

**ADDIS ABABA UNIVERSITY**  
**COLLEGE OF HEALTH SCIENCES**  
**SCHOOL OF ALLIED HEALTH SCIENCES**  
**DEPARTMENT OF NURSING AND MIDWIFERY**  
**ASSESSMENT OF QUALITY OF PEDIATRIC EMERGENCY**  
**TRIAGE AND ASSOCIATED FACTORS IN SELECTED**  
**HOSPITALS OF WOLAITA ZONE 2017**

**BY: DANIEL BAZA (BSc)**

**A thesis submitted to the school of graduate studies of Addis Ababa University in partial fulfillment of the requirements for the degree of Master of Science in pediatrics and child health nursing in department of nursing and midwifery.**

**JUNE, 2017 GC**

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**ADDIS ABABA, ETHIOPIA.**

## Approval by the Board of Examiners

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# **Assessment of quality of pediatric emergency triage and its associated factors in selected hospitals of Wolaita Zone 2017 GC**

## **Abstract:**

**Background:** the quality of pediatric emergency triage is dependent on current professional knowledge; perception of health care workers, on the level of confidence of health care workers (HCWs), the availability of essential medicines, supplies, equipment's and on the presence and adherence of HCWs to evidence based clinical practice guidelines. Therefore, the objective of this study is to assess the quality of pediatric emergency triage and its associated factors in selected hospitals of Wolaita zone 2017.

**Methodology:** descriptive cross-sectional facility based study design was used. The sampling procedure of the study was done by using purposive sampling technique. The study period was from Dec. 2016 to June 2017 and data collected from March to April 2017GC. 175 HCWs responded to the questionnaire from the total of 178. The tools mainly consisted of socio-demographics of HCWs, knowledge and perception of HCWs, factors associated with triage quality and observation check lists focusing on availability of essentials of pediatric emergency triage. The data was collected by using self-administered questionnaire on the health care workers and observation check list. The descriptive statistics such as frequency, percentage and SD was used for analysis as appropriate. The findings from observation checklists were summarized in the form of text and tables. Multivariate analysis was used to declare statistical.

**Results:** this study indicated 41.7 % not correctly defined triage, 81.1 did not know triage duration, 85.72% not identified all triage places and 64% did not categorize child with urgent signs. 32 % of HCWs not interested when assigned in pediatric emergencies and 77 % of HCWs were not confident when allocated in the unit. None of the hospitals have guidelines, protocols, standards, sick child flow charts, treatment algorithms and no glucometer and IO needle. All the three hospitals were lacking oxygen cylinder. This study result has shown that level of qualification, training experience and reading guidelines were factors affecting triage quality

**Conclusion:** the overall quality of pediatric emergency triage service was poor. It was not as recommended in all three hospitals assessed and needs an improvement.

**Key words:** quality, pediatrics, emergency, triage, assessment.

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## LIST OF ABBREVIATIONS AND ACRONYMS

AAU .....	Addis Ababa University
ATS .....	Australian Triage Scale
CI .....	Confidence Interval
CTAS.....	Canadian Triage and Acuity Scale
EDs.....	Emergency Departments
ESI.....	Emergency Severity Index
ETAT+ Ethiopia .....	Emergency Triage assessment and Treatment plus admission
EMDs.....	Emergency Medicine Departments
GC.....	Gregorian calendar
HCWs.....	Health Care Workers
LOS.....	Length of stay
MTS.....	Manchester Triage Scale
OPD.....	Outpatient Department
PICU.....	Pediatric Intensive Care Unit
SAT.....	South African Triage Scale
UNICEF.....	United Nations Children Education Fund
WHO.....	World Health Organization
PI .....	Principal Investigator
SPSS.....	Statistical Package for Social Science
CPGLs .....	Clinical Practice Guide Lines
IO .....	Intra-Osseous
IOM .....	Institute of Medicine
DKA .....	Diabetic Keto acidosis
SD .....	Standard Deviation
FDRE.....	Federal Democratic Republic of Ethiopia
Moh .....	Ministry of Health
ER .....	Emergency Room

# CHAPTER ONE

## 1. Introduction

### *1.1. Back ground*

Pediatric emergency triage is categorization of patients according to their level of acuity on arrival at an emergency unit of any hospital without delay(1) .It is an essential function of health care workers which is critical to the effective management of modern emergency departments. Triage assessment of patients on arrival at the emergency unit is an essential function in quality emergency care provision. (2). Most deaths of children in hospital frequently occur within the first 24 h of admission of which are attributable to easily treatable, time sensitive illness(3, 4).This is because in many hospitals, children are not checked before a senior health worker examines them and these may be due to lack of immediate triage which results in death due to a treatable condition(5). This can be simplified by quick triage for all children presenting to hospital in order to determine whether any emergency or priority signs are present and providing appropriate emergency treatment (1, 5, 6).

World health organization therefore published guidelines and training materials for pediatric emergency triage, assessment and treatment in 2005. These were mainly designed to be used in resource constraint settings to enhance quality of pediatric emergency service including triage but international difference in triage systems limits the capacity for benchmarking (1, 4, 7).

Even though triage is a central task in an emergency department which is viewed as the rating of patients 'clinical urgency, Internationally, no consensus has been specifically reached on the functions that should be measured globally and different triage systems have been developed. Systems most commonly used by western countries are Australian triage scale, Canadian triage and acuity scale, Emergency severity index, and Manchester triage scale (8, 9) which have five categories and south African triage scale(10, 11)

World health organization developed emergency triage assessment and treatment guide lines to be used in most developing countries which identifies emergency or priority signs(1) and this method has been shown to diminish mortality but implementation and consistency varies(12, 13). The delay in recognition, late presentation, lack of resources, and illness severity make the first 24 hours of hospitalization the most susceptible period (14) and

this may be due to health care workers are lacking knowledge on pediatric emergency triage or due to its associated factors.

## ***1.2. Statement of the problem***

Children in sub-Saharan Africa are more than 15 times more likely to die before the age of five than children in developed regions (15) and this may be partly due to many hospitals in low-income countries lack a formal triage system(4).Clinicians usually see the patients on a ‘first-come-first-served’ basis rather than their acuity level (7).Seventy-Five percent of 7.6 million children under 5 who die each year worldwide are in Africa or Asia(16).Therefore, a process of quality of triage and treatment for all children presenting to pediatric departments and hospital needs to be put in place, to determine whether any emergency or priority signs are present (17).

Common challenges facing emergency care for children are overcrowding of emergency care areas in hospitals, poor facilities for children, long waiting times for a hospital bed, limited access to hospital beds that are suitable for children ,poor staff training for pediatric emergency conditions , Insufficient equipment and supplies of the right size , policies & guidelines more suited for adult than pediatric patients, ignorance or acceptance of poorer standards of care for children in the ED(10, 16, 18, 19).

Despite WHO case management guidelines, studies in low-income settings continue to identify poor health workers' compliance with evidence-based standards and poor follow-up care as some of the problems facing pediatric service delivery including pediatric triage(20). Since Ethiopia does not have a national training manual on pediatric emergencies, it adapted the WHO generic ETAT manual for Ethiopia with the addition of common pediatrics emergencies as of child with serious infection and severe malnutrition.

Since inappropriate use of ETAT+ Ethiopia guideline may result into under triage and treatment or over triage of patient as evidences shows misuse of national guide lines results in poor patient outcome(10, 21). Since the tool was introduced in ED (6) assessment of quality of pediatric emergency triage and its associated factors has never been done in study area in particular, in the region as whole and little is known in country. So, quality assessment on pediatric emergency triage among hospitals providing pediatric emergency service including triage and its associated factors need to be assessed.

### ***1.3. Significance of the study***

Even though pediatric emergency triage assessment and treatment is introduced since 2014 in Ethiopia, no research was done to assess the quality of pediatric emergency triage and its associated factors in the study area and in the country as whole.

Therefore, result of this study will lead to an improvement of the prioritization and treatment of children in the emergency and pediatric units, which, in turn will enhance the effectiveness of the care and services rendered in the emergency and pediatric units of the selected hospitals in the study area.

The finding from this study will be used to revise curriculum of under graduate health professionals to include pediatric emergency triage assessment and treatment as one of the course for medical and health science students during their training in pre service education.

The final result of this study will recommend federal democratic republic Ethiopia, ministry of health to scale up of quality of pediatric emergency triage in hospitals including primary or districts as one of quality improvement for children and as a tool for decreasing early mortality.

The study will also merit researchers as being the base or milestone for future investigation in study area or region since similar study were not done in the area as well as in the region previously, this may be the first research on pediatric emergency triage assessment and treatment.

The finding of the study will help health care workers, practitioners and the hospital administrators in the study area by showing the area of weakness on its implementation and by making scientifically proved recommendations to provide quality care for hospitalized children.

The finding from this study will explore how health care workers triage pediatric emergencies and could identify factors associated with quality of pediatric emergency triage service and finally will determine the improvement strategies for the triage quality at Emergency and pediatric Units.

## **Chapter two**

### **2. Literature review**

#### **2.1. Introduction**

On a worldwide level, the challenges facing pediatric emergency medicine are similar to those facing emergency medicine in general but are more acute in children since emergency care for children globally is poor (19) So WHO has developed emergency triage assessment and treatment guideline that is adapted from the advanced pediatric life Support guidelines used in western countries to be used for immediate identification of children with life-threatening conditions which are most frequently seen in developing countries, such as obstruction of the airway and other breathing problems caused by infections, shock, neurologic emergencies (coma or convulsions), and severe dehydration and are the causes of death within 24 hrs of hospital admission(22, 23).

Over 4 million children under 5 years of age died in unindustrialized countries according to UNICEF 2011 report and of this deaths, acute diarrheal disease and respiratory tract infections have continued leading among under-5 year age group which are included in WHO pediatric emergency triage assessment and treatment guide lines adapted for developing countries (6) are responsible for over 50% of all child deaths in that age group in 2011 (24) could be reduced by applying triage system that help to quickly identify sick patients who require immediate attention which are with emergency signs versus patients who can wait their turn or those with priority signs(3, 6, 20).

Pediatric emergency triage assessment and treatment guideline is intended for use in low-resource settings where newborns, infants and children presenting with signs of severe illness are likely to be managed by non-specialists and care may be complicated by lack of diagnostic equipment and medical technology, insufficient human resources and a high workload. Health care workers in resources constraint countries commonly deliver care for a variety of conditions by evidence based practices and guide lines for diagnostic and management decisions and a lot of work has focused on emergency care for children. As up to 20% of children treated in primary health care centers are referred to hospital, emergency triage assessment and treatment guidelines have been developed to improve hospital care for children which is influenced by Lack of triage and inadequate assessment, late treatment, inadequate drug supplies, poor knowledge of treatment guidelines, and insufficient monitoring of sick children (1, 3, 6).



## **2.2. Quality of pediatric emergency triage**

The standard of care of the ETAT guide line corresponds to the minimum that should be maintained even in small hospitals and is a tool to reduce facility mortality. ETAT can be applied everywhere where sick children are cared especially most useful for busy first level health facilities and OPD of hospitals and its principles are universally applicable by health professionals at different levels of hospital settings(1).

