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RESEARCH THESIS ON

ASSESSMENT OF BASIC PRE HOSPITAL AMBULANCE CARE FOR PATIENTS TRANSPORTED FROM SCENE TO EMERGENCY DEPARTMENT HOSPITALS/HEALTH CENTERS OF ADDIS ABABA, ETHIOPIA

BY

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Declaration

I, the undersigned, declare that this is my original work and that all sources of materials used for this thesis are duly acknowledged.

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LIST OF ABBREVIATION AND ACRONYM

AED: Automatic External Defibrillator

BP: Blood Pressure

DNS: Dextrose in Normal Saline

BLS: Basic Life Support

ED: Emergency Department

EMS: Emergency Medical System

EMT: Emergency Medical Technician

EMCC: Emergency Medicine and Critical Care

GCS: Glasgow Coma Scale

IV: Intra Venous

IM: Intra Muscular

LMICs: Low Middle Income Countries

MSc: Masters of Science

MOH: Ministry Of Health

NS: Normal Saline

NGO: None Governmental Organization

PPE: Personal Protective Equipment

PO: Perouse

PR: Pulse Rate

RTA: Road Traffic Accident

RBS: Random Blood Sugar

RR: Respiratory Rate

$SPO_{2:}$ Partial Oxygen Saturation

T^{O}: Temperature

TASH: Tikur Anbesa Specialized Hospital

ABSTRACT

Back ground: Emergency medical services (EMS) system are a community's gateway to acute and emergency medical care for members of the public facing time sensitive condition, critical illness and injury.

Objective: This study is aimed to assess basic pre hospital ambulance care for patients transported from scene to emergency department hospitals/health centres of Addis Ababa, Ethiopia, 2018.

Methods: An ambulance based cross sectional study was conducted prospectively for patients transported with emergency ambulance service from scene to emergency department from March 15-April 15, 2018 with observational check list for one month duration. The data was entered to epi data version 3.1 and analysed using SPSS version 20 software. Frequency, percentage, mean, median and standard deviation were used to describe the data using tables and figures.

Result: one hundred twenty patients transported with ambulance from scene were included. From total assessed level of consciousness (n=118), 28(23.3%) patients were lost their consciousness out of them oral airway were applied only for 3(10.7%) patients. Circulation was assessed for 74(61.7%) patients among them 8 had cardiac arrest CPR were done for 6(75%) of them but no adrenaline drug. From (N=120), 44(36.7%) patients had bleeding but only for 23(52.2%) of them was tried to stop bleeding and out of 41(34.2%) trauma patients 5(12.1%) patients were applied c collar but majority 36(87.9) patients weren't. In this study more than half of 64(53.3%) patients hadn't documented their findings .Over all 69(57.7%) patients did not receive at least one of the necessary basic prehospital medical cares.

Conclusion and recommendation: lifesaving procedures like manual airway opening, cardiopulmonary resuscitation, vital sign measurements, emergency drug administration, and stop bleeding as well as spinal immobilization were not performed adequately. Emergency professional inside ambulance, emergency physician consultation during transportation and performing administrative inspections may improve prehospital care.

Key words: scene, response interval, basic prehospital care, TASH

1. INTRODUCTION

1.1 Back Ground

Emergency medical services (EMS) system are a community's gateway to acute and emergency medical care for members of the public facing time sensitive condition, critical illness and injury (1). The medical care that delivered is time dependant for each action , starting from the place injury occurred (scene), during transportation via ambulance and care in health facility (2).

Pre hospital care constitutes an important link of emergency care continuum for a patient transported to hospital and will increase survival rate (3). As development of acute and emergency care in sub-Saharan Africa expands, there is a strong need to improve the delivery of prehospital care to help relieve the overwhelming regional morbidity and mortality attributable to time-sensitive, life-threatening conditions (3).

Emergency medical system encompasses different disease either in acute case like trauma injuries, obstetrical and other medical (surgical) emergencies or chronic complication like HIV/AIDS and other oncologic emergencies so it is difficult to define the burden of diseases addressed by emergency medical system. For example injuries alone accounted for 14% of the burden of disease among adults in 2002(4). Since more than 80% of all deaths resulting from injury occur in low- and middle- income countries, injuries are a significant contributor to the disease burden that is amenable to emergency care (5).

When pre hospital transportation is poor or absent, deaths that could have been prevented even by inexpensive procedures occur (3).Though ambulance care is as such important, there is a paucity of researches in Ethiopia which shows quantity and quality of care given in the ambulance. Therefore, this paper tries to assess basic prehospital medical care for trauma and non-traumatic patients that transported by emergency ambulance from scene to emergency department with private (non-governmental) or governmental ambulance.

1.2 Statement of the Problem

The global burden of road traffic injuries (RTIs) is growing constantly, with approximately 1.2 million people killed and 20–50 million people injured each year; Eighty percent of road traffic deaths occur in middle income countries, which account for 72 % of the world's population; The risk of dying as a result of a road traffic injury is highest in Africa (24.1 per 100 000 population) (6).When these tragic and traumatizing large-scale events occur, the public expects emergency medical care to be available quickly – to save lives, to treat pain and to lessen the fear of those involved by letting them know help has arrived.

In Ethiopia, road traffic collisions are responsible for almost 4000 deaths annually (7). But we do not know how many of people are dying due to acute cases like air way obstruction, massive haemorrhage, tension pneumothorax and so on. Similarly, we are blind whether time sensitive illnesses due to coronary heart diseases, hypertensive emergencies, stroke and other illnesses which need prompt diagnosis and intervention by well-trained paramedics inside ambulance have got basic pre hospital care.

