSPITAL	24	23	95.8%
AaBET trauma center	75	75	100%
Total	139	132	96.4%

Table 1 Nurses surveyed from the three selected public hospital adult EDs of Addis Ababa, Ethiopia, Feb 2017.

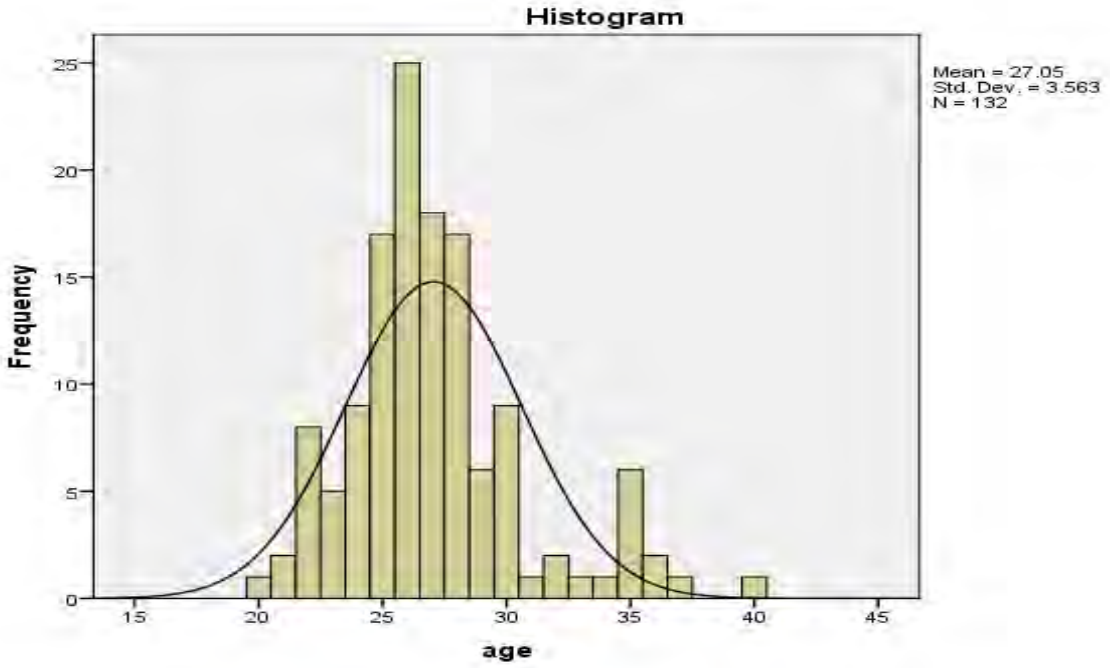
More than half of the respondents 71 (53.8%) were male and 61 (46.2%) were female. Majority 117/132 (88.6%) of respondents age were between21 to 30, the rest 15 (12.1%) were age greater than 30 years with the (mean=27.09, SD=3.8 and mood=26).

Regarding to marital status majority of the respondents 88 /132 (66.7%) were unmarried and they were orthodox in religious status. more than three fourth (84.1%) of the respondent had BSC degree in nursing. While a few respondents 21/132 (15.9%) had diploma in nursing.

Characters	Category	Frequency	Percentage
Sex	Male	71	53.8%
	Female	61	46.2%
	Total	132	100%
Age	21-30	117	87.1%
	31-40	15	11.4%
	Total	132	100%
Marital status	Married	44	33.3%
	Unmarried	88	66.7%
	Total	132	100%
Religion	Orthodox	82	62.1%
	Muslim	16	12.1%
	Protestant	29	22%
	Catholic	4	3%
	Others	1	0.8%
Educational level	Diploma	21	15.9%
	BSC degree	111	84.1%
	Total	132	100%

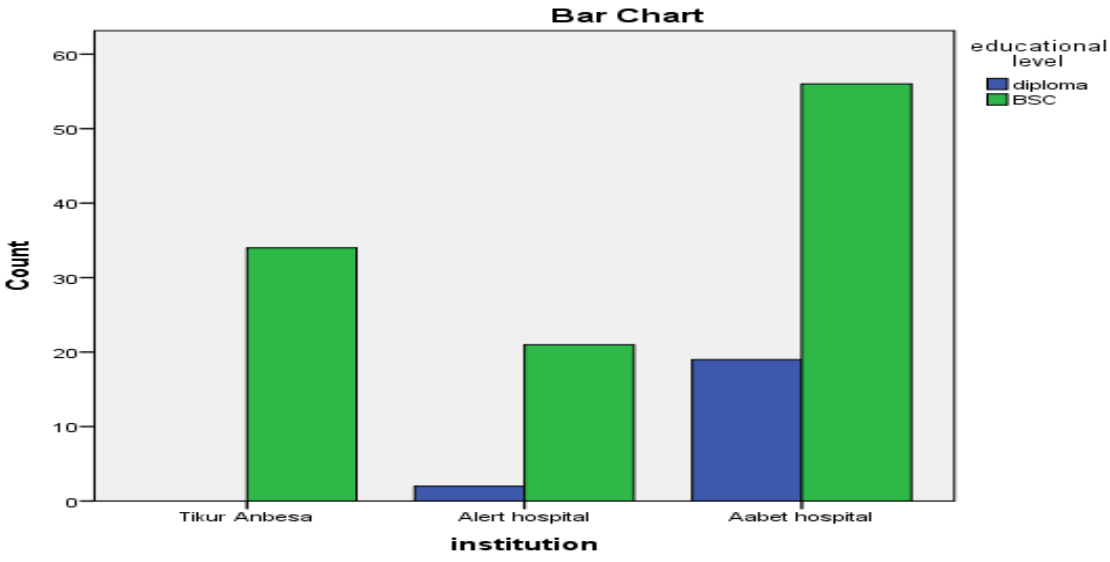
Table 2 Socio-Demographic characteristics of the respondents from selected public hospitals adult EDs, Addis Ababa, Ethiopia.

Figure 2 showing distribution of respondent age with normal curve among selected public hospitals adult EDs, Addis Ababa, Ethiopia.



