

**ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE SCHOOL
OF NURSING, DEPARTMENT OF EMERGENCY AND CRITICAL CARE**



**PRACTICE OF PRE-HOSPITAL HEALTHCARE PROVIDERS AND
ASSOCIATED FACTORS WITH PRE-HOSPITAL HEALTHCARE IN
ADDIS ABABA, ETHIOPIA 2022**

INVESTIGATOR: AZANAW ABEBE (BSc, MSc. Candidate)

November 29, 2022

ADDIS ABABA, ETHIOPIA

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**A RESEARCH THESIS TO BE SUBMITTED TO SAINT PAUL’S
HOSPITAL MILLENNIUM MEDICAL COLLEGE, SCHOOL OF
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THE DEGREE OF MASTER OF SCIENCES IN PARAMEDICS**

November 29, 2022

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Information sheet

Name of principal investigator	Azanaw Abebe
Full title of the research project	Practice of pre-hospital healthcare providers and associated factors with pre-hospital healthcare in Addis Ababa, Ethiopia, 2022
Duration of the project	October 2021-february 2022
Study Area	Addis Ababa(Addis Ababa fire and emergency prevention and rescue agency, Ethiopian Red Cross Addis Ababa branch and Tebita ambulance ,Addis Ababa, Ethiopia 2022)
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Acronyms and Abbreviations

ALS - Advanced Life Support

AOR- Adjusted Odd Ratio

BLS - Basic Life Support

CI- Confidence Interval

COR- Crude Odd Ratio

CPR - Cardiopulmonary Resuscitation

ED - Emergency Department

EMS - Emergency Medical Services

EMT- Emergency Medical Technician

ERCS- Ethiopian Red Cross society

FEPPRA- Fire and Emergency Prevention and Rescue Agency

FMHACA- Food, Medicine and Health Care Administration and control Authority

FMOH - Federal Ministry of Health

IV – Intravenous

NGO-Nongovernmental organization

PHCP- Pre-hospital Healthcare providers

SPHMMC- Saint Paul's Hospital Millennium Medical College

WHO - World Health Organization

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ABSTRACT

Background: Poor practice about pre-hospital healthcare hurt the health outcomes of the patients. An increase in the number of sites of ambulance dispatch and provision of basic skills training in trauma care reduced deaths.

Objective: To assess practice of pre-hospital healthcare providers and associated factors with pre-hospital healthcare in Addis Ababa, Ethiopia 2022

Method: Facility based cross sectional study incorporated with observational study was conducted from October, 2021 to February, 2022. Observational checklist data were collected by principal investigator by taking all participants who were working patient care during data collection period before self-administered questionnaire were distributed. Data obtained from pre-hospital healthcare providers working in Addis Ababa and data were entered and cleaned using Epidata v4.4 and exported to SPSS software version 26 for further analysis. Both bi-variable and multivariable logistic regression analyses were conducted. P value of 0.05 with a 95% confidence interval is considered statistically significant.

Result: This study was conducted on 191 pre-hospital healthcare providers working in Addis Ababa with an overall response rate of 94%. This study assessed pre-hospital healthcare providers revealed that 42% and 43% of the participants had good practice of pre-hospital healthcare with self-administered and observational checklist respectively. A participant who performing properly advanced life support (AOR= 88.99; 95%CI: 27.143-291.603), adequate monitoring and defibrillator (AOR=5.829; 95%CI: 1.430-23.765), and to have 4-5 years of work experiences (AOR=5.86; 95%CI: 1.424-24.109) and opportunity of continuing education (AOR=31.953; 95%CI: 6.479-157.591) were independently predictors of good practice.

Conclusion and recommendation

More than half of pre-hospital healthcare providers' practices with pre-hospital care were poor. And also identified factors increases the likelihoods of good practice were performing properly ALS, adequate monitoring and defibrillator, work experience, and opportunity of continuing education were independently predictors of good practice of pre-hospital healthcare. Therefore, policymakers and health planners would be better establish pre-hospital healthcare teaching and training centres based on pre-hospital healthcare guideline were recommended to Ministry of health and Ministry of education.

Keywords: practice, pre-hospital healthcare providers, SPHMMC

1. INTRODUCTION

1.1 Back ground

Emergency medical services are designed to rapidly treat and transport seriously ill or injured patients to the Emergency Department (ED)(1, 2).

An emergency medical services (EMS) is the approach of rendered to a patient on the scene and during transport prior to initiation of in-hospital patient care(2).

Pre-Hospital Care is those emergency medical services rendered to emergency patient for analytic, resuscitative, stabilizing or preventative purposes, precedent to patient to health care facilities(2).

Pre-hospital emergency care is a medical care given to patients before arrival in the hospital after activation of the emergency team. Poor knowledge and practice about pre-hospital emergency care hurt the health outcomes of the patients (3, 4).

A severely injured victim should be transported from the scene of injury to definitive care at a fixed facility and as quickly and safely as possible by pre-hospital workers (5, 6).

In Mexico, poor selection of medications and late referral to hospital were judged to be important contributory in more than half the deaths(7).

Other study In Mexico, an increase in the number of sites of ambulance dispatch and provision of basic skills training in trauma care reduced deaths among patient en route to hospital(7-9).

An absence of emergency transport is a common barrier to care. This may arise because of any of several factors including the lack of appropriate vehicles, the absence of or inadequacy of roads, and the inability of to pay transport services(7).

The study in Sri Lanka shows; the required skills for advanced life support, most of the staff showed skills in IV cannulation (71.4%) and IV drug administration (71.4%) however less skills were shown cricothyroidotomy (22.9%), pleural drainage (25.7%) and laryngoscopy and intubation (31.4%)(10).

A study in Ethiopia shows, Trauma outcomes are better managed by rapid transportation to definitive health care and less field interventions, while medical emergencies such as cardiac arrests benefit more from prompt field interventions and stabilization before transport(11).

Another study at Gondar, Ethiopia shows, the majority of the participants know about basic life support (76.2%) and how cardiopulmonary resuscitation (CPR) (77.0%) is performed. More than half of the participants well gave adequate basic life support (BLS) and CPR for patients. And Less than half of the participants (42.3%) have training related to pre-hospital emergency care(3).

Ethiopian emergency medical services Protocol Guideline (FMOH) says, when moving a patient on an ambulance bed, adjust the height of the ambulance bed down to the safe position for moving a patient, in accordance with manufacturer's instructions and Properly secure all patients, especially children, to the ambulance bed, using all of the required straps, or in an approved infant/child carrier or seat, or harness, or in an appropriate immobilization device, in a position of comfort, or in a position appropriate to the chief complaint, and/or the nature of the illness or injury.