The availability and efficacy of an adequate pre-hospital care system in Ethiopia is very limited though access to pre-hospital services and quick evacuation and transport to hospital can save many lives, since the majority of those who die before they reach a hospital (6)

Skilled and motivated personnel, adequate medical equipment, supplies and drugs, coordination, effective communication and ambulance management that are oriented towards the needs of the critically ill all contribute to making emergency care effective in reducing death and disability. When there is decreased survival rate due to poor medical care among patients transported by the ambulance, community trust for the ambulance care may decrease and affect the future ambulance utilization.

Ethiopia is one of the developing countries from east Africa with new growing of emergency care at the scene and during transportation with ambulance. There are limited Emergency Medical Technicians (EMTs) and no certified Paramedics who possibly work inside ambulances. And, also there is no medical oversight by experienced emergency physicians and nurses as a

consultant during transportation. Though there are different prehospital care ambulances from governmental and non-governmental dispatch centres, most still works with untrained ambulance crews and poor ambulance system.

1.3 Significant of the Study

Pre hospital ambulance care is the main important gate to start saving life of a patient on the way before reaching at hospital. This study was mainly focused on the overall patient medical care given inside ambulance with specific time interval to increase life survival before reaching at hospital. Knowing the gap is important to equip with updated knowledge and practice through trainings and other short course programs.

The overall finding will also pave the way for further research.

2. LITERATURE REVIEW

Pre hospital care is a care provided at a place where injury occurred and/or during ambulance transportation to hospital for definitive care. Pre-hospital care should comprise basic strategies with proven effectiveness, such as accessible and rapid transportation and the deployment of personnel with basic life-support skills (8).

Basic life support assumes the management of injured patients by noninvasive methods. The principles of Basic Life Support assume release of the airway, oxygen supplementation, cardiopulmonary resuscitation, and stopping of the external bleeding, immobilization of the fractures and of the spine. The main goal of the BLS is to maintain cardiac and respiratory function during patient's transportation to the trauma center, without causing further damage(9).

2.1 Paramedics and Response time

There is little published literature on the impact of first responders. One study in northern Iraq and Cambodia evaluated a programme designed to train a core group of paramedics; these paramedics then trained thousands of laypeople to act as first responders. The study demonstrated a significant reduction in mortality from injury among populations with a high prevalence of injury (10, 11). There are no studies comparing the effectiveness of lay responders with that of trained paramedics. In Ghana, it was demonstrated that commercial taxi and minibus drivers trained in first aid could provide effective pre-hospital care (12).

In most middle-income countries, and some cities in low income countries, trained paramedics render pre-hospital care (13). In most of sub-Saharan Africa and Asia, paramedical personnel (and ambulances) are used only to transfer patients between health facilities and not from the scenes of injury or from their homes (14).The level of training of paramedical personnel should be appropriate to the provider. Some evidence has shown that training paramedics in basic life-saving skills improves patients' outcomes (15). There is no evidence to support training paramedics in advanced life-saving skills (16).

Where paramedical personnel already exist as part of the emergency medical system, their numbers and organization (location, training, deployment and supervision) should be enhanced

to improve response times and patients' outcomes. Effectiveness has been demonstrated for well-placed dispatch sites in urban populations where vehicles and personnel can be deployed most efficiently (15). The recommended ratio of 1 team to 50,000 people suggested by Mc Swain results in response times as low as 4–6 minutes (17).

A retrospective study conducted in Iran, response time for RTA patients in city areas was with a mean of 5 minute compared with 10.5 minute for interurban road locations (18). Traffic congestion, poor maps, poor road signs and limited road access May all increase response times in cities with poor infrastructure. (Response time is measured from the time a call activates the emergency medical system until the team arrives on the scene). In Monterrey, Mexico, an area with a ratio of 1 team per 100,000 people, the average response time was 10 minutes, while in Hanoi, Viet Nam, five teams dispatched from one station that are expected to serve 3 million people (1 team per 600 000 people) have recorded an average response time of 30 minutes (3).

2.2 Primary survey

2.2.1 Airway assessment

During the prehospital care of trauma victims, as much as 66%-85% of preventable deaths occur by airway obstruction (19). The airway management is of paramount importance in patients with traumatic brain injury, cervical spine lesions, chest trauma and for any patient with Glasgow comma scale <8 for those to open the airway by lifting the chin and jaw thrust manoeuvres, to aspirate the oropharynx and to introduce the nasopharyngeal or oropharyngeal tubes (9).

A study conducted in Turkey in 2015, out of 873 patients transported with ambulance 13 patients with Glasgow Come Scale (GCS) 8 and under did not receive any interventions for protecting airway safety (20).In 2008, Stiell et al. presents 598 patients with cerebral trauma and GCS<9: the survival rate was lower in patients with Advanced Life Support (including endotracheal intubation) as compared to patients with Basic Life Support (51.2% versus 60.1%) (21). The high level of mortality and lack of benefits for trauma patients due to prehospital endotracheal intubation can be explained by temporary hypoxia and bradycardia during the time of rapid intubation(22).

2.2.2 Respiratory evaluation

Oxygen application for patients with respiratory distress is one of the easiest and basic interventions. A study conducted in Turkey revealed that 28% of 25 patients with oxygen saturation below 90%, did not receive oxygen(20).

Ventilation must be assisted when a patient has a hypoventilation due to superficial breathing or to decreased respiratory rhythm under 10/minute (23). Positive pressure ventilation may enlarge a tension pneumothorax. This condition requires a quick pleurotomy with chest drain tube or, at least, needle decompression in the second intercostal space – these manoeuvres have to be performed by trained personnel (22).

2.2.3 Circulation evaluation

Hemodynamic instability is a very often used term, but quite little understood. Systolic blood pressure of 100 mm Hg may be a normal value for 20 years old patient but very low for a 75 years old trauma victim(24). In 1994, Bickell et al. reports 598 patients with penetrating trunk wounds and blood pressure less than 90 mmHg – 309 (62%) of them received standard volemic resuscitation therapy both in pre-hospital stage as well as in hospital. 289 patients received intravenous fluids only after they reached the Operating Room – delayed volemic resuscitation. These last patients registered a higher survival rate (70% versus 62%, p=0.04), a lower complications rate (23% versus 30%, p=0.08) and a shorter hospitalization time (25).