All (34) respondents from TASH, most of the respondents from Alert generalized hospital 19/23 (82.6%) and three fourth 56/75 (74.6%) of the respondent from AaBET Trauma center had BSC degree in nursing. As shown fig below.

Figure 3 Bar chart showing respondents level of education with working place from three selected public hospitals adult EDs of Addis Ababa, Ethiopia.



More than half, sixty eight percent (91/132) of respondents had worked between 1 and 5 years, only four percent (5/132) respondents had worked for more than five year. The rest had less than one year experience in ED. In addition Majority 70.4 percent (92/132) of the respondents had less than 1 year work experience in triage room, and there was no respondent having more than five year experience in triage room. At the time of data collection only 20% of respondents were working in triage room the mean score of work experience in triage room were (mean= 11 and SD = 10.2) as shown in the next table.

Experience in month	**Work experience in triage room**		**work experience in ED**	
Category	Frequency	Percentage	Frequency	Percentage
<12months	92	70.4%	36	27.3%
12-36 months	38	28.8%	79	59.8%
36-60 months	1	0.8%	12	9.1%
>60month	0	0%	5	4%
Total	132	100%	132	100%

Table 3 Shown that distribution of ED and triage work experience in months among respondents from three selected public hospitals Addis Ababa, Ethiopia, 2017.

5.2. KNOWLEDGE OF TRIAGE

Seventy two percent (95/132) respondents had poor knowledge on ED triage with (mean=18.18, SD=3.78). Among this (77/132) are BSC degree nurses. While twenty eight percent (37/132) respondent had good knowledge o ED triage. Majority of respondents from TASH 73.5% (25/34), 82 %(19/23) from Alert hospital and 68 %(52/75) respondents from AaBET trauma center had poor knowledge.

	TASH		AaBET trauma center		Alert specialized hospital		
Level of triage Knowledge	Frequency	Percentage	Freq	percentage	Frequency		Total
Poor knowledge	25	73.5%	51	68%	19	82%	95(72%)
Good knowledge	9	26.4%	24	32%	4	19%	37(28%)
Total	34	100%	75	100	23	100%	132(100%)

Table 4 found that distribution of triage knowledge among respondents from selected Addis Ababa public hospitals adult EDS, Addis Ababa, Ethiopia.

From overall respondents 76 %(16/21) of diploma nurses and 71% (79/111) BSC nurses had poor knowledge and twenty three (5/21) diploma nurses and twenty eight percent (32/111) has good knowledge. As shown below.

Educational level	**Poor knowledge**		**Good knowledge**		**Total**
Category	Frequency	Percentage	Frequency	percentage	
Diploma	16	76.2%	5	23.8%	21
BSC	77	69.4	34	30.6%	111
Total	95	71.9%	37	28%	132

Table 5 indicated that distributions of knowledge of respondent with educational level among selected public hospitals Addis Ababa, Ethiopia.

60.6% of the respondents had no training on emergency related courses for the past three years. While the rest 39.4. % were took different type of emergency related training course as shown fig below.

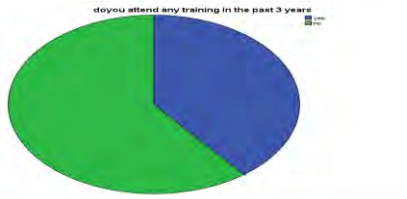


Figure 4 distribution of training from selected public hospitals working at adult ED Addis Ababa Ethiopia, 2017

14 (41.2%), 13 (56.5%), and 25 (33.3%) respondents were took ED related training in the past three years respectively at Tikur Anbessa, Alert and AaBET trauma center. While the rest didn't take any ED related training for the past three years as shown in the fig below.

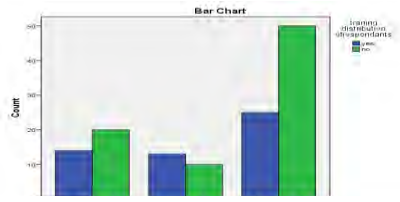


Figure 5 Distribution of training among respondents from selected public hospitals working in Adult ED Adis Ababa ,Ethiopia 2017

Regarding to training type and distribution BLS training had given for 34 (25.8%) with a mean f (a mean=1.72 SD=0.499.), ACLS 24 (18.2%) with a mean of (mean=1.82 and SD= 0.388).ATLS 30 (22.7%) with (mean=1.77 and SD= 0.23). Triage course 34 (25.8%) with (mean = 1.74 and SD =0.441). Emergency care 39 (29.5%) with a mean of (mean= 1.7 and SD = 0.461). Disaster management 10 (7.6%) with the (mean=1.92, SD= 0.27).

Character	Training type	Frequency	Percentage	Mean	SD
	BLS	34	25.8%	1.72	0.449
	ACLS	24	18.2%	1.82	0.388
	ATLS	30	22.7%	1.77	0.23
	Triage course	34	25.8%	1.74	0.441
	Emergency care	39	29.5%	1.7	0.461
	Disaster management	10	7.6%	1.92	0.267
	Others	11	8.3%	1.91	0.281

Table 6 found that over all distribution of type of training among selected public hospital.

Majority of equipment's which is essential for triaging activity were full field but some equipment's some was not available such as ECG machine, Pain assessment scale, and Urinalysis strip as shown below on table.

List of equipment's	TASH	ALERT	AaBET
ECG machine	No	No	No
Thermometer	Yes	No	No
Pulse oximetry	Yes	Yes	Yes
Gluco-meter – strip	Yes	Yes	Yes
Sphygmomanometer	Yes	Yes	Yes
Triage assessment form	Yes	Yes	Yes
Pain assessment scale	No	No	No
triage guideline	yes	yes	Yes
Cardiac d machine	Yes	Yes	Yes
Urinalysis strip	No	No	No
Stethoscope	Yes	Yes	Yes

Table 6 shown that availability of equipment which assists triaging activity in selected Addis Ababa hospitals

Over all nurse to patient's ratio among the study area shows the number of nurses assigned in one shift in ED were 30nurses at AaBET trauma center , 12 nurses at TASH ED and 4 nurses at ALERT specialized hospitals. While the number of nurses assigned in triage room in one shift is 3, 2 and 4 respectively for AaBET, TASH and ALERT hospitals. On average in one shift there were 30, 50 and 20 patient visit each hospital ED giving nurse to patient ratio of 1:10, 1: 25 and 1:5 at AaBET, TASH and ALERT hospital respectively.