Institute of medicine defined “Quality of care is the degree to which health services for individuals and populations are consistent with current professional knowledge (39). According to the Donabedian framework, structure refers to the characteristics of the setting in which the care occurs and comprises physical resources, human resources, and organizational structure (40).

Study conducted in Malawi showed that ETAT application halved the pediatric inpatient death Rate (25) and reported that it is Simple, inexpensive interventions to improve pediatric emergency care at under resourced hospitals in sub-Saharan Africa because it enhances immediate and rational treatment of case, the similar study in Rwanda indicated that its intervention improved the health care workers knowledge and skill related to managing emergency pediatric and neonatal care conditions (7, 26) and the study in Brazil revealed using the ETAT algorithm identified one in 40 children as needing emergency treatment and one in six as requiring priority treatment (10). Treatment of these children could have been delayed without triage.

Study made in Kenya indicated that most practitioners neither were aware of nor followed International guidance on best practice and which is similar to study in Cambodia, Indonesia, Kazakhstan, Solomon Islands, and Timor Leste. There is no international consensus on implementation of ETAT since scale varies globally (1, 4, 20) and another study in Kenya showed that implementation of ETAT+ admission resulted in mortality for children admitted with dehydration dropped from 17.9% (53/297) to 8.8% (26/294) and for severe malnutrition dropped from 29.9% (82/284) to 22.3% (44/197)(27)

Applying ETAT+ Ethiopia is useful for the speedy identification of children with life-threatening conditions which are most frequently seen in resource limited countries such as obstruction of the airway and other breathing problems caused by infections, shock, neurologic emergencies (coma or convulsions), severe dehydration, severe mal nutrition(22)

which is useful to improve quality of care for seriously ill children including inpatient unit. Main findings showed that over 31% of the emergency departments did not use a triage system. Emergency departments using the MTS had a mean adherence rate of 61% of the guideline's recommendations and emergency departments using the Emergency System Index adhered to a mean of 65% (28) as to the study conducted in in Holland where different guidelines are in use which is supported by numerous scholars showing that implementation and use of guidelines is not always mirrored in the care patients receive in practice in where health care workers are based on order of arrival rather than patient's condition . This is also referred to as the gap between theory and practice. As a consequence, patients often do not receive the care they need (22) (10).

In another study evaluating ETAT guidelines in Brazil indicated that, the performance of nurses using ETAT guidelines identified 98 Group 1 patients (those with emergency conditions) with 105 conditions requiring immediate treatment (five children having two conditions, and one child having three) and treatment was appropriate in 94/102 cases (92.2%) and inappropriate or partially inappropriate in eight cases (10) similar study in Guatemalan public hospital concluded that pediatric ETAT implementation results Significant decreases in admission rates (both overall and for the PICU) and trends towards decreased LOS and mortality rates of critically ill children which is evidenced by admission rates for the RS (8% vs 4%,  $P=0.01$ ) declined after implementation. For the CI sample, admission rate to the PICU (47% vs 24%,  $P=0.002$ ) decreased and LOS (7.3 vs 5.7 days,  $P=0.09$ ) and mortality rates (12% vs 6%,  $P=0.15$ ) showed trends toward decreasing post-implementation and the study in Taiwan reported that using pediatric triage assessment is related with better identification of pediatric emergencies, more precise in utilization of resources and greater patient safety (29, 30).

### **2.3. Triage**

Triage is a rapid process that is conducted as soon as a patient arrives at the hospital or anytime a patient's clinical condition changes in the hospital ward(3) and high triage knowledge and improved emergency care have been shown to lessen inpatient death in Malawi and South Africa, while also radically dropping patients' waiting times. Poor triage knowledge on the other hand can endanger the existence of patients received in the hospital (2). All clinical staff working in emergency settings have a minimum level of knowledge,

skills and competence in caring for children and young people have to have guidelines for safeguarding children and young people(31)

Precision of triage assessment is measured to be a key issue that governs patients' outcomes. Study done in Tanzania across nominated hospital in Dares salaam hospitals shows that more than half (52%) of the HCW involved in the study failed to allocate proper patient's triage category. Fifty eight percent (58%) of the respondents had no knowledge on waiting time limits for patients' triaged classes. Nearly 67 % of the respondents had awareness on what triage is all about. Another Study directed in three hospitals of Mazandaran University of Medical Sciences, Sari, Iran; shows only (20.1%) study participant had Triage knowledge (32).

## ***2.4. Factors affecting quality of pediatric emergency triage***

### **2.4.1. Organizational factors**

one of quality measurement is adhering to expected standards, both those that are officially stated (as in national or local standard) (4).

Quality of care provided to children in hospital settings in low-income countries has generally been found to be poor and study conducted in 18 randomly selected district (n=6) and sub-district (n=12) in Bangladesh showed that No hospital had a functioning triage system to prioritize those children most in need of immediate care (2)and Study in Kenya directed that blocks to operation of best-practices included mismatch between the hospital's vision and reality, poor communication, lack of objective mechanisms for monitoring and evaluating quality of clinical care, limited capacity for planning strategic change, limited management skills to introduce and manage change, hierarchical relationships(13) and interpersonal, motivated staff, clear pediatric emergency triage and treatment protocol, management or administrative support (33) are determinants of quality care for hospitalized children and therefore a facility needs to be capable of timely triage for all pediatric patient, capable of stabilizing pediatric patients and staffed by appropriate HCW and able to transfer to higher level facility to have timely access to definitive care(34).

### **2.4.2. Physical factors**

All facilities receiving sick or injured children should be equipped with an appropriate range of drugs and equipment which are essential to implementation of ETAT like Laboratory supports, drugs and essential equipment were deficient (2). Other non-personnel factors affecting triage decision-making included; unit crowdedness, rules and criteria, medical team coverage and the personnel's work volume(5) .Physical services, clinical guide lines, Child-friendly facilities, Supportive technology, essential medicine lists and access to financing are taken as common factors for implementation of the pediatric emergency triage (6) and study in Guatemala showed that improved pediatric care was observed after implementation of ETAT in hospitals and making simple changes to practice & better utilization of the available resources which is possible by using rapid, accurate triage of the patient based on a reliable and valid triage system (2, 4, 5, 30).

### **2.4.3. Factors related to HCW**

Study from Sweden revealed that having experience, power of decision making, skill of organizing and physical examinations have been among the important and effective factors in triage decision-making among health care workers(5).

A study of 21 hospitals across 7 countries in Asia and Africa showed that more than half of the children were undertreated or incorrectly treated with antibiotics, fluids, feeding, or oxygen. Lack of triage and inadequate assessment, experience of health care workers on pediatric emergencies, late treatment, poor knowledge of treatment guidelines, and inadequate monitoring of sick children were factors observed and, poor teamwork, failure to maintain professional integrity and mal-adaptation to institutional pressures are the challenges for implementation of best practices to provide quality care for children (4, 27, 35). Failure to follow to the triage guideline/protocol has an consequence in categorizing of patients according to the their principal complaints and the impending life threatening circumstances patient may show(10) and Study in Kenya reported that the quality of care in seven less developed countries including Ethiopia was designated as poor and the biggest gap in the process pillar was knowledge and same study showed that failure to implement guidelines into practice contributes to poor health Outcomes (36) and the other study showed that most doctors in regional hospitals, nurses and medical assistants in teaching and district hospitals, had insufficient familiarity and testified practice for handling significant childhood sicknesses(37).

It is important for guidelines to be presented as a tool used in conjunction with clinical judgment and not as a substitute for the provider's ability to treat each child as an individual. The concept that guidelines limit the physician to think freely or mandate a specific intervention may limit physicians' acceptance of a guideline (38).

### 3.1. Conceptual frame work of the study

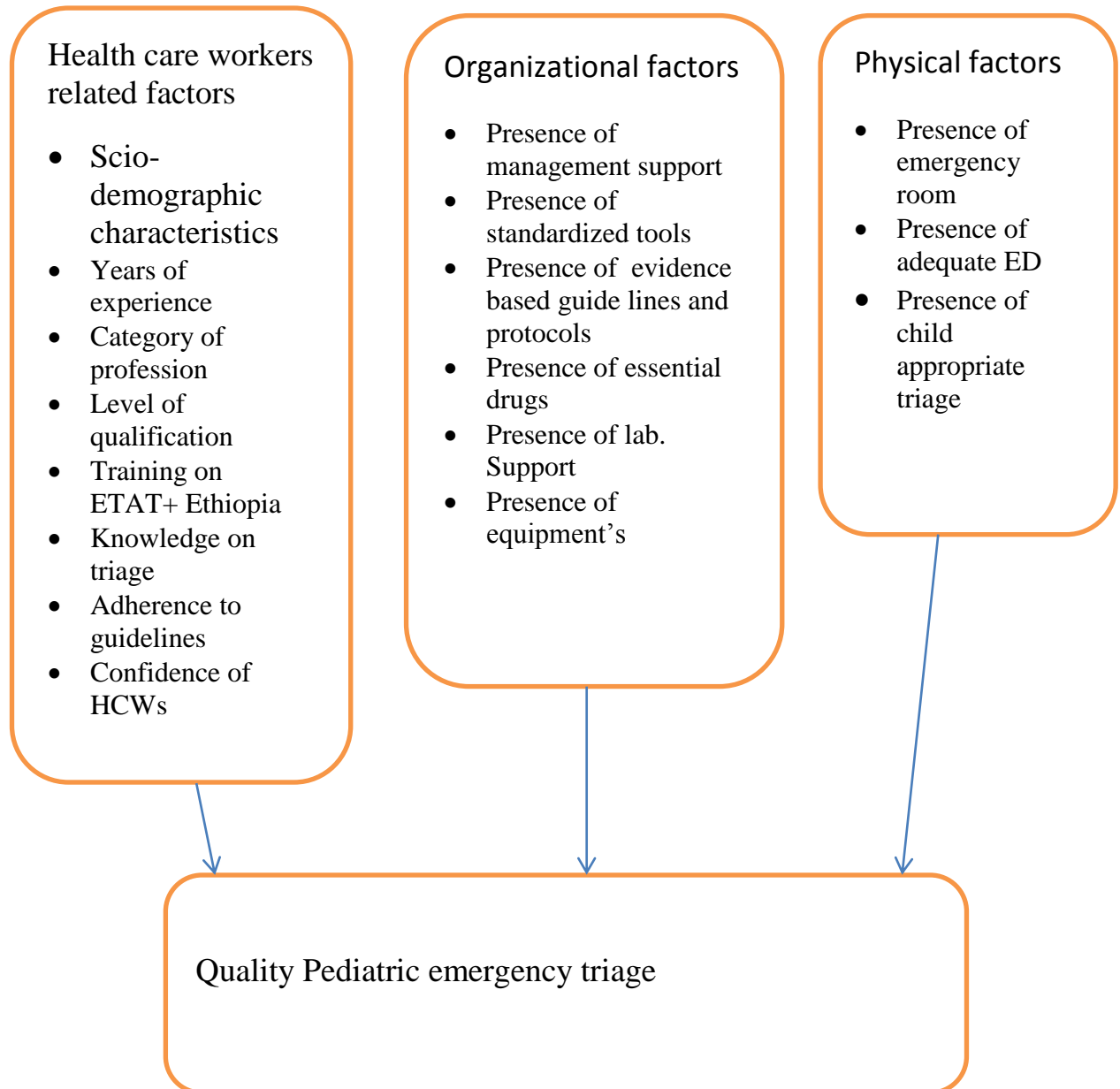


Fig.1 conceptual framework developed after extensive review of literature and from experts' opinion.