Most of the bleedings can be stopped by direct pressure over the haemorrhagic area. If this manoeuvre is not solving the problem, than a tourniquet should be immediately applied on the proximal segment (9). Femoral fracture immobilization can decrease the blood loss on the site of the fracture(23). A study conducted in Turkey revealed that , Out of 15 patients with initial fracture diagnosis only 4 had inflatable splint implemented and 13 (72.2%) patients had bleeding control out of 18 patients with bleeding due to trauma (20).

Early recognition of sudden cardiac arrest and proper management of the patient can prevent irreversible damages (26). A study conducted in turkey in 2015, out of 873 patients transported with ambulance five patients with cardiac arrest all of them had IV line but only two (33.3%) had

cardiopulmonary resuscitation (CPR), one (20%) was intubated, one (20%) received adrenaline (20).

2.2.4 Assessing the level of consciousness and cervical spine protection

The paramedic or trauma team leader should start the conversation with the victim with: "My name is ... . We are here to help you. Can you tell me what happened?". Depending on how the patient answers the rescuers may assess the status of consciousness and the airway patency (27).

The patients with traumatic brain injuries seem to benefit most from the prehospital stabilization, because in this group of patients the hypoxia aggravates the neurological injury. In a group of patients with traumatic brain injury and Glasgow Coma Scale < 8, the mortality was 23% in patients stabilized on the scene (including endotracheal intubation) and 50% of those approached according to "scoop and run" protocol (endotracheal intubation in the hospital) (28).

Spinal immobilization should be done for the entire column and not just for the cervical spine, by setting the victim on a rigid stretcher for transport(23). A study conducted in Turkey out of 120 patients who needed spinal immobilization 69 (57.5%) had spinal board and cervical collar usage was 65.1% for the trauma patients(20).

2.2.5 Exposure

Hypothermia can lead to death for trauma patient due to vasoconstriction effect. So careful recording of vital sign and covering with blanket is necessary measurement (23). A study in Turkey during ambulance transportation, Temperature measurement (88.4%) was the most lacking vital sign and it can be lifesaving for some patients (hypothermia or hyperthermia etc.) (20).

3. OBJECTIVES

3.1 General Objective

- To assess basic pre hospital ambulance care for patients transported from scene to emergency department hospitals of Addis Ababa, Ethiopia, 2018.

3.2 Specific Objectives

- To determine Ambulance response time from dispatch to scene, at the scene and from scene to hospital
- To investigate ABCDE abnormality and management given.
- To describe vital sign derangement

4. METHODOLOGY

4.1 Study Area and Period

The study was conducted in Addis Ababa capital city of Ethiopia with an attitude of 2300 m above sea level. The city is divided into 10 sub cities and 99 woredas. In Addis Ababa there are 37 hospitals (two NGO, twelve governmental, and twenty three private hospital), 29 Health centres, 116 private not for profit and 357 private for profit clinics. There are also three major organizations which give pre-hospital ambulance service. These are Fire and Emergency Response Authority (governmental), Addis Ababa Red Cross Society (non-governmental), Tebita private ambulances. The study was conducted from March to April 2018 in the ambulance stations of fire and emergency as well as Tebita private ambulance company. Fire and emergency have 8 branches with 33 ambulances but 13 are functional and Tebita has one dispatch centre with 11 ambulances.

4.2 Study Design

An ambulance based cross sectional study was conducted prospectively during study period.

4.3 Source population

All Fire and Emergency response authority and Tebita Ambulance patients

4.4 Study Subjects

All Patients who were transported by fire and emergency response authority, and Tebita ambulance from scene to the ED of hospitals/health centres of Addis Ababa

4.5 Sampling technique

Fifty percent of functional ambulance was selected from Fire and Tebita (equal proportion from both institutions) 7 functional ambulance from Tebita and 6 functional ambulance from fire. A purposive sampling method was used to select the dispatch centres based on high flow of call from the community. My sampling unit was dispatch centre to get ambulance station. Finally using a convenient sampling method to enrol study subjects, all patients who were transported from scene during study period was studied. Three dispatch centres from fire and emergency response authority were selected based on flow of call and Tebita private ambulance dispatch centre. For sake of feasibility and to increase number of patients including weekend time had been assessed.

4.5 Inclusion and Exclusion criteria

4.5.1 Inclusion criteria

- ☞ Patients transported by Fire and Tebita ambulances from scene to emergency department of hospitals/health centres in Addis Ababa, Ethiopia

4.5.2 Exclusion criteria

- ☞ Patients who uses Fire and Emergency Response Authority and Tebita ambulance for inter-facility referrals and diagnostic purpose
- ☞ Patients who uses Fire and Emergency Response Authority and Tebita ambulance during night time

4.6 Data Collection Procedure

A structured observational check list was conducted inside ambulance from dispatch centre to scene and from scene to emergency department hospital by data collectors who were educated and trained in emergency medical care. The data collectors were waiting at the dispatch centre and went with ambulance if the call was from scene and the checklist was filled inside ambulance during patient care.

4.7 Study Variables

4.7.1 Dependent variable

- Airway, breathing, circulation, disability and exposure (ABCDE) assessment and intervention

4.7.2 Independent variable

- ⧫ Response time
- ⧫ Vital sign derangement
- ⧫ Branch of service giver ambulance

4.8 Data Analysis and presentation

The data was checked for its completeness and entered to epi data version 3.1 and analysed using SPSS version 20 software with 95% CI. Frequency, percentage, mean, median and standard deviation were used to describe the data using tables and figures

4.9 Data Quality Management

Data quality was assured before, during and after data collection process

Before data collection: objective based and standardized English check list was prepared. Training had been given for supervisor and data collectors on sampling procedures and data collection process.