Hospitals	Total Number of nurses assigned in one shift in ED	Number of nurses assigned in triage room in one shift	Number of patient visiting triage room in one shift	Nurse to patient ratio of triage room
AaBET	30	3	20-40	1;10
TASH	12	2	40-60	1;25
ALERT	4	4	20	No

Table 8 shown that nurses to patient's ratio of triage room among selected public hospitals

5.3. SKILL OF TRIAGE

More than half 67.4% of respondent perceived their overall skill as good with (mean = 111, and SD=9.4). Will the rest 32.6% of the respondents had poor skill. More than three fourth 26/34 (76.4%) 0f respondents from TASH, more than half 14/23 (60.8%) of respondents from Alert specialized hospital and 49/75 (65%) of respondents from AaBET trauma center perceive there triage skill as good level.sas show in the next table.

	TASH		AaBET trauma center		Alert Specialized hospital		Total
level of triage skill	Frequency	Percentage	Freq	Percentage	Frequency	Percentage	
Good skill	26	29.2%	49	55.1%	14	15.7%	89
Poor skill	8	18.6%	26	60.5%	9	20.9%	43
Total	34		75		23		132

Table 9 distribution of s triage skill with working place among respondents from selected Addis Ababa public hospitals

In addition to the above result 37/132 (28%)of respondents were observed while performing triage activity the reminder 63% of respondents were not observed because there were not allocated in triage room during data collection periods.

The triage nurses at TASH were triaging patients but they didn't allocate patients to respective area which has effect on time of treatment, patients with priority one (red) who must be assigned directly to resuscitation where assigned to examination room .in addition principally they were assessed patients using the physiologic and objectives parameters but they didn't include all the parameters, this lead to incorrect triage categorization. Their assessment activity includes assessment of airway, respiratory status and circulatory status. The airway assessment didn't involve assessing the patency; the respiratory status assessment didn't involve auscultation of breathing sound, look for chest movement. From over all observed nurses at TASH 84% of triage nurse didn't count respiratory rate.100% of triage nurses assessed oxygen saturation. In relation to circulatory assessment 6 (100%) of triage nurses measure blood pressure count pulse rate but didn't include assessing pulse status, cold/warm extremity assessment. Capillary refill was not assessed by 6 (100%) of nurses. Neurological status assessment was done by all nurses. RBS test were assessed by 66% of observed triage nurses. Temperature and pain assessment were not done by all nurses. Pain assessment was not included in the triage assessment form. Documentation of assessment finding and short history taking were performed almost by all triage nurses. Re assessment of patients who were triaged and waiting to enter examination room were not done by all nurses

The second observed hospital was AaBET trauma center, 8/75 (10%) of nurses were assigned to triage was observed while performing their triage activity. They assessed and categorized patients according to the guide line and assign to respective priority area. Their activity involved assessment of airway respiratory and circulatory status. The airway assessment includes assessment of air way patency with Cervical-spin protection. Applying Cervical-collar for patients suspected Cervical-spin fracture. The respiratory status assessment didn't include auscultation of breath sound, chest movement.7/8 (88%) were assess respiratory rate, and 100% of triage nurses assess oxygen saturation and administer oxygen if necessary. Blood pressure measurement and pulse rate were assessed by all triage nurses from this 62% were assessed pulse status like weak, full. Capillary refill, cold/warm extremity assessment was not done by all triage nurses. Bleeding control and administration of fluid were done by 88% of triage nurses.

Neurological statuses were assessed by all triage nurses. RBS measurements and administration of 40% glucose as necessary were done by all triage nurses. Pain assessment and control were done by all triage nurses.

Documentation and short history taking were done by all triage nurses but didn't include all assessment findings accordingly.

The third hospital were Alert specialized hospital, there were a total of 24 nurses in ED form which 12 nurses in trauma center and 12 nurses in medical Emergency .in both sites four nurses were assigned in each working shift and no nurse were assigned for triaging activity. They were doing as one group all activity at ED. They didn't perform triage according to the guide line. After initial stabilization of patient's condition they were categorized patients in to priority group but they didn't assign to the respective area. The resuscitation are were not working at the time of data collection.. They were working all activity in one room and they were transferring patients to ICU and ward. So it is difficult to say there were triaging there

5.4. ASSOCIATED FACTOR ANALYSIS OF TRIAGE KNOWLEDGE AND SKILL USING BIVARIET AND MULTIVARIABLE LOGISTIC REGRATION.

Bivariet logistic regression was conducted to assess those variables which had influence over triaging knowledge and skill of nurses working in emergency department. From Bivariet logistic regression analysis factors like training experience, work experience in emergency department and triage experience had been seen significant association at p valueless than 0.005 with 95% CI. To control confounding factor those variable which had been significant at Bivariet liner logistic regression and those variables having COR greater than one was entered together to multivariable logistic regression. From those variables only training experience and work experience in ED had been significant association with triage.

Training have significant association with triage skill {p=0.000, (AOR=4.52(2.10-6.33)}This association tells us nurses working in ED who have training are four times more skill full regarding ED triage than nurses who don't have training.

There is also staticall significant association between ED work experience and triage skill{p=0.002,(=AOR 3.17(1.15-8.72),95%CI)}.this implies those nurses having ED work experience between 1-3 years are three times more skill full compared to nurses having less than one year ED work experience. In addition those nurses having more than five years ED work experience are five times more skill full than those nurses having less than one year ED work experience.(AOR=5.37(3.11-13.25 95%CI).

Triage experience, triage knowledge, educational level, age, and sex have no staticall association with triage skill.