## **Chapter three**

### **4. Objectives of the study**

#### **4.1. *General objective:***

- ❖ To assess quality of pediatric emergency triage and its associated factors in selected hospitals of Wolait Zone, South Ethiopia, 2017 GC

#### **4.2. *Specific objectives:***

- ❖ To assess quality of pediatric emergency triage in selected hospitals of wolaita zone 2017GC.
- ❖ To identify factors associated with quality of pediatric emergency triage in selected hospitals of Wolaita Zone 2017 GC.

## **Chapter four**

### **5. Methods and materials**

#### **5.1. Study area**

The study was carried out in Wolaita Zone which is located 334 KM from the capital city of the country, Addis Ababa and 151 KM far from the SNNPR regional city Hawassa .Wolaita zone is one of the 13 zones in the region with population of 1,928,196 and it has Dega, Woina Dega and Qola weather condition. Considering health infrastructure, zone has 68 functional health centers, 6 hospitals of one teaching and referral, one general, one district hospital and the three primary level hospitals with 341 health posts.

#### **5.2. Study design and period**

The study design was descriptive facility based cross-sectional from Dec.2016 to June 2017GC.

##### **5.2.1. Source population**

Source populations were health care workers in selected hospitals of wolaita zone.

##### **5.2.2. Study population**

The study populations were health care workers who are working in emergency departments of three selected hospitals of Wolaita zone.

#### **5.3. Inclusion and exclusion criteria**

##### **5.3.1. Inclusion criteria**

- Health care providers who were officially employed and delivering care in emergency and pediatric room of the selected hospitals and willing to provide informed consent to participate in the study

##### **5.3.2. Exclusion criteria**

- Health care workers who were on the way of departing from the selected hospitals during the data collection period.
- Hospitals not providing emergency triage, assessment and treatment service.

#### 5.4. Sample size determination and procedure

Wolaita Zone has six hospitals which consist of three primary, one teaching and referral, one general and one district hospital. All hospitals providing pediatric emergency triage assessment and treatment care were selected for this study to meet the study objective. They were ottona teaching and referral hospital having health care professionals of 250, Christian general hospital with HCW of 215 and dubo saint marry catholic hospital with HCW of 100 and the total of 565 HCW who were source population for this particular study. First a single population proportion sample size estimate was determined by using the following formula:

$$n = \frac{Z_{\alpha/2}^2 P(1-P)}{d^2}$$

With single population, correction formula was used

Where n=sample size

P= 50% since proportion of pediatric emergency triage assessment and treatment status was not known.

d =5% (maximum margin of error the researcher was willing to allow)

Z =1.96 (standard normal deviation value corresponding to 95% confidence level)

n= **384**, since the source population was less than 10.000, the single population proportion correction formula was used as:

$$\begin{aligned}nf &= n / 1 + (n/N), \\ &= \frac{384}{1 + (384/565)} \\ &= \frac{384}{\frac{565+384}{565}} \\ &= \underline{\underline{229.}}\end{aligned}$$

Where nf= the final sample size

N= source population=565 HCW

Therefore, the required sample size for the study was 229.00, however there were only 178 HCW allocated in the selected units of the hospital, so this leads to the final sample size of 178.



### 5.5. Sampling procedure and technique

All hospitals providing emergency triage assessment and treatment were selected and health care professionals working in emergency and pediatric unit were chosen as study population in a deliberative and non-random fashion by purposive sampling technique to achieve the study objective. Units were purposively selected to include all health care workers who have had experience on caring for children with emergency or priority signs. All health care professionals at the selected units or working in emergency room were involved in the study.

#### SCHEMATIC PRESENTATION OF SAMPLING PROCEDURE

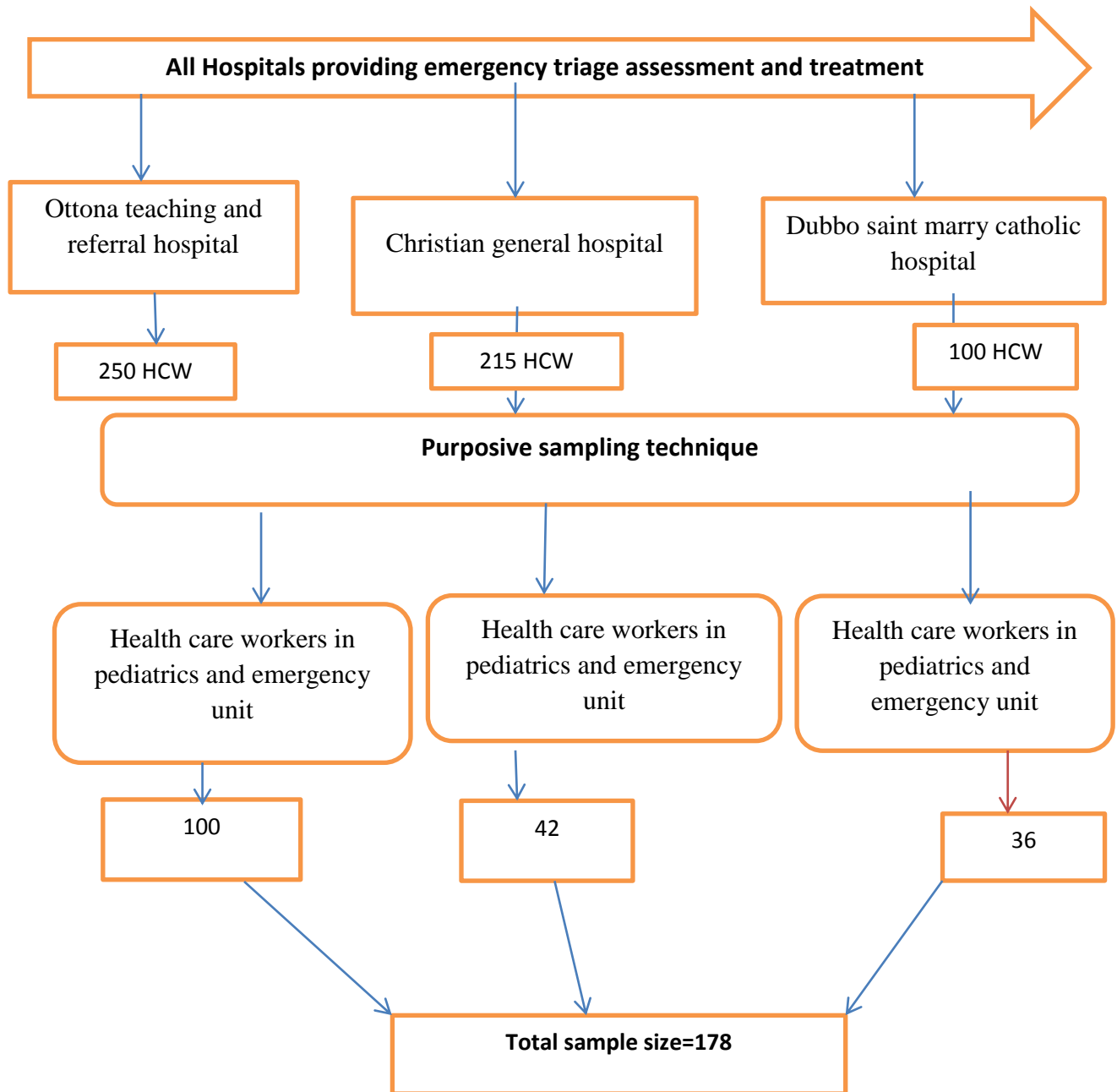


Fig.2. Schematic presentation of sampling procedure and selection

## 5.6. Variables of the study

### 5.6.1. Dependent variable

- ❖ Quality of Pediatric emergency triage

### 5.6.2. Independent variables

- ❖ **HCW related factors:** : Age, Gender, Religion, Marital status, Ethnicity Category of qualification, Level of qualification and confidence, Years of working experience, Training on ETAT+ Ethiopia, Knowledge on categorization of cases, perception of HCW towards ETAT.
- ❖ **Organizational factors:** Presence of management support, Presence of standardized tools, Presence of evidence based guide lines and protocols, Presence of essential drugs, Presence of lab. Support, presence of basic equipment's
- ❖ **Physical factors:** presence of adequate ED, presence of child appropriate triage area, presence of area for treatment of emergency cases.

## 5.7. Operational and term definitions

### 5.7.1. Operational definition

- **Good Quality Pediatric emergency triage:** is present if an immediate categorization of a child with emergency or priority signs without any delay, adherence to national guideline ,having high level triage knowledge and confidence of HCWs and availability of basic triage infrastructures.
- **Poor quality of pediatric emergency triage:** delay in child triage, no adherence to national guidelines, and low level of triage knowledge, low confidence and lack of basic triage infrastructure.
- **High level confidence:** if 80-100 % of HCWs were feels not frustrated when assigned in pediatric emergency triage.
- **Triage knowledge:** Is the awareness of the health care workers about the key principles related to pediatric emergency triage and it was measured in the following way:

<u>Percent (%)</u>	<u>level</u>
80-100	high
60-79	medium
Less than 60	low

- **Adherence to guidelines:** conformity in fulfilling or following officially recognized clinical practice guidelines as to ETAT+ Ethiopia.
- **Availability of essential drugs, equipment's and lab. Tests:** if the mean score of 05 materials are availed in the units selected

## **5.7. Data collection procedure**

### **5.7.1. Tool description**

Questionnaire were adapted from previous studies on emergency conditions abroad, adjusted to ETAT+ Ethiopia context and adopted from WHO and Ethiopia ETAT guideline which was reliable internationally and also partly developed from various literature reviews (2, 4, 5, 15) (35) including WHO updated emergency triage assessment and treatment guidelines (4).Reliability, validity, and completeness was proven globally since adapted from CPGLs .The questions and statements were grouped and arranged according to the particular that they can address.

The tool contained four sections which assessed Socio demographics of HCWs, knowledge and perceptions of HCW on pediatric emergency triage, factors associated with quality of pediatric emergency triage as to HCWs perspective, and observation check lists which were prepared in simple English version were used.

### **5.7.2. Data collection procedures**

Six health care workers; four BSc nurses and two HO were data collectors. The three supervisors, one MSc and two BSc were selected. Two data collectors for each hospital were assigned to gather self-administered data, one during day time and one during night shift under close supervision of the principal investigator and supervisor. Two days training was given to data collectors before the actual work on the aim of study, tools of the study, sampling procedures and data collection techniques, ways of collecting the data and clarification given on each doubt.