During data collection: there had been a close day to day supervision in the data collection process. The check list was checked to ensure completeness.

After data collection: first data was cleaned, coded and then entered into Epi data then double data entry was done in the epi data to check for consistency then the entered data was exported in to SPSS for analysis.

4.10 Operational Definition

- Airway blocked partially: having any secretion, blood, foreign matter that block airway passage but patient tries to breath.
- Airway blocked completely: having any secretion, blood, foreign matter that block airway passage and a patient becomes unconscious or not breath at all.
- Have no breathing : no chest movement or rise or no air sound when auscultating lung or no air pressure when tried to feel with hand at patient mouth
- Unconscious patient: when a patient respond to Pain or Unresponsive
- Conscious patient: when a patient alert or respond to voice
- Have difficulty of breathing: when a patient used accessary muscle for breathing purpose like sub costal, intercostal and abdominal muscles
- Basic pre hospital care: assessing and make intervention in each ABCDE problems
- Response time interval: from call activation till ambulance arrives at a scene
- On scene time interval: ambulance arrives at scene and do any procedure
- Transport time interval: the time from scene leave till ambulance arrives at hospital
- Total trip time: from call activation till a patient arrives at hospital
- Total trip distance: the distance from the dispatch centre to hospital including scene distance
- Functional ambulance: an ambulance that gives service for patients during data collection time

4.11 Ethical Consideration

The ethical approval for this study was obtained from emergency medicine and permission letter was written for Fire and emergency and for Tebita ambulances.

4.12 Dissemination of Results

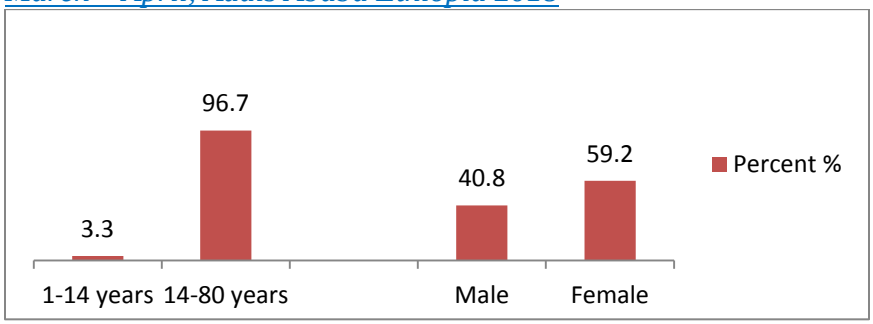
The final report of this study will be submitted to college emergency medicine department, fire and emergency rescue ambulance and Tebita ambulance. Efforts will also be made to disseminate the result through publication and presentation in scientific conferences.

5. RESULTS

5.1 Socio demographic characteristics

Out of 120 patients who transported with ambulance from scene to emergency department, 71(59.2%) were females and 49(40.8%) were males. The average age of patients (range 15-80years) were 33±16 years. (Fig 1)

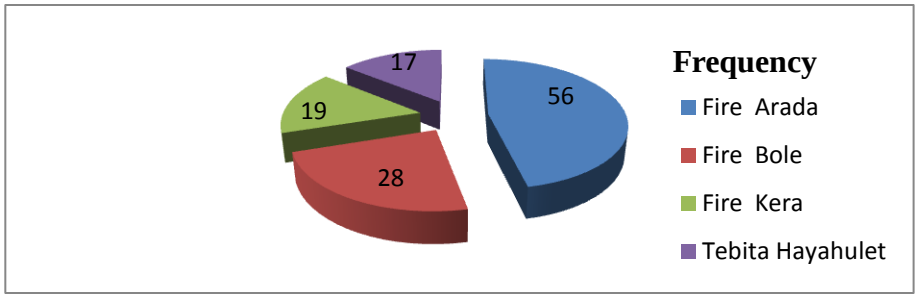
Figure 1 Socio demographic characteristics of patients transported from scene to ED from March – April, Addis Ababa Ethiopia 2018



5.2 Ambulance service provider

Majority of call from scene were from fire and emergency rescue authority at Arada branch 56(46.6%) followed by bole branch 28(23.3%). (Fig 2)

Figure 2 Ambulance service provider from March – April, Addis Ababa Ethiopia 2018



5.3 Number of casualty, Time and distance assessment

There was multiple causality accident with RTA in five different places at different time; one with two and other with three peoples were injured at the same time.

In day time data collection out of all calls (N=120), around 36(30%) of calls were during morning (2:00-4:00) followed by 30(25%) of calls during afternoon (8:00-11:00) time respectively.

During this period for N=120 calls from the patients; response time were with mean of 12.6±9.7minute; after arriving in the place of injury, ambulance was started to go to destination place within a mean of 7.7±5.8 minute and patients arrived at hospital within a mean of 19±11 minute and the total trip time was mean of 39.3±17.5 minute with mean distance of 9±7 Km. (Table 1)