There is no research done in this kind in Ethiopia, so it will be used as the baseline information for future researchers. The findings of this study will also give important clues to health professionals, policymakers, and other concerned bodies to improve the knowledge and practice of pre-hospital healthcare professionals on patient transportation.

1.2 Statement of the problem

A study in America shows; 32% of the paramedics reported having no experience as a paramedic before providing critical care transport and paramedics who provided only ground critical care transport services reported administering fewer categories of medications and performing fewer procedures than those providing rotor wings or fixed wing transports(12).

In Mexico, poor selection of medications and late referral to hospital were judged to be important contributory in more than half the deaths(7).

Other study In Mexico, an increase in the number of sites of ambulance dispatch and provision of basic skills training in trauma care reduced deaths among patient en route to hospital(7-9).

A study in Japan shows; willingness to perform CPR among health student before BLS training was 13% but after BLS training it was 77% (13).

A study in England shows, the most common assessment recorded by paramedics were respiratory (20.1%), pain (15.8%) and deceased (7.9%) and 74.4% were transported to hospital (99.5%). Of those with pain as the primary impression, (53.9%) received an analgesic(14).

A qualitative study in India; most trauma victims in Delhi were rapidly brought to hospital by bystanders, taxis and police and sometimes died on the way. But ambulances were common, and they were primarily used for interfacility transfers(15).

A study in England shows, 60%–78% study participants had not practiced clinical skills of first aid management of heat and heat illnesses, burn, shock, sprains and fractures, poisoning, and road traffic accidents. 40% of participant had not practiced the clinical skills of recording respiratory rate and temperature (16).

A qualitative study's done in Qatar showed that, during transportation patients are exposed to potential risks related to falling on stretchers, medication errors and clinical judgment(17).

A study in Tanzania shows, higher education level and first aid training were associated with higher practical and knowledge score(18).

In Gondar, Ethiopia, around 41.5% of emergency workers including pre-hospital health providers have inadequate practice of basic life support (BLS) and 50.1% have inadequate practice advanced life support (ALS)(3).

1.3 Justification

Poor practice among pre-hospital healthcare professional's results in compromised patient care, transportation and safety(7, 19).

The pre-hospital healthcare providers are the first healthcare workers reach to a patient that needs special attention, regular training, and well organized infrastructure. The occurrence of poor practice among pre-hospital healthcare professionals may cost a patient life's, decrease productivity, increase medical errors and increase financial crisis on health system.

Throughout the nation there was lack of professional development, lack of appropriate recognition, lack of appropriate school for education and training system of pre-hospital healthcare professionals to care and lifting and moving of patients. Therefore this study will

inform to the ministry of health, Addis Ababa health bureau and study site to improve all this system.

The practice and associated factors among pre-hospital healthcare providers was not studied however different related studies suggest poor practice to patient care costs patient lives. This study is important for policymakers, practitioners and researchers to organize periodically training system, good practice and education system.

1.4 Significant of the study

This study was assessing practice and factors affect practice of pre-hospital healthcare providers and recommend practical strategies on pre-hospital healthcare givers. This study was show pre-hospital healthcare provider's practical level and will improve patient's care, early diagnosis and intervention and health provider's safety. The research result helps for doctors, nurses, paramedic and emergency medical technicians; to improve practice, for teachers to improve way of teaching related to practice and preparation of training. For policy makers will use to implement and improve guideline and for pre-hospital healthcare professionals will make easy and clear to practice results prevent tension and depression and it can also help the future researchers to draw base line finding for further study in this area.

This study will help for the government to give attention for improve pre-hospital guideline.

2. LITERATURE REVIEW

2.1 Over view of pre-hospital patient care

A policy in Chicago shows; Emergency medical services are designed to rapidly treat and transport seriously ill or injured patients to the Emergency Department (ED)(2). Pre-Hospital Care is those emergency medical services rendered to emergency patient for analytic, resuscitative, stabilizing or preventative purposes, precedent to and during transportation of such patient to health care facilities(2).

Critical Care Transport means the pre-hospital or inter-hospital transportation of a critically injured or ill patient that uses paramedic, pre-hospital registered nurse and, on occasion, specialized nursing staff to perform skills and interventions at levels above the usual and customary scope of paramedic practice(2).

A study in America; Paramedics are often the primary provider on the critical care transport team and are performing skills, using equipment, and administering medications beyond their education, training, and scope of practice(12).

Qualitative study in India; most trauma victims in Delhi are rapidly brought to hospital by bystanders, taxis and police and sometimes died on the way. But ambulances were common, and they were primarily used for interfaculty transfers(15).

A qualitative study in Ethiopia suggests, Trauma outcomes are better managed by rapid transportation to definitive health care and less field interventions, while medical emergencies such as cardiac arrests benefit more from prompt field interventions and stabilization before transport(11).

2.2 Practice of pre-hospital healthcare providers

A study in America; Of the 610 respondents, 317 paramedics (52%) reported practicing in a critical care transport setting and comprise the study group (12). Of which the majority of the study group identified as ground critical care transport providers (78.5%). And 32% of the paramedics reported having no experience as a paramedic before providing critical care transport. But paramedics who provided only ground critical care transport services reported administering fewer categories of medications and performing fewer procedures than those providing rotor wings or fixed wing transports(12).

For all skills, equipment and medication management of the paediatric patient, and vasopressors, continuing education was the most common source of training reported by practicing paramedics(12).

The study in Sri Lanka shows; the required skills for advanced life support, most of the staff showed skills in IV cannulation (71.4%) and IV drug administration (71.4%) however less skills were shown cricothyroidotomy (22.9%), pleural drainage (25.7%) and laryngoscopy and intubation (31.4%), (10).

A study in India shows; on students in a tertiary care hospital, 35% answered correctly about the location of chest compression and only 10.8% could arrange a. Airway, b. Breathing, and c. Chest compression in orderly sequence(20).

A study Free State, South Africa, The majority (92%) of participants indicated a desire to obtain further qualifications/training in pre-hospital emergency care, while 3% did not(21).

A study in Tanzania shows, there was a statistically significant difference between pre-hospital transporters with and without first aid training, those with different educational levels and self Employed vs. employed. And higher education level and first aid training were associated with higher practical and knowledge score(18)

In Gondar, Ethiopia, around 41.5% of emergency workers including pre-hospital health providers have inadequate practice of basic life support (BLS) and 50.1% have inadequate practice advanced life support (ALS)(3).

2.3 Factors associated with practice of pre-hospital healthcare providers

2.3.1 Socio demographic factors

A study in Indonesia shows; practice score was higher who had more training, more work experience and higher education levels (15, 22).

A study in Tanzania shows, there was a statistically significant difference between with and without first aid training, those with different educational levels and self Employed vs. employed(18). And higher education level and first aid training were associated with higher practical and knowledge score(18).