VARIABLES		GOD SKILL	POOR SKILL	P value	COR95 % CI	AOR 95% CI
Age	21-30	80(89.90%)	37(86.6%)	0.86	1.44(0.48-4.35)0.52	1.65(0.42-6.46)
	31-40	9(10.1%)	6(14.0%)		1.00	1.00
Sex	Female	39(63.9 %)	22(36.1%)		1.00	1.00
	Male	50(70.4%)	21(29.6%)	**0.43**	**1.343(0.647-2.787**)	0.49(0.2-1.23**)**
Educational level	Diploma	13(61.9%)	8(38.1%)		1.00	1.00
	BSC degree	76(68.5%)	35(31.5%)	**0.56**	**1.336(0.508-3.516)**	1.77(0.54-5.77)
TRAINING	YES	46(88.5%)	**6(11.5%)**	**0.000**	**6.60 (2.53-17.20)**	**4.52 (2.10-6-33)**
	NO	43(53.8%)	37(46.3%)		1.00	1.00
ED WORK EXPERIENCE	<12	14(42.40%)	19(57.6%)		1.00	1.00
	12-36	65(74.70%)	22(25.3%)		**4.01**(1.73-9.31) 0.001	**3.17(1.15-8.72)**
	36-60	8(88.90%)	1(11.1%)	**0.002**	**10.86**(1.22-17.06)0.003	**5.37(3.11-13.25)**
	>60	2(66.70%)	1(33.3%)		2.71(0.22-32.99)0.433	**2.30(0.11-19.15)**
Triage experience	<12	51(58.0%)	37(42.00%)		1.00	1.00
	12-36	37(88.1%)	5(11.90%)	**0.000**	**5.37**(1.93-14.97)	**2.49(0.74-8.39**)
	36-60	1(50%)	1(50%)		0.73(0.44-11.98)	0.17(0.13-7.18)
Triage knowledge	Poor	16(41.0%)	27(29.00%)	0.182	**1.70(0.78-3.71)0.18**	1.85(0.71-4.83)
	Good	23(59.0%)	66(71.00%)		1.00	1.00

Table 10 associated factor of triage skill in three selected public hospitals adult EDS Addis Ababa Ethiopia 2017.

This study shows there is strong staticall association between triage knowledge and ED work experience with {(p=0.69, (AOR=12.75(1.59-23.26)95%CI)}.this tells us those nurses having more than three years ED work experience are 12 times more knowledgeable than those nurses having less than one year experience but triage experience and training experience have low staticall association with triage knowledge.

Variables	Category	Good knowledge	Poor knowledge	COR	AOR
Age	20-30	37(68.4%)	80(68.4%)	**3.006(0.645-14-007)**	4.606(0.85-24.8)
	31-40	2(31.6%)	13(86.7%)	1.00	
Sex	Male	20(28.2%)	51(71.8%)	1.00	
	Female	19(31.1%)	42(68.9%)	**1.154(0.55-2.44)**	1.50(0.66-3.43)
Educational level	Diploma	5(23.8%)	16(76.2%)	1.00	
	BSC degree	34(30.6%)	77(69.4%)**p=0.55**	**1.413(0.479-4.17**)	2.008(0.59-3.32)
Training experience	Yes	14(26.9%)	38(73.1%)	1.00	
	No	25(31.3%)	55(68.8%)**p=0.59**	1.239(0.56-2.68)	
ED work experience	<12	9(27.3%)	24(72.7%)	1.00	1.00
	12-36	25(28.7%)	62(71.3%)	1.075(0.439-2.634)	1.55(0.578-4.25)
	36-60	5(55.6%)	4(44.4%)**p=0.69**	**3.33(0.73-15.28**)	**12.75(1.59-23.26)**
Triage experience	<12	28(31.8%)	60(68.2%)	1.00	
	12-36	10(23.8%)	32(76.2%)	0.67(0.29-1.55)	
	36-60	1(50%)	1(50%)**p=0.553**	**2.14(0.129-15.58**)	

Table 11 associated factors of triage knowledge among three selected public hospital adult EDS Addis Ababa, Ethiopia.

Chapter SIX

DISCUSSION

6.1. SOCIO DEMOGRAPHIC CHARACTERISTICS OF RESPONDENT

The finding shows that more than half of the respondents 53.8% were male. And more than three fourth (86.4%) of respondents were between the age of 21 to 30 with the (mean=27.09, SD=3.8 and mood=26 max, =40, min=20). more than three fourth (84.1%) of the respondent had BSC degree in nursing. This study finding is incomparable to other study done at Indonesia that the majority of the participants (71.40%) were female, and they were between the age of 22 to 53 years old (mean = 33.37, SD = 7.54). Most of the subjects (94.40%) had a diploma in nursing (15). The finding shows that most of nurses working in this study area have higher educational level. This difference may be due to the difference in the countries educational policy regarding human resource and level of education to cover health service demand of society.

More than half, sixty eight percent (91/132) of respondents had worked between 1 and 5 years, only four percent (5/132) respondents had worked for more than five year. The rest had less than one year experience in ED. This finding is different compared with the study conducted at Indonesia more than half of the subjects (51.90%) had greater than five years of work experience in EDs with mean score of (59.48 months ,SD = 33.81.) (24). the difference may be due to high nurse's turnover rate and rotation from working area.

According to a descriptive study conducted in three hospitals of Iran in 2014 found that 15 (14.4%) participants had Basic Life Support training course, 17(16.3%) had Basic Trauma Life Support training course, 6(5.7%) had Advanced life Support and 84(80.7%) Triage Officer Course. (12). This is slightly comparable to this study finding which shows that (39.4%) of respondents have taken different types of training Commonly BLS training 34 (25.8%), ACLS 24 (18.2%) and ATLS 30 (22.7%), triage course 34 (25.8%) and basic Emergency care 39 (29.5%). Disaster management, 10 (7.6%). But it is less compared with other study conducted in east Java ,Indonesia indicate that all subjects had attended the Basic Life Support (BLS) training course, 59.39% had attended the Basic Trauma Life Support (BTLS) training course,

30.83% had attended the Advanced Life Support (ACLS) training course, and 29.32% had attended the Triage Officer Course (TOC) (15).this means each respondent have taken at least one triage related training which is different from this study finding in which 60.6%of respondent have no training in the past three years