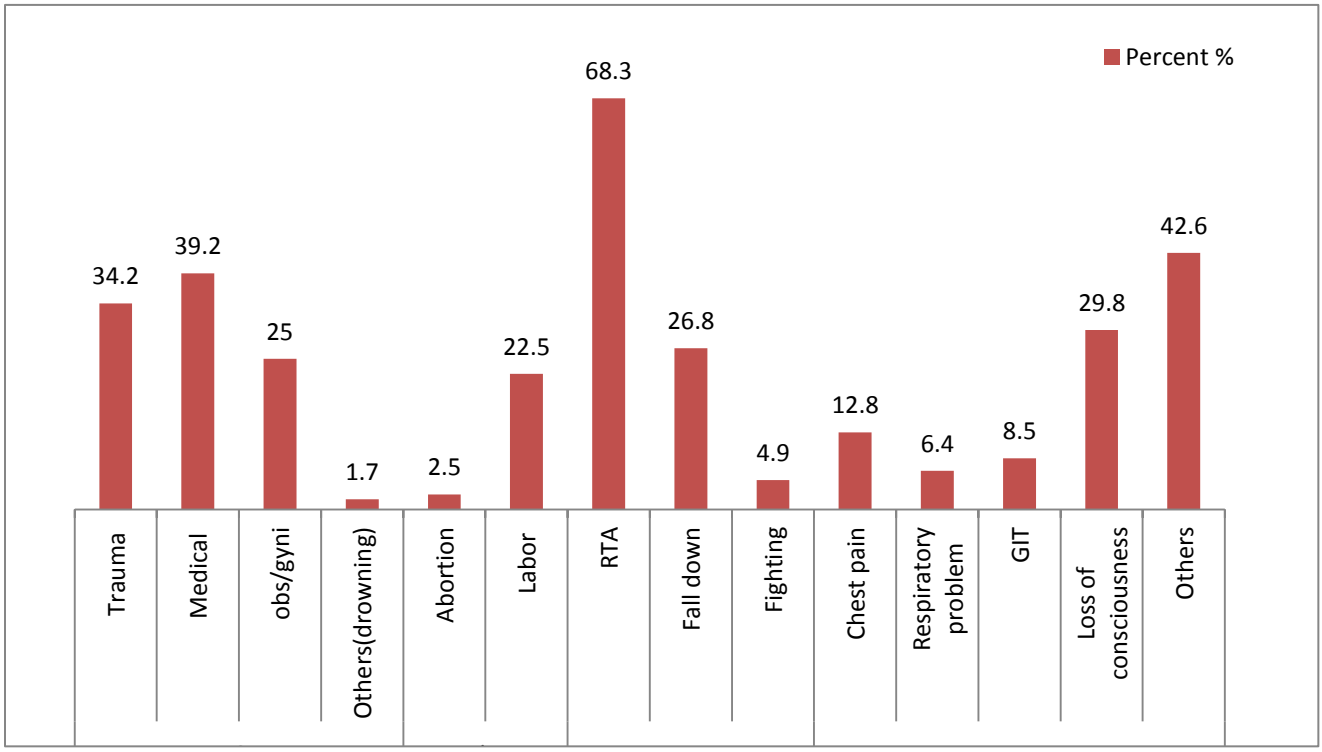
Table 1 Time and distance assessment for patients transported from scene to ED from March – April, Addis Ababa Ethiopia 2018

N=120		**Frequency**	**Percent**				
Number of causality at scene	One	115	95.8				
	Two	2	1.7				
	Three	3	2.5				
Time of call	**N= 120**	**Frequency**	**Percent**	**Mean**	**SD**	**Min**	**Max**
1:58-4:00 A.M		36	30				
4:00-6:00 A.M		28	23.3				
6:00-8:00 PM		26	21.7				
8:00-11:00 PM		30	25				
Response time interval	**N =120**	**Frequency**	**Percent**	**Mean**	**SD**	**Min**	**Max**
<8 min		21	17.5	12.6	9.7	2	55
8-15 min		26	21.7				
15-35 min		60	50				
35-55min		13	10.8				
On scene time interval	**N= 120**	**Frequency**	**Percent**	**Mean**	**SD**	**Min**	**Max**
<5 min		57	47.5	7.7	5.8	1	27
5-10 min		34	28.3				
>5 min		29	24.2				
Transport time interval	**N =120**	**Frequency**	**Percent**	**Mean**	**SD**	**Min**	**Max**
<10 min		31	25.8	19	11	1	54
10-20 min		45	37.5				
21-40 min		26	21.7				
>40min		18	15				
Total trip time	**N= 120**	**Frequency**	**Percent**	**Mean**	**SD**	**Min**	**Max**
<30 min		43	35.8	39.3	17.5	7	89
30-45 min		39	32.5				
>45 min		38	31.7				
Total trip distance	**N =120**	**Frequency**	**Percent**	**Mean**	**SD**	**Min**	**Max**
<10km		84	70	9	7	1	33
10-20km		27	22.5				
>20km		9	7.5				

5.4 Nature of cases

From total (N=120) nature of case, medical was the most dominant one with a value of 47(39.2%) next trauma 41(34.2%). From trauma RTA was the one with highest rate 28(68.3%) this proceeded by fall down accident 11(26.8%) and from medical case loss of consciousness was 14(29.8%) proceeded by chest pain 6(12.8%). (Fig 3)

Figure 3 Nature of cases of patient transported from scene to ED from March – April, Addis Ababa Ethiopia 2018