A study in Ethiopia shows; The odds of good practice was more likely in male, married marital status, more than 5 years' work experience and had taken pre-hospital healthcare training than that of female, single marital status, less than 5-year experience and who had not taken the

training respectively(3).More than half 52.1% of the participants were female, 51.5% of participants were in the age group of 20 to 30 years, more than half of the participants 51.6% were single and educational level majority, and 89.2% had a baccalaureate degree(3).

2.3.2 Facility related factors

An absence of emergency transport is a common barrier to care. This may arise because of any of several factors including the lack of appropriate vehicles, the absence of or inadequacy of roads, and the inability of to pay transport services(7).

The essential tasks of patient handling, care, and transport cannot be eliminated, the design of ambulance and its equipment, which play a significant role in how EMS personnel interact with patients (23, 24). The development, design and evaluation processes of a paediatric immobilizer, nothing that current backboard did not provide proper spinal immobilization for infants and children due to their low weight and size (23, 25).

2.3.3 Personal related factors

A study in America shows, physical fitness affects practice of trauma patient during moving and lifting (26).

A study in turkey shows; the knowledge among who participated in a course/ seminar on CPR in the last 3 months was significantly higher than who did in the last 6 and 12 months(27).

A study in Israel shows; Lack of career options, extensive and strenuous physical demands accompanied by unrewarding salaries, unusually long work hours, and shift work that negatively affected family and personal life results affects practice. Lack of opportunities for promotion, lack of professional prospects, and inappropriate compensation for hard work are crucial factors(28).

2.4 Conceptual frame work

Based on the literature review above different studies suggest practice of pre-hospital healthcare providers were affected by socio demographic factors, Facility related factors and Personal related factors.

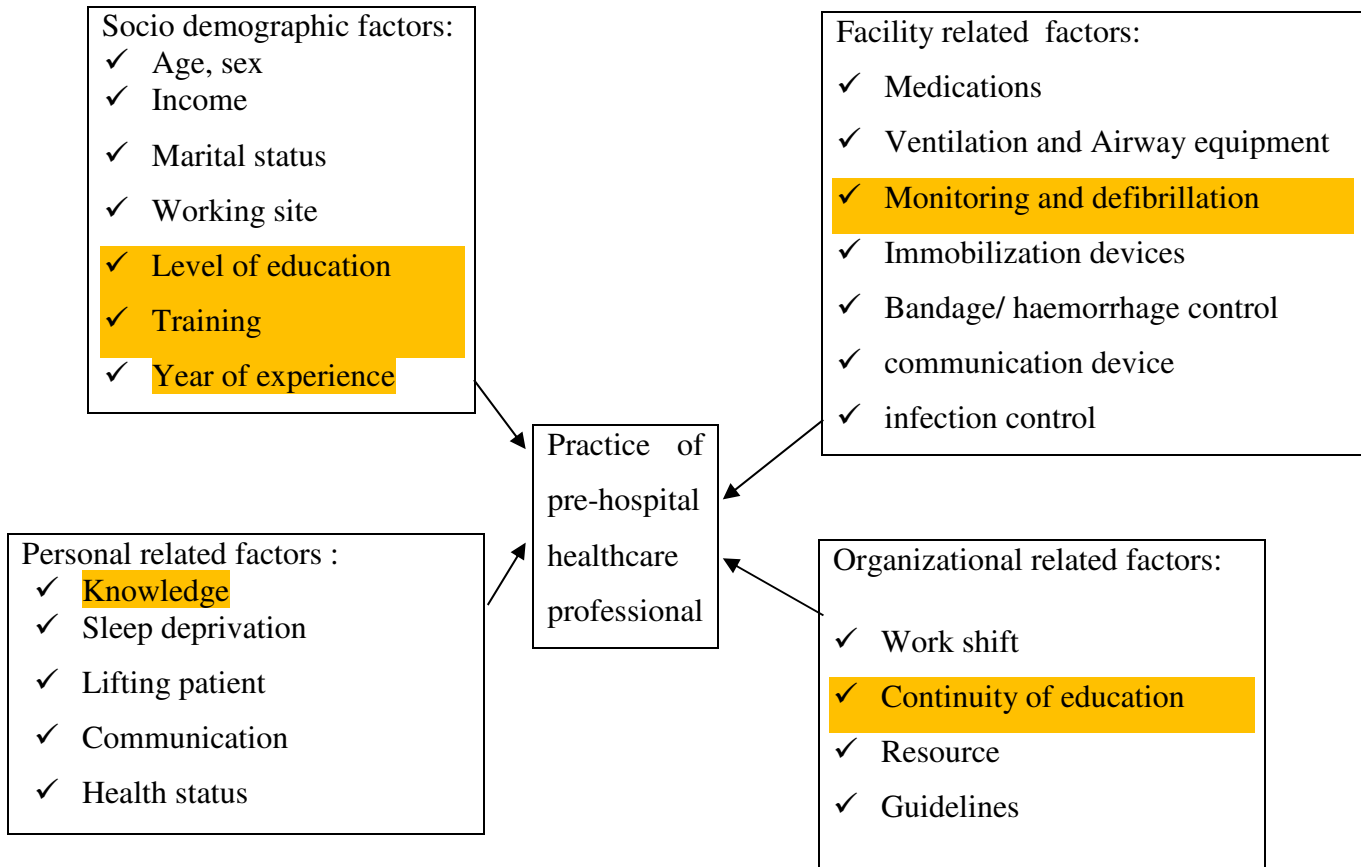


Figure1. The figure shows relationship between dependent variable with independent variables and was adapted and modified by reviewing of different literatures 2022 (3, 7, 18, 25)

3. OBJECTIVE OF THE STUDY

3.1 General objective

To assess practice of pre-hospital healthcare providers and associated factors with pre-hospital health care in Addis Ababa, Ethiopia 2022

3.2 Specific objective

1. To assess practice of pre-hospital healthcare providers with pre-hospital health care in Addis Ababa, Ethiopia 2022
2. To identify factors associated with practice of pre-hospital healthcare providers with pre-hospital health care in Addis Ababa, Ethiopia 2022

4. METHODS AND MATERIALS

4.1 Study design and period

An institutional-based Cross sectional study incorporated with observational study were conducted among pre-hospital healthcare providers at Addis Ababa fire and emergency prevention and rescue agency, Ethiopian Red Cross Addis Ababa branch, and tebita ambulance January 2022

4.2 Study area

The study was conduct in Addis Ababa city. Addis Ababa is a capital and largest city of Ethiopia with a population of 4.8 million and a place of Africa union. The health facilities in Addis Ababa were; Addis Ababa fire and emergency prevention and rescue agency (FEpra) was established at 1933 G.C at Arada sub-city and have 9 dispatch branches with three digit call number (939) and working with more than 165 healthcare providers(29).