5% of self-administered questionnaire as a pre-test was carried out during the first two weeks before actual data collection period at Arbaminch general hospital on HCWs who were in emergency and pediatric unit. The researcher assessed clarity, understandability and uniformity of the questions and coded manually. Little amendment was done based on pretest result. After obtaining ethical clearance and completion of pre-testing, discussion was made with data collectors and supervisors. The data was collected by using self-administered questionnaires and check lists. The triage material and physical assessment was done by PI

via the use of a checklist on basic triage equipment, medicines and consumables (glucometer, IO needle, IV /rectal diazepam) as well as triage assessment forms, triage guidelines, sick child flow charts, presence of separate triage area for children, treatment algorithm. Filled questionnaires were checked for completeness and legibility by the researcher immediately. Data was collected over a period of March to April 2017 GC.

### **5.7.3. Data Quality assurance**

Data was collected by six data collectors together with supervisor after giving two days training on the tool, objectives of the study, and ways of administering before data collection by PI. Same data was entered twice by two different experienced individuals to ensure appropriate data consistency and quality. Data entry was done by using EpiData version 3.01 programs. An entry was verified and mistakes of data corrected through comparing visually the numbers on a printout of a data file with codes on the original source. For impossible codes, correct codes were tracked by using identification numbers of the original source. Consistency check was also done for entered data. The investigators and supervisors thoroughly checked before receiving the filled questionnaire from each data collector. Coding, entering, verifying and cleaning of the data were done with great care.

### **5.8. *Data quality management***

Each completed questionnaire was checked for errors, completeness and legibility immediately and missing or unclear data regained from the participant soon. Filled questionnaires were stored safely with the researcher. Pre-coded data was directly entered onto a computer file to create a data set. For questions with possibility of more than one response, each response was coded as a separate question and code was assigned to the responses. Data from open-ended questions and other unstructured formats were coded after reviewing.

### ***5.9. Data analysis procedure***

Descriptive statistics such as mean, median and standard deviations (SD) was done as appropriate. Frequency distribution and percentages was employed for categorical variables. Data analysis was accomplished with SPSS version 20.0. Frequencies and percentages were used on responses about knowledge on principles of pediatric emergency triage and to analyze data on factors associated with quality of pediatric emergency triage. For the open-ended questions, the researcher first read the responses on questionnaires and came up with key codes and themes during analysis. Then, the themes were used to come up with frequencies and percentages.

### ***5.10. Ethical consideration***

Official Ethical clearance letter was obtained from Addis Ababa University College of allied health Science research ethical committee after approval by the department of nursing and midwifery. Then, the necessary communication was made with chief clinical directors, medical directors and the hospital administrators after delivering of the official letters. Written informed consent was obtained from the respective participants before participation on the study .The consent form written in simple English clearly stating the purpose, benefits, risks and rights of participants like the right to withdraw any time was used. The participants were assured that their participation is totally voluntary and if they choose not to involve in the study, it will not affect them anyway. The nature of commitment in the form of like filling a questionnaire was clearly indicated and information obtained will be kept utmost confidentiality.

Filled questionnaires kept securely and only accessible to the researcher. Access to data entered on a computer file kept secret through a password known to the researcher only.

### ***5.11. Dissemination plan***

A research report will be submitted and presented to the School of Nursing and midwifery at AAU College of allied health sciences as partial fulfillment of the requirements for the award of Master's degree in pediatric and child health Nursing. The results of the study will be communicated to ottona teaching and referral hospital, Christian general hospital, Dubbo saint marry hospital and to federal democratic republic of Ethiopia, ministry of health. The researcher will hold a dissemination meeting with health care workers in selected hospitals. Efforts will be made to publish the results in a peer reviewed scientific journal and make presentations at seminars, workshops and scientific conferences. Hard and soft copies will be availed to AAU library.

## 6. Results

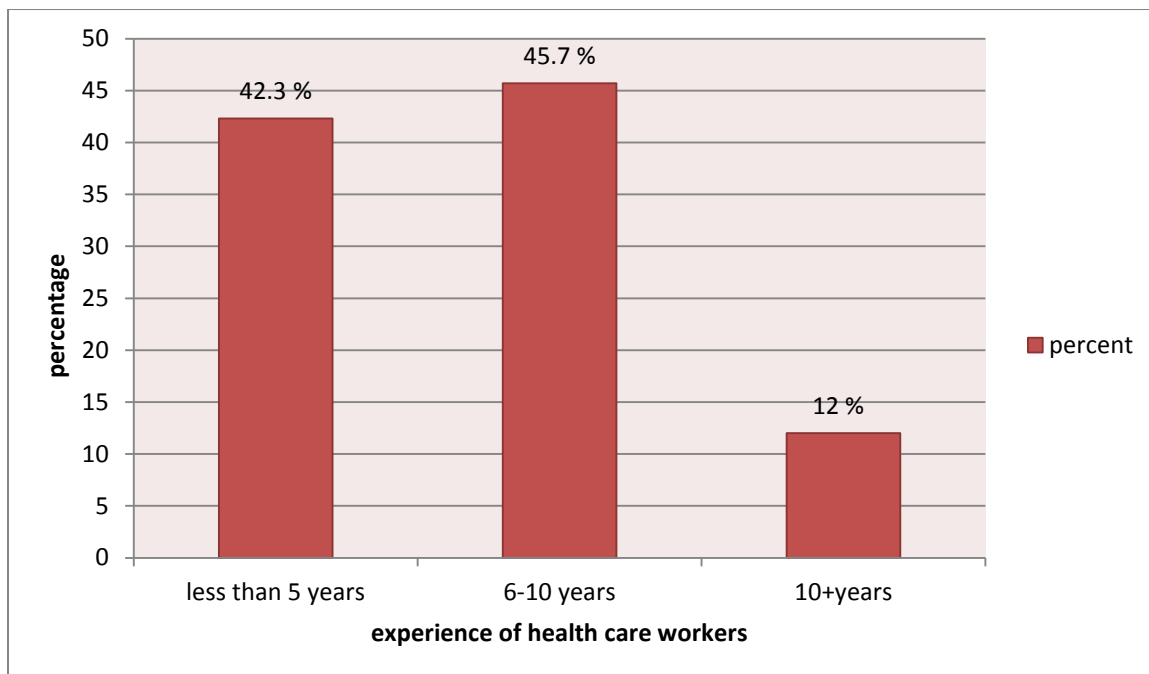
### 6.1. *Socio-demographic characteristics of the respondents*

One hundred and seventy five health care workers completely answered and returned the questionnaire from the total of 178 which makes the response rate of 98.31 % and the rest 3 (1.68%) of the questionnaire were left unanswered. Majority of the respondents 108 (61.7%, SD +.487) were male and 115 (67.5%, SD+0.909) were nurses in their category of profession. 113 (64.6 %, SD .576) of the health care professionals participated in the study were found between 20-30 years with mean age 30.38. The study revealed that 99 (56.6 %) of the respondents were the followers of protestant Christians and of the total respondents 125 (71.4%) of respondents were from Wolaita ethnic group. The study showed that 46(26.3.1%) were degree nurses, 73 (41.7 %) were diploma nurses, 23(13.1%) were health officers, 15(8.6%) were midwife, 13(7.3) were GP, 3 (1.7% %) were pediatricians and 11 (6.8%) of respondents were others (internists, MSc nurses and MSc in emergency) in their level of qualification. This study shown that 93(53.1%) of HCWs stated that pediatric emergency triage is responsibility of BSc nurses while 89(50.9%) responded that it should carried out by diploma nurses. The majority of respondents believe that pediatric emergency triage as responsibility of pediatric nurses but only 6(3.4%) have said it is better if done by health officers.

**Table 1: Socio-demographic characteristics of health care professionals (respondents) in selected hospitals of Wolaita Zone, Southern Ethiopia, 2017**

Socio Demographic Variable	Frequency ( %,n=175)
Age group	
<b>20-30</b>	<b>113(64.57)</b>
<b>31-40</b>	<b>56(32.00)</b>
<b>41-50</b>	<b>5(2.85)</b>
<b>51 +</b>	<b>1(0.57)</b>
Sex of HCW	
<b>Male</b>	<b>108(61.7)</b>
<b>Female</b>	<b>67(38.3)</b>
Ethnicity	
<b>Wolaita</b>	<b>125(71.4)</b>
<b>Amhara</b>	<b>20(11.4)</b>
<b>Others</b>	<b>30(17.2)</b>
Religion	
<b>Protestant Christians</b>	<b>99(56.6)</b>
<b>Orthodox Christians</b>	<b>52(29.7)</b>
<b>Catholic</b>	<b>16(9.1)</b>
<b>Others</b>	<b>8(4.6)</b>
Category of profession	
<b>medical doctor</b>	<b>18(10.3)</b>
<b>nurse</b>	<b>115(65.7)</b>
<b>midwife</b>	<b>15(8.6)</b>
<b>ho</b>	<b>23(13.1)</b>
<b>specialist</b>	<b>4(2.3)</b>
level of qualification	
<b>diploma nurse</b>	<b>73(41.71)</b>
<b>BSc</b>	<b>75(42.85)</b>
<b>GP</b>	<b>13(7.42)</b>
<b>Pediatricians</b>	<b>3(1.71)</b>
others	<b>11(6.28)</b>





**Figure 3: Experience of HCWs on selected hospitals of wolaita zone**

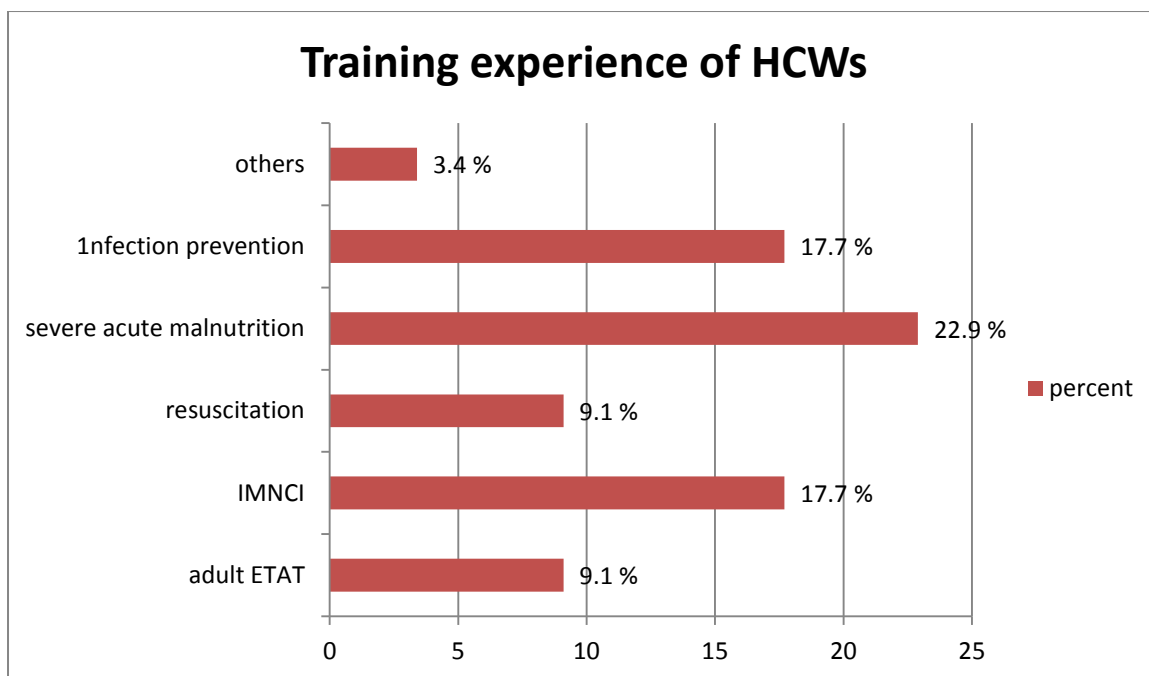
The study shown 74(42.3%, n=175) of HCWs have experience of less than five years, 80(45.7%, n=175) of the health care workers included in the study have experienced for 6-10 years in the health facilities and 21(12%, n=175) have experience greater than 10 years. These shows that HCWs who were delivering care in the pediatric emergency triage in this study were experienced.