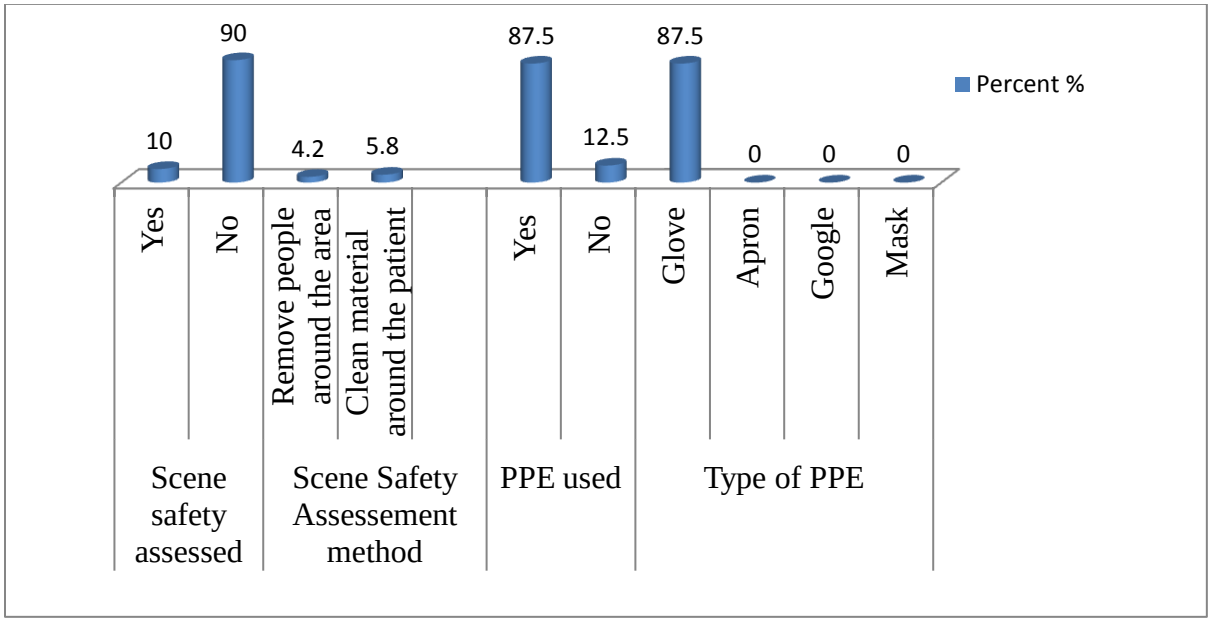
Keys: others (other medical illness like seizure, poisoning, known hypertensive, DM ….)

5.5 Scene safety assessment

Scene safety was almost not done by ambulance crew; from total call (N=120), only 12(10%) of the areas was assessed for safety by removing material and people around the injured victim but 108(90%) were not assessed for any hazardous environment.

From (N=120) patients, personal protective equipment (only glove) was used for 107(87.5%) of patients. (Fig 4)

Figure 4 Scene safety assessment of patient transported from scene to ED from March – April, Addis Ababa Ethiopia 2018



Keys: PPE (personal protective equipment)

5.6 Primary (ABCDE) assessment and emergency treatment given

5.6.1 Airway assessment and management given

From (N=120), air way was assessed for 112(93.3%) patients out of them 102(85%) had clear airway, 8(6.7%) partly blocked airway and 2(1.7%) had completely blocked airway but out of blocked airway only 2(20%) patients were suctioned.

From total assessed level of consciousness (n=118), 28(23.3%) patients were lost their consciousness but manual airway maneuver were done for 12 (42.8%) and oral airway were applied only for 3(10.7%) patients respectively. out of 41(34.2%) trauma patients majority 36(87.9%) patients weren't applied c collar. (Table 2)

Table 2Airway assessment and management given for patients transported from scene to ED from March – April, Addis Ababa Ethiopia 2018

	N=120	Frequency	Percent %
Airway assessed	Yes	112	93.3
	No	8	6.7
Status of airway	Clear	102	85
	Partly blocked	8	6.7
	Completely blocked	2	1.7
Blocked with	Secretion and blood	8	80
	Foreign body	0	0
	Laryngeal spasm	2	20
Suctioned	Yes	2	20
	No	8	80
If trauma patient "c" collar applied	Yes	5	12.1
	No	36	87.9
Manual airway maneuver done for unconscious patient	Yes	12	42.8
	No	16	47.2
Oral airway protection for unconscious patient	Yes	3	10.7
	No	25	89.3
Nasopharyngeal protection for conscious patient	Yes	0	0
	No	76	63.3

5.6.2 Breathing assessment and management given

In the case of breathing assessment out of N=120 patients almost all patients 118(98.3%) were assessed breathing status from these 112(93.3%) of patients were had breathing activity and 6(5%) didn't have breathing. Out of patients that hadn't breathing (n=6) only for 2(33.3%) patients were ambubag used to assist ventilation.

In addition to this among breathing assessed patients (n=118), 47(39.2%) were had difficulty of breathing among these 36(76.5%) were got oxygen initially and 11(23.5%) didn't. (Table 3)

Table 3 Breathing assessment and treatment given for patients transported from scene to ED from March – April, Addis Ababa Ethiopia 2018

	N=120	Frequency	Percent %
Breathing assessed	Yes	118	98.3
	No	2	1.7
Have breathing	Yes	112	93.3
	No	6	5
Ambubag used for no breathing activity	Yes	2	33.3
	No	4	66.7
Have difficulty of breathing	Yes	47	41.9
	No	65	58.1
Oxygen given initially	Yes	36	76.5
	No	11	23.5
Intra nasal	<6 liter/min	30	83.3
	>6 liter/min	4	11.1
Face mask	>6 liter/min	2	5.5
	<6 liter/min	0	0

5.6.3 Circulation assessment and management given

Out of (N=120), Circulation was assessed for 74(61.7%) patients among them 8(10.8%) were cardiac arrest initially, for 6(75%) of patients were CPR done but no AED.

From all (N=120) patients, 44(36.7%) had bleeding among them for 23(52.2%) of patients were tried to stop bleeding and IV fluid was given for 20(45.4%) of patients. (Table 4)

Table 4 Circulation assessment and treatment given for patients transported from scene to ED from March – April, Addis Ababa Ethiopia 2018

	N=120	Frequency	Percent %
Circulation assessed	Yes	74	61.7
	No	46	38.3
cardiac arrest	Yes	8	10.8
	No	66	89.2
If Cardiac arrest CPR done	Yes	6	75
	No	2	25
AED used	Yes	0	0
Is any bleeding part	Yes	44	36.7
	No	76	63.3
Bleeding arrested	Yes	23	52.2
	No	21	47.8
IV fluid given	Yes	20	45.4
	No	24	54.6
Type of IV fluid	Normal saline	19	95
	Ringer	0	0
	DNS	1	5