Ethiopian Red Cross Society (ERCS) Ambulance and First Aid services delivery started 1952 G.C in Addis Ababa with the call number of three digits (907). Addis Ababa branch Red Cross was established in 1973 EC, Located in Lideta sub-city.now working with nine nurses and many volunteers.

Tebita ambulance Pre-hospital Emergency Medical Service is the first private pre-hospital emergency medical service providing company in Ethiopia. It was founded in 2008 and worked with 17 EMT and nurses with call number 8035. At those sites, pre-hospital healthcare providers, provide pre-hospital cares were more than 191 works in Addis Ababa, Ethiopia.

4.3 Population

4.3.1 Source population

All staffs who worked in Addis Ababa pre-hospital emergency medical service provider institution 2022

4.3.2 Study population

All pre-hospital healthcare providers worked in Addis Ababa, Ethiopia 2022.

4.4 Eligibility criteria

4.4.1. Inclusion criteria

All pre-hospital healthcare providers worked in Addis Ababa, Ethiopia 2022

4.4.2. Exclusion criteria

Pre-hospital healthcare providers who worked with less than six month work experience

4.5 Sample size determination

Sample size was calculated by using a single population proportion of practice of pre-hospital healthcare providers was 0.5(3), 95% confidence interval, the margin of error were take 0.05 rate =5%. The initial sample size was 384. By the following formula;

$$\begin{aligned} n_o &= (Z_{\alpha/2})^2 p (1-p) / d^2 \\ &= (1.96)^2 0.5 (1-0.5) / (0.05)^2 \\ &= 384 \end{aligned}$$

Where

n_o = number of the study subjects (initial sample size)

$Z_{\alpha/2}$ = is standardized normal distribution curve/value for the 95% confidence level (1.96)

p = 0.5 of population proportion because of behalf of my knowledge there was no published previous study done on the study population.

d = the margin of error taken (0.05 taken) rate = 5%

But the available population size of pre-hospital healthcare provider's in fire, Red cross, and tebita ambulance worked in Addis Ababa was approximately 191. Therefore the sample size needed rearrangement by the following formula.

Final sample size (n) = $n_o / (1 + (n_o/N)) + 10\%$ non response rate

$$\begin{aligned} &= 384 / (1 + (384/191)) + 10\% \text{ non response rate} \\ &= 128 + 128 * 10\% \\ &= 141 \end{aligned}$$

Where N = number of study population

To determine the required sample size for the second specific objectives was calculated on open Epi software using factors associated with practice of pre-hospital healthcare providers. By using the following assumption 95% confidence interval, 5% margin of error, and power of 80%.

Table1. Sample size calculation with different variables factors associated with practice of pre-hospital healthcare providers 2022.

Factors associated with practice of pre-hospital healthcare providers	Ratio	AOR	Sample size	No response rate	Final sample size
Having first aid training	1.1	6.16	113	$10\% \times 113 = 11.3$ $= 12$	125(3)
Having good Physical fitness	1.1	5.2	149	$10\% \times 149 = 14.9$ $= 15$	164(25, 26)

The calculated sample size for first objective was 141 and the calculated and maximum sample size of second objective was 164. Therefore maximum sample size was from both objective 164. But the population size was 191, which was manageable by census of PHCP for the final required sample size was 191.

4.6 Sampling procedure

Three pre-hospital health facilities provider were included. From these study two government health facilities (Addis Ababa fire emergency services have 165 study participant and Addis Ababa Red Cross had 9 study participant) and one private health facility (tebita ambulance had 17 study participant) were addressed. Then self-administered questionnaire was distributed to each facility to all PHCP (census) after observational checklist sample was taken. And observational sample was selected by using simple random technique.

4.7 Study variable

4.7.1. Dependent variable

Practice of pre-hospital healthcare professionals

4.7.2. Independent variable

- ✓ Socio demographic; (Age, sex, Income, Marital status, Level of education, working site, First training, work of experience)
- ✓ Personal related factors ;(Sleep deprivation, Lifting& moving patient, Communication with co-workers, health status, knowledge)
- ✓ Facility related factors; (Availability of Medications, Ventilation and Airway equipment, Monitoring and defibrillation, immobilization devices, bandage/ haemorrhage control, communication device, infection control)
- ✓ Organizational related factors; (Work shift, Continuity of education, resource, guideline)

4.8 Data collection tools and data collection procedure

4.8.1 Data collection tool

Data was collected by using structured self-administer questionnaire and observational checklist. The question form was in English and has three sections. First part of question sheet was design to capture socio-demographic characteristics, the second section of the question sheet was practice Inventory and the third section of question was used to assess factors; those were: Personal related factors, Organizational related factors, and facility related factors.

4.8.1 Data collection procedure

Before the data collection starts, data collectors were trained for one day regarding the approach, objective of the study and Ethical issue. Principal investigator was on clinical attachment during data collection period. There for data was collected with observational checklist by principal investigator during data collection period with patient care before self-administered questionnaires were distributed and all observational data was collected from participants who were worked on patient during data collection period and inform them after observational data were completed and taken consent. Self-administer Question sheets were distributed to Addis Ababa fire and emergency prevention and rescue agency, Ethiopia Red Cross society Addis Ababa branch, and tebita ambulance by 5 trained BSc nurses to pre-hospital healthcare providers from 10 Dec to 10 Jan 2021-2022 and data was collected accordingly.

4.9 Operational definitions and definition of terms

Pre-hospital healthcare providers are qualified health care providers characterized by perform BLS, ALS and lifting and moving of patients on pre-hospital area.

Emergency medical services are designed to rapidly treat and transport seriously ill or injured patients to the Emergency ED.

Basic Life Support (BLS) is non-invasive basic interventions and rapid transport to definitive health care facility. Interventions are usually basic and include non-invasive CPR, ventilation and oxygenation, stop bleeding, immobilization, and manual open airway, position patient, lifting and moving.

The Advanced Life Support (ALS) is includes all the BLS procedures with the addition of invasive procedures such as endotracheal intubation, intravenous line placement, fluid replacement, and the administration of controlled and potent medications.

Associated factors were factors that affect practice of pre-hospital healthcare providers.

Practice was assessed by participants who scored the mean and above the mean labelled as good practice, whereas participants who scored below the mean were labelled as a poor practice.