## 6.2. Triage knowledge of HCW

Only 102(58.3%) of the respondents have low level knowledgeable on triage definition, only 33(18.9%) were recognized triage duration, merely 25(14.28%) respondents were able to identify all triage places and only 57(32.57%) of HCWs were able to categorize child with emergent condition. Solely 63(36%) were able to categorize the child with urgent signs which needs immediate attention. This shows that majority of HCWs were not able to provide timely and continuous triage service to children with emergent or urgent categories which used to enhance service quality. This study revealed that the level of knowledge of HCWs on the studied hospitals was found to be low.

**Table 2: Triage knowledge level of health care workers on selected hospitals**

items	Low level knowledge (< 60 %)	Medium level knowledge (60-79 %)	High level knowledge (>80 %)
<b>Triage definition</b>	102(58.3 )	0.00	0.00
<b>Triage duration (15-20 sec.)</b>	33(18.9 )	0.00	0.00
<b>All triage place(OPD, ward&amp; ER)</b>	25(14.28)	0.00	0.00
<b>What are emergency signs</b>	57(32.57)	0.00	0.00
<b>What are urgent signs</b>	63(36)	0.00	0.00



**Fig.4: Shows type of training taken by HCWs on the studied hospitals**

The present study shown that (n=175), 140(79.99%) have taken different kinds of training, of which, only 16(9.1%) of HCWs have adult ETAT training, 31(17.7) % have IMNCI, 16(9.1%) have resuscitation training, majority of them were trained in severe acute malnutrition 40 (22.9 %), 31(17.7 %) have training experience of infection prevention, 6(3.4 %) were trained in others and 35(20%) of HCWs have no training experience at all. Others include malaria training, food in prescription and NICU case management. This shows that there was no training experience in selected hospitals on pediatric emergency triage assessment and treatment which used to upgrade pediatric emergency triage quality.

### 6.2.1. HCWs responsible for pediatric emergency triage

109(62.28%) of the respondents stated that pediatric emergency triage should be done by pediatricians, 56(32.00) reported that it should be carried out by medical doctors and 10(5.72) suggested that it is responsibility of the pediatric nurses. This finding demonstrates that health care providers were considering pediatric emergency triage as sophisticated strategy which needs highly qualified or trained professionals. But it is simple to apply and is with high yield.

**Table 3: Showing distribution of HCWs responsible for pediatric emergency triage as respondents answered**

Who is responsible?	Frequency(n=175)	Percentage (%)
<b>Pediatrician</b>	109	62.28
<b>Medical doctor</b>	56	32.00
<b>Pediatric nurse</b>	10	5.72

### 6.3. Perception of HCWs towards pediatric emergency triage

Regarding feeling of health care providers towards pediatric emergency triage from selected hospitals, 166(94.9%) reported that triage increases quality, 37(21.1%) said that it did not need highly qualified professionals, 79(45.1%) stated that it did not need expensive instrument, 29(16.6%) reported that pediatric triaging does not rationalize treatment, 169(96.6%) declared that it decreases early mortality and 17(9.7%) stated that it decreases LOS. This demonstrates that majority of health care providers assume that pediatric emergency triage needs highly skilled specialists and high-tech.

**Table 4: HCWs perception towards pediatric emergency triage**

Items	yes	no
<b>Pediatric emergency triage increases quality of care</b>	166(94.9%)	9(5.1%)
<b>Triaging of a sick child needs highly qualified health professionals</b>	138(78.9%)	37(21.1%)
<b>Triaging of a sick child needs expensive instrument</b>	96(54.9%)	79(45.1%)
<b>Triaging of a sick child increases rational treatment of cases</b>	146(83.4%)	29(16.6%)
<b>Triaging of a sick decreases early mortality of children</b>	169(96.6%)	6(3.4%)
<b>Triaging of a sick child decreases the length of hospital stay?</b>	158(90.3%)	17(9.7%)

#### **6.4. Feeling of HCWs when assigned in pediatric emergency or triage unit**

This investigation has shown that 56(32 %) of the respondents uninterested when they assigned in pediatric emergency unit and 21(12%) feels frustrated when they located in the selected units, 50(28.6%) feels satisfied, only 2(1.1%) senses they were trained and 46(26.3) were very satisfied. So the confidence of health care providers when allocated in pediatric emergency or triage unit is low.

**Table 5: Feeling of health care workers when assigned in pediatric emergency or triage unit**

items	Frequency (% , n=175)
<b>Feels Uninterested</b>	56(32)
<b>Feels frustrated</b>	21(12)
<b>Feels satisfied</b>	50(28.6)
<b>Feels enabled</b>	2(1.1)
<b>Feels very satisfied</b>	46(26.3)

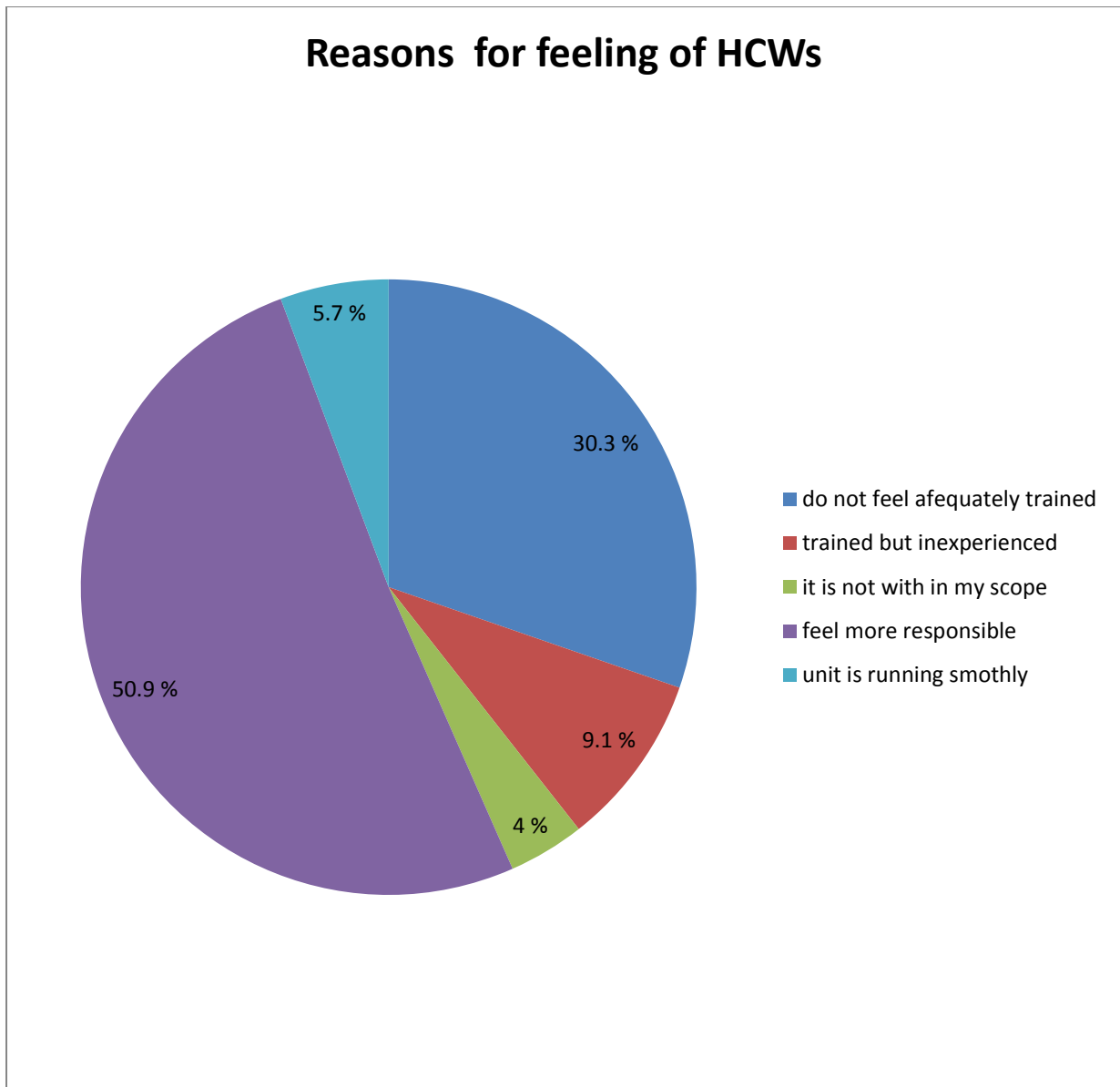


Figure 5: Reasons for feeling of HCWs when assigned in pediatric emergency or triage unit

This study has shown that the reasons for feeling of health care professionals when assigned in pediatric emergency or triage unit (n=175). 50(30.3%) of HCWs stated that they were not adequately trained and 16(9.1%) reported that they were trained but not experienced, 7(4.00%) said it is beyond my scope, 89(50.9%) stated they feel more responsible and only 10(5.7%) suggested that the unit is working smoothly. Therefore, this shows that the hospitals selected were not providing training to HCWs on pediatric ETAT + Ethiopia which was internationally proven and validated guideline to provide quality of care in less developed country including our nation.

## **6.5. Observation findings**

### **6.5.1. Availability of resource and structural qualities**

The simple observation was done focusing on the availability of resources needed to pediatric emergency triage and structural qualities of the selected facilities. All the health facilities have active triage systems and treatment area for emergency cases in emergency room. Regarding necessary equipment's, all selected units were equipped with functioning oxygen cylinder, fluids and drugs desired for emergency triage including salbutamol puff, adrenaline, and diazepam IV and all kinds of iv fluids critical in the unit were obtainable. But only one hospital (otona teaching and referral hospital) has separate triage area or emergency room for children however the other two hospitals (Christian general and Dubo saint marry catholic district hospitals) have no child appropriate triage space and they provide the service together with adult cases. None of the health facilities have had working ETAT+ Ethiopia guidelines, ETAT + Ethiopia charts/formats, have had no sick child flow charts as of cardiopulmonary resuscitation, neonatal resuscitation and emergency management of triaged children. There are no treatment algorithms on child emergency settings which include asthma, anaphylaxis, and DKA and pain in all health facilities. Only teaching and referral hospital has sick child flow charts on severe dehydration. None of the hospitals have IO needle. Except in general hospital, there was only one oxygen cylinder for 6-8 patients in the units. All the three selected hospitals were lacking glucometer, and hemoglobin as essential laboratory support in the unit, however they access it from the hospital main laboratory. This finding is also supplemented with the providers' perspective in which they mentioned absence of ETAT+ Ethiopia clinical management or practice guideline and lack of familiarity with the guidelines as one of the barrier for the provision of good pediatric emergency triage service.