6.2. KNOWLEDGE OF TRIAGE

Rapid and accurate triage of patients is the key to success in patient care. According to previous findings, the accurate triage of injured patients has reduced fatalities and improved resource usage. An accurate triage system can be beneficial for determining the treatment trend of patients and facilitating patent's admission and stabilization process. Since Triage is mostly performed by nurses their Decisions directly affect the time of providing medical care's and any failure in providing triage services leads to serious consequences. Triage knowledge is commonly cited as a major influence in clinical decision-making the pure knowledge of nurses on triage plays a more important role in their triage decisions than their records in nursing.() to make effective and safe triage decisions, nurses must draw from an extensive internal base of knowledge and experience to identify salient cues and act based on the patient presentation(30)But this study shows that Seventy two percent (95/132) respondents had poor knowledge on ED triage. Only thirty nine present have good knowledge. I.e. triage is performed in Addis Ababa hospitals while nurses have not been provided with sufficient knowledge and education. This is similar with a study conducted in Pakistan; with the same measuring tool and study design on 100 ED nurses 69% of the study subjects were having poor knowledge. (24). similarly a study conducted at IRAN with prospective cross sectional study design shows the knowledge of nurses towards EDT were 42.07. (12). but a study conducted in Tanzania with descriptive crossctional and observational study to assess knowledge and skill of triage on selected four hospitals with 78 ED nurses shows 58% the study participants had no knowledge. This is relatively lower than my study (14). This implies that 17.5% less likely from my study. This difference may be due the difference in-service training experience and work experience of respondents.

6.3. SKILL OF TRIAGE

More than half 67.4% of respondent perceived their overall skill as good with mean of 111, and SD=9.4, which is good while the rest 32.6% of respondents had poor skill. This is different from the study conducted in Darussalam Tanzania in which More than half (52%) of the respondents were not able to allocate the patient to the appropriate triage category. To maintain the effectiveness of ED triage, emergency nurses require triage skill, which is centered on the decision-making ability to prioritize patients into the most correct urgency-of-care categories within a limited space of time .This Skill includes rapid assessment, patient categorization and patient allocation. To perform this ED nurses require triage skill and experience (14).this study finding is slightly similar with a study conducted in Indonesia hospital in which the mean scores for triage skill were (mean = 75.12, SD = 11.23,) (15).In addition a study conducted at IRAN shows the triage skill of nurses were below average (12).among the three hospitals observed in this study two hospitals had nurse specifically assigned for triage purpose. Among the observed nurses while triaging pt majority of nurses asses pt including air way, breathing, circulation and neurological status .blood pressure measurement, pulse rate and oxygen saturation was assessed by all nurse but respiratory rate was not assessed by 35/37(95%) of nurses. capillary refill, cold and warm extremity assessment, body temperature measurement was not done by all nurses. breathing pattern, chest movement and pulse status was not assessed by majority of nurses. Pain assessment was not done at TASH; even it is not included to pain assessment form. But nurses observed from AaBET trauma center asses pain for each pt. and manage accordingly center. Bearing in mind those nurses are working in referral hospitals which are major trauma centers, with lots of pt. visit with various presentation both medical and trauma emergency. For example pt. having car accident may presented with chest injury possibly with hemo thorax or pnemothox those triage nurse asses the pt. without counting respiratory rate, observing chest movement and auscultation of breath sounds resulting in misdiagnosis and inappropriate triage decision. The same is true for other cases. As a comparison nurses observed from AaBET trauma center had relatively good skill compared to the other two. This difference may be due to high training experience and working environment related factor (arrangement of ED) and resources availability compared to the other two. This study finding is relatively

comparable to a study done in Tanzania, in which 84% of participant didn't count respirator rate of pt.

Neurological status .blood pressure measurement, pulse rate and oxygen saturation was assessed by all nurse but respiratory rate was not assessed by 35/37(95%) of nurses. capillary refill, cold and warm extremity assessment was not done by all nurses.

This study shows training has significant association with triage skill {p=0.000, (AOR=4.52(2.10-6.33)}This association tells us nurses working in ED who have training are four times more skill full regarding ED triage than nurses who don't have training. This study finding is similar with study conducted at Indonesia in which training have strong association with triage skill. ($r = .37$, $p < .01$). (15) Which reflects that the more trainings or drills attended, the higher skill nurses develop? This is Consistency to the study which suggested that the regular training of triage could improve skill of nurses to handle stressful work situation (29)

Regarding the training requirement of triage nurse Emergency Nursing Association(ENA) states the following point.1) Triage is a critical assessment process performed by a registered nurse or nurse practitioner with a minimum of one-year of emergency nursing experience, as well as appropriate additional credentials and education that may include certification in emergency nursing and continuing education in trauma, pediatrics, and cardiac care, with verification or certification in those subspecialties as appropriate.2) Emergency nurses complete a comprehensive, evidence-based triage education course and a clinical orientation with an experienced preceptor to enhance triage knowledge and skills.3) emergency department leadership ensures that registered nurses receive appropriate education and demonstrate the knowledge application and situational awareness required to successfully function in the role of triage nurse according to professional and accreditation standards. In addition participate in research involving the triage process and patient outcomes in the emergency care setting. (9)

There is also significant association between ED work experience and triage skill{p=0.002,(=AOR 3.17(1.15-8.72),95%CI)}.this implies those nurses having ED work experience between 1-3 years are three times more skill full compared to nurses having less than one year ED work experience. In addition those nurses having more than five years ED work experience are five times more skill full than those nurses having less than one year ED work

experience.(AOR=5.37(3.11-13.25 95%CI) In line with this other study found that working experience in ED was significance relationship with triage decisions and more years of experience increased the decision-making consistency in triage skill (7, 23). While, this study finding is different from a study conducted by Considine et al, which found that there was no significant relationship between experience and triage decision making in triage skill. The more experienced and less experienced emergency nurses could have the same ability to perform triage (4).

Lacks of equipment which assist triage decision have impact on triage delay. In addition it results inaccurate triage decision making, avoidable death and disability (14). But this study shows some equipment was not available in triage room of observed hospital like, 12 lead ECG, and urinalysis strips thermometer. This study finding is different from study conducted in Tanzania in which the most available equipment was ECG machine, urinalysis strip and thermometer. (14)

6.4 STRENGTH AND LIMITATION OF THE STUDY

6.4.1 STRENGTH OF THE STUDY

- Observational cheek list were used to assess triage skill while respondents were perform in actual working setup.
- To make appropriate conclusion and recommendation, this study were conducted with same standardize selective government public trauma centers

6.4.2 LIMITATION OF THE STUDY

- Nurses who work in ED were hectic. So, it is difficult to contact and collect data.
- Observational study was not including all nurses working in adult ED. This is because of time constraint.