4.10 Data quality assurance

The supervisor was routine checkups for completeness and consistency of the data, Language clarity and Appropriateness of the tools. To ensure quality of the data, the questionnaires were adapted after different literature was reviewed based on research objective and checklist questionnaire was adapted and modified based on BLS and ALS guideline. Equipment availability questionnaire was adapted and developed from National minimum requirement for ambulance services (FMHACA Ethiopia). Before data collection pre-test was conducted at Nebiela ambulance service on 5% of the total sample size to check the reliability of the instrument, to estimate the time needed to collect data and to modify the questionnaire accordingly. The tool was checked for reliability (internal consistency) and completeness using the Cronbach's alpha coefficient was 0.70.

4.11 Data analysis

Data was cleaned, coded and enter in to Epi-data v4.4 and then export to SPSS version 26 for further analysis. Descriptive statistics including, table, figures, and frequency distribution was used to describe the data. A bi-variable and multivariable analysis was done using binary logistic regression model to see the out-come association between the dependent and

independent variables. Those variables with a p-value of ≤ 0.25 were transferred to multivariable analysis for identification of independent predictors. The Hosmer and Lemeshow goodness of fit was considered to check model fitness with $p=0.5$ and Multicollinearity was checked by variance inflation factor (VIF). An adjusted odds ratio with 95% C.I was used to measure the strength of association between dependent and independent variables. P-value < 0.05 was used to determine the level of statistical significance. Finally, the findings were presented using tables, text, and figures.

4.12 Ethical consideration

Ethical clearance was obtained from research Ethical committee of SPHMMC. Following this ministry of health, Addis Ababa health office were knew on study aim and objective and study permission was obtain and Formal letter was given to health institutions. Then a written consent was securing from the study Subjects through informed consent and the participants knew the right to withdraw any time from the study and no any harm was happened on the participants. The participant will have the right to benefit from the result of the study .The participants were assuring that the information gave was used only for the purpose of the study and confidentiality to be kept.

4.13 Dissemination of result

The result of this study will be disseminated to SPHMMC department of nursing and critical care for academics purpose, for Federal minister of health, for Addis Ababa health office and for pre-hospitals institutions involved in the study will be informed about the result of the study.

5. RESULT

5.1 Socio-demographic characteristics

Among 191 participants 178(94%) of participants were included in the analysis. The mean age of participants was 27.81 with a standard deviation of ± 4.012 . Majority of the participants were female 95(53.4%). From the respondents 130 (73%) were with the age of range of 25-35 followed by ≤ 24 age range with 41(23%). About 114(64%) were single participants and 64(36%) were married. Concerning the experience of pre-hospital healthcare providers in the pre-hospital care, 55(30.9%) of participants had an experience of ≥ 6 years but majority (77, (43.3%)) of participants had an experience of ≤ 3 years with the mean of 4.48 ± 2.851 . Most (119, (66.8%)) of participants were diploma nurse holders and the rest, 42(23.6%), 9 (5.1%) and 8(4.5%) were degree nurses, EMT, and masters nurses respectively. Concerning to monthly income, 131(73.6%) participants had monthly incomes ranges from 3201 to 5250 with the mean of 4983.57 ± 989.99 Ethio-birr. From the respondents 152 (85.4%), 17(9.6%) and 9(5%) were working in Addis Ababa fire, Tebita and Ethiopian red cross Addis Ababa branch respectively. About 126(70.8%) participants had first aid training of which 19(10.7%) of participants had first aid training within six months and 52(29.2%) never took first aid training (Table2).

Table2: Socio-demographic characteristics of pre-hospital healthcare providers working at Addis Ababa fire, Addis Ababa Red Cross and Tebita in Addis Ababa, Ethiopia, 2022.

S.No	Variable	Category	Frequency	Percent (%)
1	Sex	Male	83	46.6
		Female	95	53.4
2	Marital status	Single	114	64
		Married	64	36
		Others	0	0
3	Experience in PHCP	$\leq$ 3years	77	43.3
		5-4years	46	25.8
		$\geq$ 6years	55	30.9
4	Educational level	Diploma nurses	119	66.8
		Degree nurses	42	23.6
		EMT	9	5.1
		Masters nurses	8	4.5
5	Working site	A.A fire	152	85.4
		Tebita	17	9.6
		Red Cross	9	5
6	Age category	$\leq$ 24	41	23
		25-35	130	73
		$\geq$ 36	7	4
7	Monthly income category	3201-5250	131	73.6
		5251-7800	45	25.3
		>7800	2	1.1
8.	First-aid training	Yes	126	70.8
		No	52	29.2
9	If yes no 8, when?	Before 6 months	107	60.1
		Within 6 months	19	10.7

5.2 Organizational related factors

Of the total respondents who had worked per day $\leq$ 12 hours was 97(54.5%), and the rest 81(45.5%) were worked 13-24 hours with the mean of 17.37. Participants had opportunity of continuing education were 79(44.4%). On resource availability 151(84.8%) of participants said, worked site had good resource and of 178 respondents only 26(14.6%) of respondents said; pre-hospital guidelines were available.

5.3 Facility related factors

The participants worked with adequate drugs, ventilation and air way equipment and monitoring and defibrillator were only 67(37.6%), 78(43.8%) and 28(15.7%) respectively. and 173(97.2%),

177(99.4%), 155(87.1%), 138(77.5%) had adequate immobilization device, bleeding control device, communication device and infection protection device respectively.

5.4 Pre-hospital healthcare providers' practice with observational checklist

From fourteen observational checklist lower than half (43% (6/14) of the observational activities were performed properly by the participant. Among 178 participants 20 participants were included in observational checklist activities were selected by whom face patient care during data collection period and those 20 observed participant also included in self-administered practical questionnaire. Among 20 observed participant 60%(12/20), 65%(13/20), 75%(15/20), 80%(16/20), 75%(15/20) and 70%(14/20) were properly open airway, position patient, lifting and moving patient , measure patient blood glucose , stop bleeding and feel pulse rate respectively. And only 30%(6/20), 35%(7/20), 40%(8/20), 15%(3/20), 40%(8/20), 30%(6/20), 10%(2/20) and 40%(8/20) were properly insert airway, suction airway, ventilate and oxygenate, made laryngoscopy and intubation, open IV line , calculate fluid , gave IV drug and immobilize patient respectively (table3).

Table 3: Findings of the observational checklists (n = 20) in Addis Ababa pre-hospital healthcare providers 2022.