All the selected facilities have consumable materials. All three hospitals did not triage soon after arrival but did it after registration has been done which might results in delay of assessment or treatment. Health care professionals in all selected hospitals were not using ETAT+ guideline. Therefore, quality of pediatric emergency triage needs to be improved in hospitals surveyed and was poor.



**Table 6: Availability of resources and structural qualities of selected hospitals**

<b>Items</b>	<b>Teaching and referral hosp.</b>	<b>General hosp.</b>	<b>District hosp.</b>
<b>1.Availability of clinical guidelines</b>			
Availability of ETAT+ guidelines	no	no	no
Availability of ETAT+ chart	no	no	no
Availability of emergency sick child flow charts	no	no	no
Availability of treatment algorithm for emergency conditions	no	no	no
Adherence to guidelines	no	no	no
<b>2.equipments and consumables</b>			
Availability of essential equipment's -IO needle -glucometer	no	no	no
Availability of essential medicines	yes	yes	yes
<b>3.Structural qualities</b>			
Separate triage area for children	yes	no	no
Room for emergency treatment	yes	yes	yes
Patients triaged without any delay	no	no	no
Availability of essential lab tests in unit	no	no	no
Training on pediatric emergency triage assessment and treatment guideline	no	no	no
Training on critical illness including trauma	no	no	no

## 6.6. Findings of provider perspective on quality of pediatric emergency triage service

141(80.6) of HCWs stated that work overload affects quality care .The frequently reported problems were lack of availability of ETAT+ guidelines 150(85.7%) and absence of ETAT training 150(85.7%), lack of familiarity with guidelines152 (86.9%), lack of support 136(77.7%%), lack of protocols and standards 139(79.9%), absence of separate triage or emergency area for children 148(84.6%),poor communication among staff 115(65.7%) and overcrowding 145(82.9%) are factors affecting pediatric triage quality as responded by HCWs in their health facilities. This indicates that quality of pediatric emergency triage is compromised in the studied hospitals and needs simple and cost effective strategies to improve the service quality.

**Table 7: Factors affecting triage quality as to respondents**

Variables	Yes (%)	No (%)
<b>work overloads</b>	141(80.6)	34(19.4)
<b>Lack of availability of pediatric ETAT guideline</b>	150(85.7)	25(14.3)
<b>Absence of ETAT training</b>	161(92)	14(8)
<b>Lack of familiarity with ETAT guide lines</b>	152(86.9)	23(13.1)
<b>lack of support from hospital management</b>	136(77.7)	39(22.3)
<b>Lack of protocols standards</b>	139(79.9)	36(20.6)
<b>No separate triage or emergency area for children</b>	148(84.6)	27(15.4)
<b>Poor communication among staff</b>	115(65.7)	60(34.3)
<b>overcrowding of emergency room</b>	145(82.9)	30(17.1)

## 6.7. The response of HCWs on emergent signs among studied hospitals

The present study has shown that 31(17.7) of the respondents identified central cyanosis as emergency signs and 12(6.9) stated that absent breathing as one of the sign for immediate treatment, 14(8) did not identified circulation problem, 14 not recognized coma or unconscious, 23(13.1), 14(10.3), 18(10.3), 31(17.7) did not identified child with the signs of convulsion, severe dehydration, bleeding, open fracture child as emergent categorization respectively. This figured HCWs were not in a correct track to quickly identify children in need of emergency treatment which in turn results in deadly delay with poor quality triage service.

**Table 8: Showing the response of health care workers on emergent signs**

<b>Emergent signs</b>	<b>Yes (%)</b>	<b>No (%)</b>
<b>Central cyanosis</b>	144(82.3)	31(17.7)
<b>Obstructed/absent breathing</b>	163(93.1)	12(6.9)
<b>Circulation problem</b>	161(92)	14(8)
<b>Coma or unconscious</b>	161( 92)	14(8)
<b>convulsion</b>	152(86.9)	23(13.1)
<b>Severe dehydration</b>	161(92)	14(8)
<b>bleeding</b>	157(89.7)	18(10.3)
<b>Open fracture</b>	141(81.7)	31(17.7)

## 6.8. The response of HCWs on urgent signs among studied hospitals

33(18.9), 21(12), and 15(8.6) of health care providers did not identify severe pallor, history of poisoning and severe pain as urgent sign respectively. 78(44.6), 72(41.1), 32(18.3), 14(8), 11(6.3), 31(17.7) and 33(8.9) of health care professionals were not categorized children with edema of both feet, severe visible wasting, urgent referral child, burn, respiratory distress, any sick child less than two months , and a child with very hot or cold in their category of classification respectively .This indicated that the listed HCWs did not classify a child which needs immediate attention in their urgent classification.

**Table 9: Response of HCWs to urgent signs**

Urgent signs	Yes (%)	No (%)
Severe pallor	142(81.1)	33(18.9)
History of poisoning	154(88)	21(12)
Severe pain	160(91.4)	15(8.6)
edema of both feet	97(55.4)	78(44.6)
Severe visible wasting	103(58.9)	72(41.1)
Urgent referral	143(81.7)	32(18.3)
burn	161(92)	14(8)
Respiratory distress	164(93.7)	11(6.3)
Any Sick child less than 2 months	144(82.3)	31(17.7)
Very hot or cold child	142(81.1)	33(8.9)

As responded by HCWs, there was lack of awareness and commitment amongst health care workers. HCWs said that essential equipment's especially oxygen cylinder and lab support were lacking in their health facilities. This finding is in line with study in Iran which reported that physical structure of the health care facilities and lack of equipment's was factors of triage quality(5). Among the various things related to their working situation, service providers revealed that lack of pediatric emergency triage specific training and onsite orientation, allocation of service providers based on their previous experience rather than related training, inadequacy of drugs and material supply, lack of motivation and absence of standardized triage tools were the key factors that can avert the provision of worthy quality of pediatric emergency triage. This perspective is similar to the finding from observation checklist. This shows that quality of pediatric emergency is suboptimal in the hospitals studied. This finding is congruent to the study in Hull University, United Kingdom, which suggested that working rapport with in the team and within hospital, the professional atmosphere and hierarchal communication affects triage quality(39).

### 6.8.1. Associated Factor analysis of pediatric emergency triage quality by using Pearson correlation

The Pearson correlation has shown that there was slight positive linear relationship with experience of health care worker and pediatric emergency triage quality( $r=+.009$ ,  $p.value=0.045$ ), level of qualification and quality of triage( $r=0.443$ ,  $p .value=0.056$ ), category of profession and triage quality( $r=0.142$   $p.value=0.052$ ), training experience and quality of triage care( $r=0.145$ ,  $p.value=0.055$ ) and while there was moderate positive linear correlation between reading guidelines and quality of pediatric emergency triage ( $r=.559$ ,  $p.value=0.044$ ).

**Table 10: Factors associated with pediatric emergency triage quality by using Pearson correlation**

Test type		Quality of pediatric emergency triage
variables		Correlation(r)
Experience	Pearson correlation Sig.2 tailed:0.045 N=175	0.009
Level of qualification	Pearson correlation Sig. 2 tailed:0.056 N=175 1	0.440
Category of qualification	Pearson correlation Sig. 2 tailed:0.052 N=175 1	0.142
Training	Pearson correlation Sig. 2 tailed:0.055 N=175 1	0.145
Reading guidelines	Pearson qualification Sig. 2 tailed:0.044 N=175 1	0.599

**r= correlation coefficient**

**6.8.2. Associated Factor analysis of pediatric emergency triage quality by using multivariate logistic regression model**

Variables significantly associated with quality of pediatric emergency triage were reading guidelines, having training and level of qualification of health care workers at p.value less than or equal to 0.025. The likely hood of triage quality of HCWs who read guidelines 2.807 times more than that of that of care givers who did not read guidelines (AOR =2.807, 95% CI=1.139-6.926).The likely hood of having pediatric emergency triage quality is 5.847 times higher in trained health care professionals than that of HCWs who were not trained (AOR= 5.847, 95 CI=1.197-2.850).

**Table 11: Shows factors associated with quality of pediatric emergency triage by multivariate logistic regression model.**

Quality of pediatric emergency triage						
variable	Fre. (%)	P.value	Good quality	Poor quality	Crude OR(CI)	AOR(CI)
Level of qualification						
• MSc	9(5.1)	0.010	9(5.1)	0.000	0.815(0.519-1.281)	0.021(0.001-0.398)
Read guide line					1	
• Yes	123(70.3)		102(58.28)	21(12)		
• no	52(29.7)	0.023	31(17.71)	73(41.71)	3.164(0.673-2.489)	2.807(1.139-6.926)
Training						
• yes	98(56)	1	117(66.85)	29(16.57)	1	
• no	77(44)	0.029	29(16.57)	48(27.42)	2.687(0.365-1.240)	5.847(1.197-28.850)

## **7. Discussion**

### ***7.1. Qualities of pediatric emergency triage***

#### **7.1.1. Structural qualities**

Similar with study in other resource limited countries (7, 15, 40), this investigation identified that quality of care on pediatric emergency triage in selected hospitals was found to be poor and needs upgrading. The deficits acknowledged were found in a number of interrelated parts including knowledge and feeling of health care workers, standardized tools, protocols, clinical practice guidelines, sick child flow charts, crucial lab support, vital hospital support systems, equipment's, drugs and child appropriate triage.

As to this study, 115(65.7%) of respondents in surveyed health facilities were nurses in their category of profession. This is in line with the study in Rwanda on quality of hospital care for children where nurse were 110(64.4%). This might be due to similar infrastructure of the two countries. This study reported that 22(12.6%) of HCWs were physicians in their profession. This is slightly different from the study in Rwanda on quality of hospital care for children where 37(21.6%, n=171) (41) were physicians. This might be due to better provision of incentives to physicians or great attention of hospitals on quality of pediatric care.

The present study revealed that 159(90.9%) of respondents were providing pediatric emergency service without specific or related training. This is higher than the study in Tanzania, Australia and Iran, where 78%, 42% and 14 % of the nurses working in the emergency centers provide care without formal training in emergency care or triage respectively. This leads to mistaken triage decisions as knowledge on triage has been recognized as a decisive issue that powers exactness of triage decision and lasts in poor quality (42, 43). This might be due to lack of sustainable development for clinicians on pediatric emergencies or poor attention was paid to the care from hospital managers, or absence of monitoring from local or national government officials, staffs were not qualified in pediatric emergencies, concentration of hospitals on chief financial or high-tech investment rather than a better use of existing resources (protocols and guidelines) to improve quality of care.

This study shown that health care providers have had low level knowledge on triage definition, triage duration, all triage place, were unable to categorize emergent or urgent cases and none of them identified clinical signs as triage criteria. This finding is in line with the study done in Tanzania and USA (42, 44). This may leads to deadly delay or under-triage



which will result in lower acuity level than required. The consequence will be wastage of ED resources, lengthy waiting times for patients to receive care, and development of dangerous complications which will preventable if correct identification (4, 7, 8). This might be due to absence of training to the staffs on pediatric emergency triage assessment and treatment who are working in peripheral hospitals of the countries or lack of online information.