7. CONCLUSION

The message of this study shows that the respondent's knowledge and skill were respectively 37 (28%) and 89 (67.4%). There is significant association between triage skill with ED work experience and Training experience. Knowledge of triage had association with, ED work experience. Of the nurses observed while they were triaging a patients. They didn't assess the chest movement of patients and no re- triaging but in comparable AaBET hospital has better triaging activity than the other two.

Therefore is important preparation of national formal triage guide line and also better to stress with some area to increase the ED triaging quality such as preparing knowledge and skill based training and including triage course for undergraduate level.

8. RECOMMENDATION

- ED nurses must be improving their knowledge and skill of triage to the sake of themselves and their profession.
- The hospital administrative give more emphases about nursing turn over and incentives for nurses who work ED, because reasons for ED triage quality decline associate with high turnover of nurses and lake of incentives.
- The need to rally worth of ED triage care for patient's safety focus, on triage skill of ED nurses must be accessible as continuous nursing education and training related to triage.
- Further research should be conduct to test the effectiveness of educational program and training course on triage knowledge and skill for emergency nurses.
- Hospitals ED with collaboration of MOH, Formulate of national triage guide line, because it leads for uniform ED triage service over all the country.
- Nursing education program on emergency nursing care need to be reviewed, to include establishing post graduate/post basic nursing course on emergency critical care at the level of certificate/diploma. This lead to capability to take emergency care and role.
- Struggles made for making improvement on triage prioritizations should also go together with increasing or easily accessing equipment's in ED triaging area. If this is fulfilled the ED nurses do proper triaging and categorization of patients

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ANNEXES

ANNEX-I INFORMED CONSENT

Addis Ababa University

College of Health Science Department of Emergency Medicine

Consent form for participation in a research study

You are welcome to participate in a research study conducted by Sister Meyrema Seid, who is 2nd year Emergency Medicine and critical care nursing MSC student in Addis Ababa University. The purpose of this study is to assess the knowledge and skill of triaging among nurses working in adult Emergency department and availability of equipment used for triaging of patients. The title of the study will be "knowledge and skill of triaging with associated factor among nurses working in adult emergency department of selected Addis Ababa public hospitals. All the information you provides about this study will be confidential.

Your identity will not be revealed at any stage of this study. Your participation in this study is voluntary; you have the right to stop at any time.

There will be no known risk associated with this study. This study will benefit health policy makers, patient who visit emergency department, nurses working there and other researchers. Thus, your information is extremely important.

If you have any questions or concerns about this study or if any problems arise please contact Meyrema Seid with phone number 0947842209, email adress: meyremaseid@gmail.com

Consent

I have read this consent form and have given the opportunity to ask questions. I give my consent to participate in this study.

Participant's signature _____ Date: _____

Instruction:

I would like to ask you some information regarding personal data. Please answer by Putting mark (x) in the space available as that is appropriate for you and/or filling in the blank.

1. Age: … … … … years
2. Gender: ☐Male ☐Female
3. Marital status: ☐Married ☐ Unmarried
4. Educational level;

   ☐ Diploma ☐ BSc ☐ MSc ☐ Others :specify.....

5. Religion:

   ☐ Orthodox ☐Muslim ☐Protestant ☐Catholic ☐others…….

6. Ethnicty: ☐Oromo ☐ Amhara ☐Tigrgna ☐other (specify)……
7. Working experience by nursing Profession……years…….month(s)
8. How long have you been working as a nurse in ED? … … .Years… … month(s)
9. How long have you been working as a nurse in triage room…….years… … months
10. Do you currently work in triage room? ☐ Yes ☐No
11. Training and continuing education:

    11.1. Did you attend any training, course or workshop during the past three years?

    ☐ Yes ☐ No

No.	**Training**	**No of training**	**Duration of training course(day)**
1	Basic cardiac life support(BLS)		
2	advanced trauma life support(ATLS)		
3	Triage course		
4	Advanced cardiac life support(ACLS)		
5	Basic Emergency care		
6	disaster management		
7	0ther ……please identify it		

TRIAGE KNOWLEDGE QUESTIONNAIRE (TKQ)

The questionnaire provides 35 questions regarding to knowledge on triage skill. Please check your choice by putting mark (x) in the available options A, B, C, and D.

Triage knowledge:

Case 1: for question number 1 – 4

The male patient, 15 years old come to ED due to right leg injury with painful. There is visible deformity of the lower part of right leg, and it appears shorter than another.

1. The nurse would focus the assessment on which of the following first.
   A. The area proximal to the fracture
   B. The actual fracture sit
   C. Look sign of hypo-perfusion/ shock and then assess the area distal to the fracture
   D. The opposite extremity for baseline comparison
2. Which of the following interventions is most appropriate?
   A. Casts
   B. Debridement
   C. Compression bandage
   D. Analgesia
3. Which of the following complications might occur within 24 hours?
   A. Bleeding
   B. Shock
   C. Compartment syndrome
   D. Infection
4. A patient presents in the emergency department after falling from a roof. A fracture of the femoral neck is suspected. Which of these assessments best support this diagnosis?
   A. The client reports pain in the affected leg
   B. A large hematoma is visible in the affected extremity
   C. The affected extremity is shortened, adducted, and extremely rotated
   D. The affected extremity is edematous.

Case 2: for question number 5 – 7

The female patient, 19 years old come to ED present with fever for 1 week, headache, nausea, vomiting, petechiae, and semiconscious.

5. Which of the following typical problems would you anticipate?
   A. Malaria
   B. Dengue Hemorrhagic Fever(DHF)
   C. Varicella
   D. Typhoid

6. Which of the following items might occur in this patient?
    A. Hypoglycemia
    B. Shock
    C. Arrhythmia
    D. Sepsis
7. The most appropriate initial management by the nurse is:
    A. Administer prescribed antiemetic medicine
    B. Apply oxygen per nasal canula as order
    C. Start IV fluid replacement as order
    D. Administer prescribed antibiotic medicine

Case 3: for question number 8 - 10

Mr. R is a 63-year-old retired business executive who comes to the emergency room with complaints of dyspnea, shortness of breath, and chest pain radiating to the left arm.