S.No	Variable	Performed correctly	Not Performed correctly
1	properly open airway and check breathing	12(60%)	8(40%)
2	properly insert airway	6(30%)	14(70%)
3	properly suctioning airway	7(35%)	13(65%)
4	properly ventilate/oxygenate patient	8(40%)	12(60%)
5	Properly perform laryngoscopy and endotracheal intubation	3(15%)	17(85%)
6	properly open IV line	8(40%)	12(60%)
7	properly calculate fluid	6(30%)	14(70%)
8	Gave IV drugs	2(10%)	18(90%)
9	Properly immobilize patient	8(40%)	12(60%)
10	Properly position patient	13(65%)	7(35%)

11	Properly lifting and moving patient	15(75%)	5(25%)
12	Measure patient blood glucose level	16(80%)	4(20%)
13	Properly stop bleeding	15(75%)	5(25%)
14	Properly feel pulse rate	14(70%)	6(30%)

5.5 Pre-hospital healthcare providers' practice with self- administered questionnaire

All of participants 178 (100%) had experience of practice of lifting and moving patients and of 178 participants 114(64%) were using proper body mechanics during patient lifting and moving. About 123(69.1%) of participants had good communication with co-workers and about 149(83.7%) of participants were perform properly basic life support but only 68(38.2%) of participants perform properly advanced life support. About 80(45%) of participants were apply properly quality of CPR (Table 4). And regarding the level of practice of participants on pre-hospital care; less than half of participants had good practice 74(42%) with (95%CI: 34.8-48.9) (figure 2).

Table 4: Pre-hospital healthcare providers' practices with self-administered questionnaire in Addis Ababa fire, the Ethiopian Red Cross Addis Ababa branch, and Tebita; Addis Ababa, Ethiopia, 2022.

S.No	Variable	Response	Response in number	Response in Percent
1	Do you have experience of Lifting and moving patient	Yes	178	100
		No	0	0
2	If yes do you use proper body mechanics	Yes	114	64
		No	64	36
3	Do you communicate properly with co-workers?	No	55	30.9
		Yes	123	69.1
4	Do you perform properly basic life support (BLS)?	Yes	149	83.7
		No	29	16.3
5	Do you perform properly advanced life support?	Yes	68	38.2
		No	110	61.8
6	Do you apply quality of CPR during patient arrest?	Yes	80	45
		No	98	55

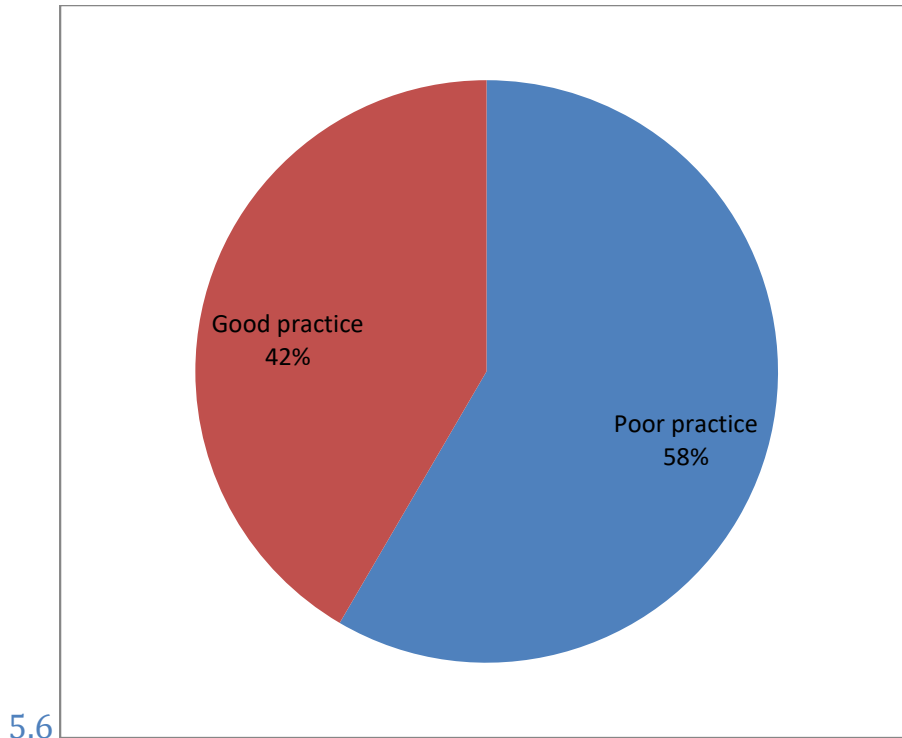


Figure 2: Level of practice of pre-hospital healthcare providers on pre-hospital Healthcare practice with self-administered questionnaire who worked at all specified site in Addis Ababa, Ethiopia, 2022.

Generally the practice of pre-hospital healthcare providers result from both measurement (observational checklist and self-administered questionnaire) were almost the same (43% and 42%) respectively. Which shows strengthen each other that was the practice of pre-hospital healthcare providers practice was poor (<50%).

5.7 Factors associated with practice of pre-hospital healthcare providers on pre-hospital care

After description of data, bi-variable and multivariable analysis was conducted using binary logistic regression model to assess the possible association of independent factors with practice of pre-hospital healthcare providers on pre-hospital healthcare. Those variables had a p-value of ≤ 0.25 in the bi-variable analysis were fitted to the final model (multivariable analysis). Variables transferred to multivariable analysis include; sex, had first aid training, perform properly ALS, rate of resource, availability of pre-hospital healthcare guideline, availability of ventilation and airway equipment, availability of monitoring and defibrillator, availability of communication device, availability of infection protection device, year of experience with pre-hospital care, and has opportunity of continuing education (Table5).

Table 5: Bi-variable logistic regression of factors affecting practice of pre-hospital healthcare providers to pre-hospital healthcare, Addis Ababa, Ethiopia, 2022

Variables	Category	Practice		p-value	COR (95% CI)
		Good	Poor		
sex	Male	42	41	0.023	2.017(1.101-3.694)
	Female	32	63	1	1
had first aid training,	Yes	66	60	1	1
	No	8	44	0.000	6.05(2.637-13.881)
Perform properly ALS	Yes	63	5	1	1
	No	11	99	0.000	0.009(0.003-0.270)
rate of resource	Good	67	84	1	1
	Poor	7	20	0.079	0.439(0.175-1.1000)
Availability of Guideline	Yes	17	9	1	1
	No	57	95	0.010	0.318(0.133-0.760)
Availability of ventilation and airway equipment	Yes	41	37	1	1
	No	33	67	0.009	2.250(1.223-4.138)
Availability of monitoring and defibrillator	Yes	21	7	1	1
	No	53	97	0.000	0.182(0.073-0.456)
Availability of communication device	Yes	66	89	1	1
	No	8	15	0.001	3(1.555-5.787)
Availability of infection protection device	Yes	61	77	1	1
	No	13	27	0.188	0.608(0.289-1.276)
year of work experience with pre-hospital emergency care	<= 3	13	64	1	1
	4-5	24	22	0.000	0.099(0.044-0.224)
	>=6	37	18	0.124	0.531(0.237-1.190)
opportunity of continuing education	Yes	60	19	1	1
	No	14	85	0.000	0.052(0.024-0.112)