### **7.1.2. Feeling of health care workers**

This study showed that health care providers were frustrated and uninterested when allocated in pediatric emergency triage. This might indicates that they have had low level of confidence and results in too slow recognition of critical cases. This is congruent to the study in USA which directed that HCWs in pediatric emergency feel uncomfortable(44). This might be due to lack of sustainable staff development, lack of in-service training or lack of onsite mentoring from the senior staffs.

According to this study finding, health care professionals sense that pediatric emergency triage needs highly qualified care givers or expensive instruments which contradicts with the findings of many resource limited countries such as Uganda, Gahanna ,Rwanda and Kenya (14, 45, 46). The feeling expressed by health workers on the surveyed may be due to lack of awareness or misconception on principles of pediatric emergency triage or due to the perception that pediatric emergency triage needs to be complicated and technologically sophisticated. This in turn will results in poor quality care, delay in treatment. As consistent to the other research in middle and low income countries, this study found that pediatric emergency triage could have capability to decrease noticeably pediatric illness ,LOS and death as described by health care providers, hence can increase quality of emergency care for hospitalized children (46-48).

### **7.1.3. Availability of resources**

Based on this assessment, all of the health facilities studied has active triage system and basic equipment's needed for pediatric emergency triage. But only one hospital has separate triage area for children (otona teaching and referral hospital). This is congruent to the reports from Amman, Jordan (49). This might be due to negligence of higher officials on the importance of pediatric emergency conditions including triage. This would make identification of pediatric emergencies or urgencies unlikely and can delay care which can result in poor patient outcome. None of the hospitals have glucometer on their emergencies or pediatric units. This might be due to insufficient logistic supply and also absence of emphasis on identification of cause for convulsion. This could result in less likely recognition of reasons for convulsing child. The absence of such test has a clear effect on the diagnosis of hypoglycemia. All hospitals have had no clinical practice guidelines including ETAT + Ethiopia, sick child flow charts and treatment algorithm on pediatric emergencies. This might be due to reluctance to change from hospital administrators side or care givers side, knowledge deficit, and leadership problems from hospitals, not using CPGLs as a requirement in pediatrics department, absence of guidelines at national level or pooling of concentration at academic or tertiary level hospitals from concerned bodies, or paying little attention to hospitals in peripheral levels This finding is similar to the study done in Rwanda and contradicting to the research in Tanzania which has showed that one of emergency center from four hospitals surveyed have ETAT and pain assessment guideline. (42, 50).

It is clear that nonexistence of such clinical practice guidelines leads to confusion of HCWs on identification of emergent or urgent cases which result in delay of treatment, increases length of hospital stay, lasts in avoidable death or preventable complication and ends in unnecessary referral. The final is poor quality of pediatric emergency care including triage. This finding is also supplemented with the providers' perspective in which the health care professionals declared that absence of guideline as one of the obstacle to provide good quality of pediatric emergency care including triage.

This study pointed out that there is a major gap on the equipment necessary to provide pediatric emergency triage service which compromises quality. Except one hospital, there is high shortage of oxygen cylinder or concentrator for management of severe respiratory distress. All surveyed hospitals have no intra-osseous needle. This might make management of severe dehydration or shock very difficult. This might be due to inadequate supply from

hospitals or lack of awareness amongst emergency departments. This finding is similar to the research done in Rwanda and other developing countries like Kenya and Tanzania which identified major gaps in resource availability (e.g., 50% of hospitals without intra-osseous needles for the management of shock in all hospitals surveyed, no nebulizer in 25% of the hospitals(4, 50). In this study, for example, two of the hospitals use one oxygen cylinder for 6-8 children (otona teaching and referral and Dubo saint marry catholic district hospital). Health care professional in all three hospitals were not adhering to guidelines (no adherence) when triaging a child with emergent or urgent signs. This might be due to absence of guidelines in the selected hospitals or due to absence of training on ETAT + Ethiopia. This may result in missed categorization of child. This finding contradicting to the study in Kabul, Afghanistan, where adherence to ETAT+ guideline was reported as low in a different place and high in a only one site (49).

This study demonstrated that all hospitals surveyed have no glucometer, were lacking oxygen cylinder, have no essential laboratory support in their unit and two of three hospitals have no separate child triage area. This is similar to the study in Bangladesh which indicated that hospitals were lacking an essential laboratory support and equipment's(51).This shows quality of care for children in the studied hospitals was poor and needs improvement.

#### **7.1.4. Factors affecting quality of pediatric emergency triage**

This investigation by Pearson correlation has shown that there was slight positive correlation between pediatric emergency triage quality and training( $r=0.440$ ,  $PV=0.056$ ) and there was moderate positive correlation found to exist in triage quality and reading guidelines. This might be due to exposure of health care providers to update guidelines. This is similar to the study in Kenya (52).

This finding revealed that reading of pediatric emergency triage guide line was significantly associated with pediatric emergency triage quality (AOR=2.807, 95 % CI=1.139-6.926,  $PV=0.023$ ). This might be due to exposure of health care workers to up-to-date clinical practice or evidence based guidelines and standards during reading and information sharing when they read guidelines. This result is congruent to the study in Iran (5).

The recent study suggested that there was association between training experience and quality of pediatric emergency (AOR= 5.847, 95%CI=1.197-2.850,  $PV= 0.029$ ). This might be due to continuous educational development and gain of knowledge necessary for accomplishment of pediatric emergency triage quality or this might be due to training of health care professionals equips with ability of identification of the children with emergency signs or priority signs without delay to take treatment or to be seen immediately. This is in line with the study done in Ghana(53).

This study has shown that there was no significance association between pediatric emergency triage quality and the experience of health care workers. This is contradictory to the research in Iran which showed experience as the supreme imperative factor that can influence triage decision making among health care professionals (5). This might be due to allocation of health care providers in pediatric emergency triage without training on up to date clinical practice guidelines or absence of continuous professional development in the hospitals studied or it may be due to under publication of the study with negative finding.

## **8. Recommendations**

This study points the need for an incorporated package of quality upgrading measures on pediatric emergency service including triage. Since pediatric emergency triage is one of the strategies to enhance the quality of hospitalized care for children, the following suggestions were indicated.

### **8.1. To Hospitals**

- ❖ The hospital should avail essential drugs, equipment, CPGLs and laboratory supports as needed for health care providers to optimize quality of care
- ❖ Ongoing training, supportive supervision and monitoring should be in place to motivate staffs and to feel knowledge gap there by advance the service quality.
- ❖ Hospital should improve infrastructure to ensure child appropriate triage service and should impress HCWs to use CPGLs as an requirement in pediatric departments
- ❖ There should be continuous evaluation of HCWs on pediatric emergency unit ensure its quality
- ❖ The administrators of hospitals need to develop a formal pediatric emergency triage based training to staffs of pediatric department in service level
- ❖ The hospitals should pay attention to the simple and cost effective strategies to increase quality of care for hospitalized children rather concentrating on high-tech and major financial investment.

### **8.2. To health care professionals**

- ❖ Health care providers should pay great attention to pediatric emergency triage service quality and update them to contemporary ED service or should be trained in principles of pediatric emergency triage assessment and treatment to deliver qualified care to their clients
- ❖ HCWs should integrate the simple and appropriate CPGLs for categorization of pediatric emergencies to enhance quality of care for pediatric emergency

### **8.3. To Researchers**

- ❖ Researchers should give attention on importance of pediatric emergency triage service since there is serious research gap in the area mentioned.
- ❖ Statistics is on demand to allow continuing monitoring and assessment of the services provided and their sustainability.

### **8.4. To FDRE Minister of Health**

- ❖ The federal minister of health should set benchmarking or accreditations not only at central level but also to the peripheral hospitals of the country to increase or to create sense of competition among hospitals.
- ❖ FDRE minister of health should work collaboratively with minister of education to incorporate pediatric emergency triage assessment and treatment course in the undergraduate curriculum for health care professionals in pre-service training program as sustainable quality improvement strategies for pediatric emergency
- ❖ FDRE minister of health should collaborate and coordinate with Ethiopian pediatric and nursing association to provide training on pediatric emergency triage assessment and treatment for staffs working in pediatric departments of hospitals.
- ❖ Educational thought needs to be applied to addressing the problems of poorly functioning district and peripheral hospitals of the country from minister of health side, problems in these hospitals should not be seen as out of view and out of mind.
- ❖ FDRE minister of health should pay attention to ensure appropriate dissemination of update guidelines to peripheral hospitals to enhance service quality.

### **8.5. Study strength:**

- This study identified the major gaps in selected hospitals and indicated the strategies which are required to scale up quality of pediatric emergency triage in hospitals surveyed
- This is the first study in the discipline, in study area, region and in the nation on quality of pediatric emergency triage service, therefore, it lies ground to the investigators
- Show the area of weakness to hospitals, professionals, researchers and other stake holders at regional or national level

- This study investigation specifically assessed the availability of essential drugs, equipment's and consumables deemed necessary for pediatric emergency by using checklists which are internationally valid rather than using self-report.
- Using the purposive sample on the selection HCWs and hospitals ensured the richness of information to achieve study objective.

#### **8.6. The study limitations:**

- One of the limitations of this study was that assessing only hospitals with established triage system while excluding others.
  - This survey focused on structural domains of quality measurement of health care services, the actual care of individual children is not seen.
  - The basic equipment's and drugs which are not avail at the time of auditing were taken as absent while it may be in the stock.
9. **Conclusion:** this study indicated that overall quality of pediatric emergency triage service was poor and needs improvement which may be described by scarcity of essential equipment's and laboratory tests, absence of adherence to national guidelines, absences of guidelines, absence of trainings, absence of standards, absence of protocols, absence of sick child flow charts and treatment algorithm, low level of HCWs knowledge on principles of triage, low confidence of HCWs in the unit, absence of regular supervision and monitoring and absence of child appropriate triage. The quality of pediatric emergency triage can be enhanced by availing clinical practice guidelines, by training HCWs on ETAT+ Ethiopia who were delivering care to children, by strengthening supportive supervision and designing simple strategies as of using CPGLs to upgrade quality care for hospitalized children.

## **Participant's consent**

\_\_\_\_\_ has explained to me what is going to be done; the risks and benefits involved and will be available for questions at the time of questionnaire administration. I understand that my decision to participate or not to participate in this study will not alter usual work. In the use of information generated from this study such as presentations and publications, my identity will remain unspecified. The records of the study must be available to only authorized study personnel. I am aware that I may withdraw from the study at any time.

I understand that by signing this consent form, I do not waive any of my legal rights but only indicates that I have been informed about the study in which I am voluntarily agreeing to participate.

\_\_\_\_\_

Volunteer's signature

\_\_\_\_\_

Date



## **APPENDIX I: information sheet**

**Title: Assessment of pediatric emergency triage and its associated factors in selected hospitals of Wolaita Zone, south Ethiopia, 2017.**

### **Introduction:**

My name is Mr. Daniel Baza, a student of Master of Science degree in pediatrics and child health nursing at AAU College of allied health sciences. I am conducting a study on quality of pediatric emergency triage and associated factors in selected hospitals of Wolaita zone

This form is meant to explain to you the important details of the study, before you decide whether or not to participate on it. You must understand its purpose, how it may help you, any risks associated with participation and what is expected from you once you decide to participate on the study.