5.6.4 Disability assessment and treatment given

From total (N=120), level of consciousness was checked for 118(98.3%) of patients out of them 74(61.7%) were alert, 16(13.3%) were response to voice, 12(10%) were response to pain and 16(13.3) were unresponsive respectively but RBS was checked for only one patient.(Table 5)

Table 5 Disability assessment and treatment given for patients transported from scene to ED from March – April, Addis Ababa Ethiopia 2018

	N=120	Frequency	Percent %
Disability assessed	Yes	118	98.3
	No	2	1.7
Casualty responsiveness	Alert	74	61.7
	Response to voice	16	13.3
	Response to pain	12	10
	Unresponsive	16	13.3
RBS checked	Yes	1	0.8
	No	119	99.2

5.6.5 Exposure assessment and management given

From (N=120) patients, only 12(10%) patients were exposed and assessed their body parts for any emergency finding out of them 8(66.6%) were covered their body to prevent hypothermia. and from trauma patients (n=41) only for 4(9.7%) patients were log roll done but 37(92.3%) weren't. (Table 6)

Table 6 Exposure assessment and management given for patients transported from scene to ED from March – April, Addis Ababa Ethiopia 2018

	N=120	Frequency	Percent %
All body exposed and assessed	Yes	12	10
	No	108	90
Any findings	Abdominal tenderness	1	8.3
	Fracture	2	16.6
	Head injury	2	16.6
	Muscle rigidity	2	16.6
	Nothing found	3	25
	Quadriplegia	2	16.6
If trauma patient log roll done	Yes	4	9.7
	No	37	92.3
patient Covered to prevent hypothermia	Yes	8	66.6
	No	4	33.3

5.6.6 Emergency drug assessment

From total (N=120), 4(3.3%) patients were given Diclofenac IM injection 1(0.8) patient was given 40% dextrose IV.

Table 7 Emergency drug given for patient transported from scene to ED from March – April, Addis Ababa Ethiopia 2018

	N=120	Frequency	Percent %
Emergency drug given	Yes	5	4.1
	No	114	95.9
Name of the drug	Diclofenac IM	4	3.3
	40 % dextrose IV	1	08

5.7 Vital sign assessment

Majority of vital sign were not performed inside ambulance particularly temperature and oxygen saturation were not taken in 116(96.7%) and 107(89.2) patients respectively and none of the patients were reevaluate their vital sign after initial evaluation. out of 4 (3.3%) pediatric age group (age<14) none of them were recorded their vital sign. (Table 8)

Table 8 Vital sign assessment for(age>14 years) patients transported from scene to ED from March – April, Addis Ababa Ethiopia

	Initially			**After initial**	
	N=120	**Frequency**	**Percent %**	**Frequency**	**Percent %**
Record RR	Yes	21	17.5	0	-
	No	99	82.5	120	100
Record PR	Yes	24	20	0	
	No	96	80	120	100
Record BP	Yes	21	17.5	0	
	No	99	82.5	120	100
Record T(^{O}C)	Yes	4	3.3	0	
	No	116	96.7	120	100
Record SPo2	Yes	13	10.8	0	
	No	107	89.2	120	100

Recorded RR (breath/min)			**Min**	**Max**
16-24	13	10.8	16	40
25-40	8	6.7		
Recorded PR (beat/min)				
60-100	18	15	60	134
100-134	6	5		
Recorded TO (OC)				
35-36	1	0.8	36	39
36-37.1	2	1.7		
>37.8	1	0.8		
Recorded SPo2				
90-100	8	6.7	72	98
70-89	5	4.2		
Recorded systolic BP				
<120	15	12.5	80	160
120-139	1	0.8		
140-159	3	2.5		
>160	2	1.7		
Recorded diastolic BP				
<80	16	13.3	50	100
80-89	0	0		
90-99	4	3.3		
>100	1	0.8		

5.8 Documentation assessment and any emergency procedure done

From all (N=120) patients, emergency procedures were done for 6(5%) patients out of them for 2(1.7%) patients delivery was assisted at ambulance during transportation.

In this study out of all (N=120) more than half of 64(53.3%) patients had not documented their work during transportation in ambulance. (Table 9)

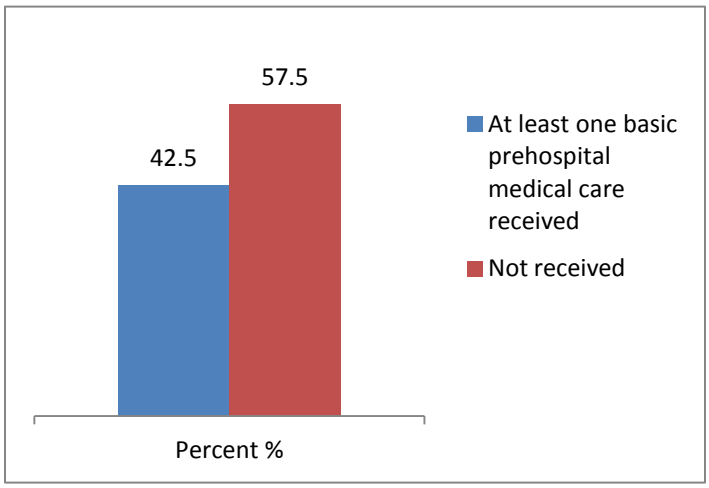
Table 9 Documentation assessment and any emergency procedure done for patients transported from scene to ED from March – April, Addis Ababa Ethiopia 2018

Any procedure done by ambulance crew	Yes	6	5
	No	114	95
The procedure was	Apply splint	2	28.5
	Attend birth inside ambulance	2	28.5
	Dressing	2	28.5
Have documented all activities in patient format	Yes	56	46.7
	No	64	53.3

5.9 Over all basic prehospital medical care assessment

Above half 69(57.7%) patients did not receive at least one of the necessary basic prehospital medical care. (Fig 5)

Figure 5 Over all basic prehospital medical care assessment for patients transported from scene to ED from March – April, Addis Ababa Ethiopia 2018



6. DISCUSSION

Pre-hospital care should comprise basic strategies with proven effectiveness, such as accessible and rapid transportation and the deployment of personnel with basic life-support skills (8). This study also reveals mainly in these parts.