A variable pass in multiple variable analysis ($p < 0.05$) were; performing properly advanced life support , Availability of monitoring and defibrillator , opportunity of continuing education, and year of working experience with pre-hospital care. Those variables were significantly associated with practice of pre-hospital healthcare practice. Properly performing advanced life support was 89 times more likely to have good practice than their counterparts (AOR= 88.99; 95%CI: 27.143-291.603). Likewise a participant had adequate monitoring and defibrillator was 5.83 times more likely to have good practice than who had not (AOR=5.829; 95%CI: 1.430-23.765). More over pre-hospital healthcare providers who had 4-5 years of work experiences were 5.86 times good practice than ≤ 3 years of experience (AOR=5.86; 95%CI: 1.424-24.109). The other variable that had significantly associated with good practice on pre-hospital healthcare was having opportunity of continuing education. Pre-hospital healthcare provides had opportunity of continuing education was revealed to have 32 times more likely to have good practice than their counterparts (AOR=31.953; 95%CI: 6.479-157.591). (Table 6)

Table 6: Multivariate logistic regression of factors affecting practice of pre-hospital healthcare providers to pre-hospital healthcare, Addis Ababa, Ethiopia, 2022

Variables	Category	Practice		p-value	COR (95% CI)	p-value	AOR (95% CI)
		Good	Poor				
Performing properly ALS	Yes	63	5	1	1	1	1
	No	11	99	0.000	0.009(0.003-0.270)	0.000	88.99(27.143-291.603)
Availability monitoring and defibrillator	Yes	21	7	1	1	1	1
	No	53	97	0.000	0.182(0.073-0.456)	0.014	5.829(1.430-23.765)
opportunity of continuing education	Yes	60	19	1	1	1	1
	No	14	85	0.000	0.052(0.024-0.112)	0.000	31.953(6.479-157.591)
year of work experience with pre-hospital emergency care	<= 3	13	64	1	1	1	1
	4-5	24	22	0.000	0.099(0.044-0.224)	0.014	5.86(1.424-24.109)
	>=6	37	18	0.124	0.531(0.237-1.190)	0.008	6.435(1.639-25.262)

6. DISCUSSION

This study was aimed to determine the level of practice pre-hospital healthcare providers on pre-hospital care and its associated factors. Based on self-administered practical questionnaire about 42% (CI%:34.8-48.9) of the participants were found to have good practice about pre-hospital care and based on observational checklist it was 43% which was almost the same, show strengthen each other that was pre-hospital healthcare providers practice were below 50% . performing properly ALS, Availability monitoring and defibrillator, more year of work experience with pre-hospital care and had opportunity of continuing education found to be significantly associated with practice of pre-hospital healthcare. The proportion of good practice regarding practice among pre-hospital healthcare providers working at Addis Ababa fire and emergency prevention and rescue agency, Ethiopian Red Cross society Addis Ababa branch and Tebita ambulance were found to be 42% (CI%:34.8-48.9) and 43% with self-administered questionnaire and observational checklist respectively. This finding was lower than previous studies conducted in Malang, Indonesia 75.4% (22) and the finding also supported by a study conducted in Free state, South Africa 48.8% (21) and some related study in Gondar, Ethiopia 49.5%(3).

The possible explanation for this discrepancy might be due to several reasons. Firstly, in Ethiopia most of the pre-hospital healthcare providers worked in the pre-hospital site was ≤ 3 years of experience and most of them were diploma nurse. Additionally, in pre-hospital settings most of pre-hospital healthcare providers received first aid trainings before long time (before 6 months). Moreover, the work hour per day was so long. This could contribute for poor practice of pre-hospital emergency care. And in Free State, South Africa it could be due to job dissatisfaction and more risky type of job and in Gondar, Ethiopia the same health system.

Participants who perform properly ALS results were 89 times more likely to have good practice compared to their counterparts (AOR= 88.99; 95%CI: 27.143-291.603). this study was significantly higher than previous study conducted in National hospital, Sri Lanka (10) and related study in Gondar, Ethiopia (3). This discrepancy may be due to this study conducted site include private pre-hospital site (Tebita ambulance services) And participants were per-hospital providers only unlike Gondar Ethiopia.

Pre-hospital healthcare providers who had opportunity of continuing of education were revealed to have 32 times more likely had good practice than their counterparts (AOR=31.953; 95%CI: 6.479-157.591).this study was significantly higher than, Studies conducted in free state, south Africa(21, 30) and Dares Salaam, Tanzania (AOR=2.3; 95%)(18).The possible evidence for this could be geographical and cultural difference

The other factor that independently associated with practice of pre-hospital healthcare providers on pre-hospital care was work experience. Pre-hospital healthcare providers who had 4-5 years of work experiences were 5.86 times good practice than ≤ 3 years of experience (AOR=5.86; 95%CI: 1.424-24.109) and. This finding significantly lower than study conducted in Malang, Indonesia(22), The possible explanation could be because Malang, Indonesia may their pre-hospital system began a long time before Ethiopia-then may had experienced workers and may had adequate resource, the more experience to a particular works and had adequate resource results good practice and this study was higher than studies conducted in Gondar, Ethiopia(3). This could be due to; this study was only done on pre-hospital site on pre-hospital providers, may had more pre-hospital training opportunity and also include private site.

Likewise, availability of monitoring and defibrillator was significantly associated with good practice of pre-hospital healthcare. participants who ware worked at sites of Available monitoring and defibrillator were found to have 5.83 times more likely to have good practice than their counterparts (AOR=5.829; 95%CI: 1.430-23.765). There were no Reports of previous studies conducted associated to those factors. The possibility explanation could be availability of monitoring and defibrillator helped the participant to use it any time when they need and knew patient's condition and support to intervene accordingly results good practice.

On the observational study: only 15% of participants had good practice to do laryngoscopy and intubation. This study was lower than study conducted in National hospital, Seri Lanka 31.4%(10). The possible explanation could be because of the less exposure to laryngoscopy and intubation results poor practice and in Seri Lanka study was done at hospital emergency site. And participants who had ability of IV cannulation and administering of IV drug ware 40%&10% respectively. This finding is more times lower than previous studies conducted in National hospital, Sri Lanka 71.4%(10). This discrepancy could be due to the study conducted site were different (hospital and pre-hospital).

7. CONCLUSION

This study determined most of pre-hospital healthcare providers' practices working on pre-hospital care were poor. and also identified factors increases the likelihood of good practice were performing properly ALS, availability of resource(monitring and defibrillator), work experience, and opportunity of continuing education were independently predictors of good practice of pre-hospital healthcare providers. Therefore, policymakers and health planners would be better establish pre-hospital healthcare teaching and training center based on pre-hospital healthcare guideline were recommended to Ministry of health and Ministry of education

Less than half of (43%) of the observed participants had good practice with pre-hospital healthcare. laryngoscopy and endotracheal intubation, IV cannulation, drug administration, fluid calculation, insert airway, suction airway, immobilization patient, and ventilation and oxygenation were improperly performed during observation.