### **Purpose of the Study**

The purpose of the study is to obtain information that will be used to gain insight into current quality of pediatric emergency triage and its associated factors and to determine the direction of future interventions at your Hospital. There is also hope that the information will be used by health care workers outside the study area and federal democratic republic of Ethiopia, Ministry of Health, to design appropriate strategies that enable health care professionals caring for pediatric patients to ensure optimal comfort for their patients for better patient outcomes.

### **Your rights as a Research Volunteer**

This consent form gives you information about the study, which will also be discussed with you. Once you understand the study and agree to participate, you are asked to sign the form. You will be given a copy of the signed form to keep. Your participation in this research is fully voluntary. You may decide to withdraw from the research at any time. If you decide to withdraw from the research, that decision will not affect you in any way.

## **Study Procedure**

The study will take about two months but you will be required to participate only once. The study will involve filling a questionnaire. If you decide to participate in the study, you will be given a questionnaire with questions about socio-demographics, triage knowledge and feelings, factors associated with triage quality and its enabling factors. Filling the questionnaire will take about 45 minutes.

## **Potential Risks**

There are no risks associated with your participation.

## **Potential Benefits**

There are no immediate benefits from the study. However, results of the study will be used to design strategies to improve the services delivered to pediatric emergency cases that may be of benefit to you, your patients and profession as whole.

## **Compensation**

There are no costs or payments to you for participating on the study.

## **Confidentiality**

A study number, which will be only known to the authorized study personnel and yourself, will be used instead of your name. Personal and any other information about you will not be released to anyone. You will not be personally identified in any publication or presentation about the study.

Finally, I would like to acknowledge you for your either responses after listening me.

**Name of PI:** Daniel Baza

Tel: 0916440606

Email: [danielbaza9@gmail.com](mailto:danielbaza9@gmail.com)

Sign and Date\_\_

AAU Contact Address: Tel: \_\_\_\_\_

E-mail:

## Appendix II: Data collection tool

Survey questionnaire for health care workers on assessment of quality of pediatric emergency triage and its associated factors in selected hospitals of Wolaita zone

**Instructions:** Read each question very carefully and tick (√) the option that best suits your response.

**Section one:** Questions related to HCWs

### 1. Socio-demographics of HCW

01. What is your age? (Age in completed years)

----- Years.

02. Your sex?

1. Male
2. Female

03. Your religion?

1. Orthodox Christian
2. Protestant Christian
3. Catholic
4. Muslim
5. Others \_\_\_\_\_

04. Your ethnicity

1. Wolaita
2. Amhara
3. Oromo
4. Gamo-Gofa
5. Gurage
6. Other, specify \_\_\_\_\_

05. Your category of profession

1. Medical doctor
2. Nurse
3. Midwife
4. Health officer
5. Specialist, specify

06. What is your level of qualification?

1. Pediatrician
2. Internist
3. Masters in nursing
4. Masters in emergency medicine
5. Degree nurse
6. Health officer
7. Diploma nurse
8. Midwife
9. GP

07. Your work experience as health care professional?

1. Less than 5 years
2. 6-10 years
3. 10+ years

08. Have you read any guidelines on pediatric emergency triage assessment and treatment?

1. Yes
- 2.No

09. Have you had training on any guidelines?

1. Yes
- 2.No

If you answered yes to Q10, which is training?

1. ETAT Ethiopia
2. IMNCI
3. Resuscitation
4. Severe acute malnutrition
5. Infection prevention
6. Others, specify\_\_\_\_\_

## **2. PEDIATRIC EMERGENCY TRIAGE KNOWLEDGE AMONG HCW IN SELECTED HOSPITALS OF WOLAITA ZONE**

10. What is triaging?

1. Rapid screening of cases
2. Rapid assessment of cases
3. Rapid treatment of cases

11. Did you triage a child with emergency or priority signs soon after arrival to your facility before any administrative procedure including registration?

1. Yes
2. No

12. If no to Q12, please describe your reason.

---

---

13. What criteria did you use to triage a child?

1. Order of arrival
2. Chief complaint of patient
3. Patient vital signs
4. Others, specify\_\_\_\_\_

14. How often are you using ETAT guide lines

1. Some times
2. rarely
3. usually
4. not at all

15. Are there problems in your emergency or pediatric unit related to pediatric emergency triage?

1. Yes
- 2.No

16. If yes to Q16, please explain the problems.

---

---

17. What are important sign(s) to provide immediate treatment after triaging and assessment of a child?

A. central cyanosis	1.yes	2.no
B. obstructed or absent breathing	1.yes	2.no
C. circulation problem or signs of shock	1.yes	2.no
D .coma or Unconscious	1.yes	2.no
E .convulsion	1.yes	2.no
F .dehydration, Severe	1.yes	2.no
G. bleeding child	1.yes	2.no
H. immediate poisoning	1.yes	2.no
I. open fracture	1.yes	2.no

18. What are important sign(s) to provide rapid attention or speedy assessment for a child?

1. severe pallor	1.yes	2.no
2. history of poisoning	1.yes	2.no
3. severe pain	1.yes	2.no
4. edema of both feet	1.yes	2.no
5. severe visible wasting	1.yes	2.no
6. burn	1.yes	2.no
7. referral(urgent)	1.yes	2.no
8. respiratory distress	1.yes	2.no
9. any sick child aged less than two months	1.yes	2.no
10. if child is very hot or very cold	1.yes	2.no

19. Where should triage assessment and treatment take place? (More than one answer is possible).

1. In emergency room
2. In ward
3. In outpatient department
4. In all places

20. How long does it take to triage a child with any emergency or priority signs?
1. 15-20 seconds
  2. 5-10 minutes
  3. 30-40 minutes
  4. 41-60 minutes
  5. 60-120 minute
  6. More than two hrs
21. Who is appropriate for triaging, assessing or treating of a child with any emergency signs?( more than one answer is possible)
1. Pediatrician
  2. Medical doctor
  3. Degree nurses
  4. Master nurses
  5. Pediatric nurse
  6. HO
22. Who is appropriate for triaging, assessing or treating of a child with any priority sign (more than one answer is possible)?
1. Pediatrician
  2. Medical doctor
  3. Degree nurses
  4. Diploma nurses
  5. Pediatric nurse
  6. HO
3. **Perceptions or feelings of HCW towards pediatric emergency**
23. Do you feel your emergency or pediatric unit has a problem with emergency triage?
4. Yes
  5. No
24. Do you feel immediate or rapid triaging of a sick child with emergency or priority signs needs highly qualified health professionals?
1. Yes
  - 2.No
25. Do you feel immediate or rapid triaging of a sick child with emergency or priority signs needs expensive instrument?
1. Yes
  - 2.No

26. Do you feel immediate or rapid triaging of a sick child with emergency or priority signs increases rational treatment of cases?

1. Yes
- 2.No

27. Do you feel immediate or rapid triaging of a sick child with emergency or priority signs decreases early mortality of children?

1. Yes
- 2.No

28. Do you feel immediate or rapid triaging of a sick child with emergency or priority signs decreases the length of hospital stay?

1. Yes
- 2.No

29. Do you feel you are routinely using pediatric emergency triage tool in your hospital?

1. Yes
- 2.No

30. How do you feel when you are assigned in emergency or pediatric unit?

1. Frustrated
2. Uninterested
3. Satisfied
4. Enabled
5. Very satisfied

31. Please **indicate the factors which contribute to the feelings answered in Q.30** about the emergency triage assessment and treatment in your unit.

1. I do not feel adequately trained
2. I am trained but still inexperienced
3. I feel this is not within my scope of practice
4. I feel more responsible
5. The unit is running more smoothly



**SECTION TWO: (Question on Factors associated with quality pediatric emergency triage.**

**32. Directions: Please indicate whether or not an item is associated factor for quality pediatric emergency triage by ticking (√) on Yes or No.**

- |   |        |      |
|---|--------|------|
| 1. Work overloads   | a. yes | b.no |
| 2. Lack of availability of pediatric ETAT guideline                     | a. yes | b.no |
| 3. Lack of adequate training on ETAT                                    | a. yes | b.no |
| 4. Lack of familiarity with ETAT guide lines                            | a. yes | b.no |
| 5. lack of support from hospital management                             | a. yes | b.no |
| 7. Lack of protocols for emergency triage assessment and treatment      | a. yes | b.no |
| 8. No separate triage area for children                                 | a. yes | b.no |
| 9. No staff formally trained in pediatric emergency treatment or triage | a. yes | b.no |
| 10. No emergency room for children                                      | a. yes | b.no |
| 11. Poor communication among staff                                      | a. yes | b.no |
| 12. No monitoring on pediatric emergency triage                         | a. yes | b.no |
| 13. Overcrowding of emergency room                                      | a. yes | b.no |

**33. SECTION THREE: Please indicate whether or not an item enables your ability to pediatric emergency triage by ticking (√) on Yes or No.**

- |  |        |       |
|--|--------|-------|
| 1. The hospital encourages the use of pediatric emergency triage assessment and treatment protocol | a. yes | b.no  |
| 2. my colleagues encourage me to use pediatric emergency triage assessment and treatment           | a. yes | b.no  |
| 3 Interested and motivated staff   | a. yes | b.no  |
| 4. Standardized assessment tools are in use  | a. yes | b.no  |
| 5. Protocols and guidelines are in use   | a. yes | b .no |
| 6. presence of senior staffs   | a. yes | b.no  |
| 7.Others,specify   |        |       |
-

### 34. SECTION FOUR: observation check lists on availability of resources

1.ETAT +Ethiopia guide lines are available	Yes	No
2.The sick child flow charts are available <ul style="list-style-type: none"> <li>• Various sick child flow charts as to ETAT + Ethiopia guideline</li> </ul>		
3.There is treatment algorithm for pediatric emergencies in the selected units <ul style="list-style-type: none"> <li>• DKA treatment algorithm</li> <li>• Anaphylaxis treatment algorithm</li> <li>• Asthma treatment algorithm</li> </ul>		
6.Essential equipment's are available in selected units <ul style="list-style-type: none"> <li>• Oxygen cylinder</li> <li>• Oxygen catheter or nasal prongs</li> <li>• IO needle</li> <li>• Glucometer</li> </ul>		
5.Essential medicines are available in selected units <ul style="list-style-type: none"> <li>• glucose 5%</li> <li>• Iv /rectal diazepam</li> <li>• Adrenaline puff</li> <li>• All kinds of Fluids</li> <li>• salbutamol</li> </ul>		
6.There is room for emergency treatment in ED		
7. Patients with emergency signs triaged and treated without any delay		
8. Triage system in place where patient is initially seen by clinical staff.		
9.Essential laboratory support(glucose testing)		
10.Separate triage area for children		
11.Adherence to guide lines		

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## **DECLARATION**

I, the undersigned, MSc student declare that this thesis is my original work in partial fulfillment of the requirement for the degree of Master in Pediatrics and Child Health Nursing.

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**Date of Submission:** \_\_\_\_\_

This thesis work has been submitted to Department of Nursing and Midwifery for examination with my approval as university advisor.

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