8. The nurse caring for Mr. R should response which of the following actions FIRST?
    A. Administer prescribed pain medication
    B. Apply oxygen per nasal canula as ordered
    C. Assess vital signs
    D. Apply electrocardiogram electrodes to the patient's chest
9. Which of the following complications is the most possible in this patient
    A. Cardiogenic shock
    B. Heart failure
    C. Arrhythmias
    D. Pericarditis
10. Atherosclerosis impedes coronary blood flow by which of the following mechanisms?
    A. Plaques obstruct the vein
    B. Plaques obstruct the artery
    C. Blood clots form outside the vessel wall
    D. Hardened vessels dilate to allow the blood to flow through

Case 4: for question number 11- 12

Mrs. C, 49-year-old female was rushed in the emergency department because of severe and steady right upper quadrant pain that radiates to the scapula lasting for 2 hours. She has vomited frequently and experiencing chills.

11. Based from the data presented, Mrs. C is experiencing which of the following problems?
    A. Acute pyelonephrites
    B. Acute appendicitis
    C. Acute cholecystitis
    D. Perforated peptic ulcer

12. Frequent vomiting puts Mrs. C at risk of which of the following acid-base imbalance?
    A. metabolic acidosis and hyperkalemia
    B. metabolic alkalosis and hyperkalemia
    C. metabololic acidosis and hypokalemia
    D. metabolic alkalosis and hypokalemia

Case 5: for question number 13- 14

The female patient, 28 years old come to ED with dyspnea, short of breathing, and cyanosis. She has history of allergy.

13. Which of the following items is the etiology of the patient's illness?
    A. Alveolar consolidation
    B. Infection of the upper airways
    C. Hyperreactivity inflammation and bronchospasm
    D. Diffuse alveolar damage
14. Which of the following breathing sounds is the most possible in this patient?
    A. Rales
    B. Crakles
    C. Ronchi
    D. Wheezing

Case 6: for question number 15-17

The male patient, 42 years old come to ED with coma. He has present illness of jaundice rising, lower extremity edema, and nausea/vomiting for 1 week.

15. Which of the following items is the most related to the current illness?
    A. Smoking
    B. Allergies
    C. Alcohol consumption
    D. Hypertension
16. Which of the following specific areas for jaundice the patient with darkness skin?
    A. Flexor surfaces of the extremities
    B. Sclera
    C. Nail beds
    D. Skin
17. What is the appropriate treatment to reduce severe vomiting?
    A. NPO
    B. Start give neomycin 2-4 gms/day
    C. Administer antiemetic
    D. Nasogastric decompression

Case 6: for question number 18 – 20

The male patient, 35 years old come to ED present after falling approximately 20 meters from the hill, has severe pain and contusion at left flank. His neighbor transfer him to ED with patient condition unconscious

18. What is the injured organ in abdomen from patient above?
    A. Liver
    B. Gastric
    C. Kidney
    D. Pancreas
19. What is the most important complication for patient above?
    A. Neurogenic shock
    B. Hypovolemic shock
    C. Anaphylaxis shock
    D. Sepsis
20. What is the appropriate to administer blood transfusion if the patient had blood loss ?
    A. 500 – 750 ml
    B. 750 – 1000 ml
    C. 1000 – 1500 ml
    D. 1500 – 2000 ml

Case 7: for question number 21-23

The male patient, 52 years old come to ED with dyspnea, anorexia, vomiting, edema, pruritus. The patient semiconscious, urine ouput 300 ml/24 hours.

21. What the phase that fluid overload in acute renal failure?
    A. Diuretic phase
    B. Oliguric phase
    C. Recovery phase
    D. End stage phase
22. What is emergency nurses should monitor from the patient above?
    A. Anorexia
    B. Vomiting
    C. Urine output
    D. Edema
23. The patient above has a serum potassium (K) level of 5.8 mEq/L. Emergency nurse would plan which of the following as priority action?
    A. Allow an extra 5000 ml fluid intake to dilute the electrolyte concentration
    B. Place the patient on a cardiac monitor in critical care area
    C. Check the sodium level
    D. Give oxygen low concentration

Case 8: for question number 24-25

The male patient, 45 years old come to ED with history DM five years ago. The patient has coma and Kussmaul's sign.

24. Which of the following findings would confirm the diagnosis of DKA?
    A. Blood glucose
    B. Urine output
    C. Blood pressure
    D. Level of conscious

25. The most appropriate initial management by the nurse is:
    A. Administer prescribed regular insulin
    B. Apply oxygen per nasal canula as order
    C. Administer IV fluid as order
    D. Retained Foley's catheter

Case 9: for question number 26 - 28

The male patient, 25 years old with motor vehicle accident. The patient's condition are eye opening by pain stimuli, inappropriate word verbal ,and has abnormal flexion of both arms. The physical exam presents bleeding and discharge from right ear.

26. Which of the following signs would confirm the diagnosis of base of skull fracture?
    A. Periorbital ecchymosis
    B. Otorrhea
    C. Battle sign
    D. Hemotympanum
27. What is the GCS score of this patient?
    A. 6
    B. 7
    C. 8
    D. 9
28. What is procedure can reduce intracranial pressure?
    A. Administer steroid drug as order
    B. Bed rest for limiting activity
    C. Clear airway by suction rottenly
    D. Keep the patient's head elevated 30 degrees

Case 10: for question number 29 - 31

The male patient, 30 years old, has car accident. He complaints neck pain, and dyspnea.