8. STRENGTH AND LIMITATION OF THE STUDY

8.1 Strength

- ✓ This study was the first report that conducted among pre-hospital healthcare providers. Hence, it will help for further study in this area.
- ✓ Of this study; unlike descriptive cross-sectional study design; it is analytical cross-sectional study. This is able to use observational checklist and associated factors.
- ✓ And try to dig out associated factors that affect practice of pre-hospital healthcare providers.
- ✓ The study sample size was almost all population working at pre-hospital area

8.2 Limitation

- ✓ The study did not observe the practices of all study participants
- ✓ Problem of Ethical issue during collection of observational checklist sample
- ✓ Patients ethical issue was the major problem
- ✓ May had Subjectivity during observational checklist
- ✓ Difficult to get related study

9. RECOMMENDATION

➤ For pre- hospitals facilities:

- ✓ Establish the practice pre-hospital healthcare providers colleague together senior staff with junior staff members
- ✓ Establish system of Teaching and giving training of pre-hospital healthcare providers about advanced life support
- ✓ Establish having sustainable resource (monitoring and defibrillator)

➤ For researchers:

- ✓ Further researches were recommended to be conducted on pre-hospital healthcare professionals practice with observational checklist with more representatives of pre-hospital healthcare providers.

➤ For MOH and police makers

- ✓ Establish the way to get opportunity of continuing education
- ✓ Establish national guideline with pre-hospital practice

- ✓ Policymakers and health planners would be better establish pre-hospital healthcare teaching and training center based on pre-hospital healthcare guideline were recommended to Ministry of health and Ministry of education.

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11.ANNEXES

I. Information sheet

How are you, I am Azanaw Abebe, I am student in Saint Paul's Hospital Millennium Medical College and School of nursing, Department of Emergency and Critical Care Nursing specialty in paramedic science.

This study is to assess practice of pre-hospital healthcare professionals and identify associated factors with practice working in Addis Ababa fire and emergency prevention and rescue agency, Ethiopian Red Cross Addis Ababa branch and Tebita ambulance, Addis Ababa, Ethiopia.

This study helps to improve practice pre-hospital healthcare professionals (PHCP) and identify associated factors. Your participation is essential for the study to better understand practice of PHCP and to identify factor associated with practice. Your participation is voluntary and you do not have to answer any questions that make you feel uncomfortable. If you feel discomfort with question, please feel free to drop it anytime you want. Your name will not be on the survey so no one will know your answers. Everything you say will be kept private and confidential. If you have any difficulties regarding the questionnaire please don't hesitate to ask the data collector's and if have any concern or question regarding the research please contact Mr. Azanaw Abebe with thisphonenumber+251932913911.

II. Consent Sheet

The Questionnaire will take some minutes. Could I have your permission to continue?

1. If yes, signature _____
2. If no skip to the next participant by writing reasons for his/her refusal

The data collector consent

Name _____

Signature _____

III. Questionnaires

The questions in this study represent a wide range of experiences and concerns faced by the PHCP with practice. Adapted and modified from (3) and related guidelines and in Yes/ No questions **Yes** represent as 1(one) and **No** represent as 0(zero)

Part one: Socio-demographic characteristics	
1. Age	_____
2. Sex	1. Male 2. Female
3. Monthly Income in birr	_____
4. Marital status	1. Single 2. Married 3. Others
5. Level of education	1. EMT 2. diploma nurse 3. degree nurse 4. masters
6. working site	1. Addis Ababa fire facilities 2. Addis Ababa red cross 3. Tebita ambulance
7. Ever taking first aid Training	1. YES 2. No
8. If yes when?	1. before 6 months 2. Within 6 months
9. Year of experience	1. <=3 years 2. 4-5 years 3. >=6 years

Part two: practical related questionnaires	
1. Do you have experience of Lifting and moving patient	1. Yes 2. No
2. If yes do you use proper body mechanics?	1. Yes 2. No
3. Do you communicate properly with co-workers?	1. Yes 2. No
4. Do you perform properly basic life support (BLS)?	1. Yes 2. No
5. Do you perform properly advanced life support (ALS)?	1. Yes 2. No
6. Do you apply quality of CPR during patient arrest?	1. Yes 2. No

Part three: Organizational related factors	
1. How long is your work shift per day	1. ≤12 hours 2. 12-24 hours 3. ≥25 hours
2. Do you have opportunity for continuing education?	1. Yes 2. No
3. How would rate the availability of resource in your work place	1. Very good 2. Good 3. Average 4. Poor 5. Very poor
4. Do you have pre-hospital care guideline?	1. Yes 2. No

Facility related factors, Develop from National minimum requirement for ambulance services (FMHACA Ethiopia) 2016.

Part four: facility related factors	Yes	No
1. Do you have all Medications you need?		
2. Do you have all Ventilation and Airway equipment?		
3. Do you have Monitoring and defibrillator?		
4. Do you have all Immobilization devices?		
5. Do you have Bandage/ haemorrhage control?		
6. Do you have Communication device?		
7. Do you have Infection control device?		

Practical related observational checklist , Develop from BLS and ALS guideline and adapted from(3).

Part 6: Practical related observational checklist	Performed correctly	not performed correctly
1. Performing properly open airway & check breathing		
2. Performing properly insert airway		
3. Performing properly suctioning airway		
4. Performing properly ventilate/oxygenate patient		
5. Performing properly laryngoscopy and endotracheal intubation		
6. Performing properly open IV line		
7. Performing properly calculate fluid		
8. Performing properly to give IV drugs		
9. Performing properly immobilize patient		
10. Performing properly position patient		
11. Performing properly lifting and moving patient.		
12. Performing properly to measure blood glucose level		
13. Perform properly to stop bleeding		
14. Properly feel pulse rate		

IV. Assurance of principal investigator

I the undersigned agree to accept all responsibilities for the scientific and ethical conduct of the research project. I was provided timely progress report to my advisor and seek the necessary advice and approval from my primary advisors in the course of the research. I was communicating timely to my advisors all stakeholders involved in the study including any source of funding for this research.

Name of the candidate: _____

Signature: _____

Date: _____

Approval of the Primary Advisor

Name of the primary advisor: _____

Signature: _____

Date: _____

Approval of the Co-Advisor

Name of the primary advisor: _____

Signature: _____

Date: _____

Approval of the Examiner

Name of examiner: _____

Signature: _____

Date: _____