29. Which of the following problems would you anticipate?
    A. Thoracic injury
    B. Cervical spine injury
    C. Sub clavicle injury
    D. Head injury
30. The nurse caring should response which of the following actions FIRST?
    A. Administer oral analgesic drug
    B. Place the patient with cervical collar
    C. Give oxygen
    D. Suction

31. Emergency nurse found the absence of breathing sound in the right upper lobe of lung. Which of the following problems would you anticipate?
    A. Flail chest
    B. Acute lung injury
    C. Pericardial tamponade
    D. Pneumothorax
32. Which of the following is true about an oropharyngeal airway?
    A. it eliminates the need to position the head of the unconscious patient
    B. it eliminates the possibility of an upper airway obstruction
    C. it is of no value once a tracheal tube is inserted
    D. it may stimulate vomiting or laryngospasm if inserted in the semiconscious patient
33. The patient has no pulse or respirations. After calling for help, the first action the nurse should take is:
    A. Start a peripheral IV
    B. Initiate closed-chest massage
    C. Establish an airway
    D. Obtain the crash cart
34. Which of the following is the correct initial drug and dose for treatment of asystole?
    A. epinephrine 2mg IV
    B. atropine 0.5 mg IV
    C. lidocaine 1mg/kg IV
    D. epinephrine 1mg IV
35. A patient who has Ventricular Fibrillation has failed to respond to 3 shocks. After started an IV and inserted a tracheal tube, confirming proper placement. Which of the following drugs should this patient receive first?
    A. Amiodarone 300 mg IV push
    B. Lidocaine 1 to 1.5 mg/kg IV push
    C. Procainamide 30 mg/min up to a total dose of 17 mg/kg
    D. Epinephrine 1 mg IV pus

Triage Skill Questionnaire (TSQ)

Instruction: Please assess your own ability in triage skills by check list the number on scale 1 to 5 following each statement below. There are five options available: 5 = very good, 4 = good, 3 = fair, 2 = poor, 1 = need, improvement

No	Triage skill	Perceived triage skill				
	Rapid patient assessment	**VG(5)**	**G(4)**	**F(3)**	**P(2)**	**NI(1)**
1	Asses patient including vital sign with rapid assessment in 2-5 minute					
2	Asses or ask chief compliant of patient rapidly					
3	In unconscious patient ,look in the upper air way such as blood vomit , foreign body ,edema, and tongue obstruction as asses air way patency					
4	Decide to open airway and remove forgein body when air way is obstructed according to air way management(A)					
5	Give positing airway to maintain patency chin lift					
6	Perform clear airway by correct position with jaw thrust and head tilt chin lift					
7	Perform clear airway by correct position by jaw thrust without head tilt if the patient suspects cervical injury					
8	Perform to insert oropharyngeal or nasopharyngeal airway					
9	Look at the chest about patient chest abnormal movement					
10	Asses rate and depth of respiration to observe breathing rate(B) pattern rhythm with look and listen					
11	Look at the patient skin to investigate for integrity ,wound ,bruising, texture and color					

12	Listen the noise in the air ways such as gurgling ,snoring and wheezing					
13	Listen the silent or noise breathing					
14	Easily identify a patient in respiratory distress					
15	Administer oxygen therapy					
16	Perform manual ventilation					
17	Perform bag–valve-mask ventilation					
18	Protect cervical spine when patient suspects cervical fracture with cervical collar					
19	Check pulse rate and rhythm according to circulation assessment					
20	Assessment of capillary refill					
21	Assess the temperature of the patient					
22	Asses the patient with diaprosis					

23	Perform chest compression in critical condition of the patient					
24	Collaborate with physician to administer emergency drugs					
25	Asses internal and external bleeding					
26	perform control blood loose appropriately to stop bleeding					
27	Collaborate resuscitation to provide appropriate intravenous fluid					
	Patient categorization					
28	Categorize the patient according to triage categorization					

29	Identify patient who require immediate care, urgent and non-urgent according to triage categories					
30	Avoid the condition of the patient with over triage under triage					
31	Initiates nursing intervention during triage categorization					
	Patient allocation					
32	Make decisions to allocate the patient with priority 1(resuscitation in ED) in the right place					
33	Make decision to allocate the patient with priorty2(critical care in the ED)					
34	Make to allocate the patient with priority 3 in the right place (ambulance in ED Correctly)					
35	Allocate the patient with nursing intervention safety in ED					
36	allocate the patient by collaboration with other emergency and medical doctor with handover effectively					
37	Allocate the patient to get advance treatment in ED in accurately and timely					

ANNEX 2. TRIAGE SKILL OBSERVATIONAL CHECKLISTS

No	Skills	Yes	No
1	Is there a nurses allocated in triage room		
2.	Perform triage according to triage guideline		
3.	Properly assign patient in their respective category		
4	Assessment of patient based on objective parameters		
	Obtains appropriate symptom driven chief complaints		
5.	Assessment of air way patency		
	open air way with head tilt chin lift for non trauma pt		
	open airway with gaw thrust for trauma pt		
	insert oral or nasal air way		
	apply c-collar if cervical spine injury is suspected		
6	Assessment of breathing		
	asses oxygen saturation		
	asses breathing pattern		
	asses chest movement		
	auscultatate breath sound		
	count respiratory rate		
	administer oxygen if necessary		
	perform bag valve mask ventilation		
7	Asses circulatory status		
	measure blood pressure		
	count pulse rate		
	asses pulse status		
	asses capillary refill		
	asses extremity as cold and warm		
	measure temperature asses internal and external bleeding start CPR in critical condition		

8	Asses neurological status		
	Measure RBS		
	Visual or communications deficits		
	Level of consciousness		
9	Perform pain assessment		
10.	Short history taking, like past medical history ,medication history ,presenting problem		
11	Documentation. document all assessment finding on triage assessment form document patients assigned category on the form		
12.	Perform re triage for patient in waiting area		

Check list to assess availability of equipment which assists nursing triage.

Name of hospital: _____

No	Equipment name	Absent	Present
1	ECG machine		
2	Thermometer		
3	Pulse oximetry		
4	Gluco-meter with strep		
5	Urinalysis strip		
6	Triage assessment form		
7	Pain assessment scale		
8	Stethoscope		
9	Sphygmomanometer		
10	Triage acuity rating guidelines		
11	cardiac monitor machine		
12	Oxygen flow meter		

Check list to asses nurse to patient ratio in triage room of each hospital.

Name of hospital----------

Number of nurses in triage room per shift	Total Number of nurses in ED per shift	Number of patient visiting triage room per shift