During the prehospital care of trauma victims, as much as 66%-85% of preventable deaths occur by airway obstruction (19). The airway management is also paramount importance for any patient with Glasgow comma scale <8 for those to open the airway by lifting the chin and jaw thrust manoeuvres, to aspirate the oropharynx and to introduce the nasopharyngeal or oropharyngeal tubes (9)

In this study out of 120 patients transported with ambulance from scene 44(36.7%) patients lost their consciousness but oral airway was applied only in 3(2.5%)of patients. similar study conducted in Turkey in 2015, 13 patients transported by ambulance with Glasgow Come Scale (GCS) 8 and under did not receive any interventions for protecting airway safety (20).

Oxygen application for patients with respiratory distress is one of the easiest and basic interventions. In this study among breathing assessed patients (n=118), 47(39.2%) were had difficulty of breathing but among these 15(12.5%) didn't receive oxygen. A study conducted in Turkey revealed that 28% of patients with oxygen saturation below 90%, did not receive oxygen(20).

Early recognition of sudden cardiac arrest and proper management of the patient can prevent irreversible damages (26). From (n=74) patients assessed circulation, 8 patients with cardiac arrest. Out of them for 6(75%) patients were CPR done but no AED and adrenaline. Similar study conducted in turkey in 2015, patients transported with ambulance five patients with cardiac arrest only two (33.3%) had cardiopulmonary resuscitation (CPR), one (20%) received adrenaline (20).this high result (75%)was due to 46(38.3%) patients weren't known their circulation status. In our country adrenaline drug in pre hospital setting is also poorly applicable.

Most of the bleedings can be stopped by direct pressure over the haemorrhagic area. If this manoeuvre is not solving the problem, than a tourniquet should be immediately applied on the

proximal segment (9). In our study out of 120 patients, 44(36.7) had bleeding but only for 23(19.2) of them was tried to stop bleeding and IV fluid was given for 20(16.7) of patients;A study conducted in Turkey revealed that , Out of 15 patients with initial fracture diagnosis 13 (72.2%) patients had bleeding control out of 18 patients with bleeding due to trauma (20). This result tells us there was high bleeding during patient transportation but not controlled; this might be due to poor practice in bleeding arrest or lack of dressing material inside ambulance.

Spinal immobilization should be done for the entire column and not just for the cervical spine, by setting the victim on a rigid stretcher for transport(23). In our study out of n=41 trauma patients only for 5(4.2) patients were applied c collar and for only 4(3.3) patients were logroll done with complete spinal immobilization. Similar study conducted in Turkey patients who needed spinal immobilization 69 (57.5%) had spinal board and cervical collar usage was 65.1% for the trauma patients (20).

Vital sign was the missed parameter to perform inside ambulance particularly temperature and oxygen saturation were not taken in 116(96.7%) and 107(89.2) patients respectively out of all patients (N=120) and no one ambulance crew did took vital sign during hand over to hospital. Similarly study conducted in Turkey during ambulance transportation, Temperature measurement (88.4%) was the most lacking vital sign and it can be lifesaving for some patients (hypothermia or hyperthermia etc.) (20)

During this period for N=120 calls from the patients; response time (Response time is measured from the time a call activates the emergency medical system until the team arrives on the scene) were with mean of 12.6±9.7minute in city areas. Similar study related to time in Iran was, response time for RTA patients in city areas was with a mean of 5 minute compared with 10.5 minute for interurban road locations (18).In Monterrey, Mexico, an area with a ratio of 1 team per 100,000 people, the average response time was 10 minutes, while in Hanoi, Viet Nam, five teams dispatched from one station that are expected to serve 3 million people (1 team per 600 000 people) have recorded an average response time of 30 minutes (3). Traffic congestion, poor maps, poor road signs and limited road access May all increase response times in cities with poor infrastructure.

7. CONCLUSION

This study reveals that lifesaving producers like manual airway opening, vital sign measurements, emergency drug administration, and stop bleeding as well as spinal immobilization were not performed adequately. In addition to this transportation time was long as compared to the distance travels.

8. STRENGTH AND LIMITATION OF THE STUDY

At the time of study some limitation was identified. When one ambulance was dispatched from the scene with data collector; another ambulance might got call from scene and data was missed. The same if one ambulance got call other than a scene call; in its journey another call from scene might send without come back to the dispatch center in this case also data was missed. Number of patients was small due to budget limitation to increase number of data collector in each dispatch center.

Strength of this study was that, to our knowledge, it was the first in the country to look basic pre hospital medical care in ambulance setting including different time intervals it takes to transport a patient.

9. RECOMENDATION

During this study, some important aspects of how basic prehospital quality of care could be improved in the Addis Ababa city EMS service have come to our attention. Targets of action and problems that may need to be resolved are listed below.

- ☞ Ambulance crew should do all emergency assessment method for traumatic and non-traumatic patient to increase survival rate rather than using ambulance only for transportation means.
- ☞ Increasing trainings, emergency professional inside ambulance, emergency physician consultation during transportation and performing administrative inspections may improve basic ambulance care.
- ☞ Majority of patients did not receive at least one basic pre hospital medical care inside ambulance. This may be due to no paramedic or EMT professional inside ambulance so it needs further research in its effect and association.
- ☞ In majority of patients Vital sign were not recorded, c collar and oral airway were not applied and emergency drugs were not given inside ambulance as necessarily this may be due lack of accessibility of supply so it needs further research.

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ANNEXES

Appendix 1 Check list

Observational study

Service giver ambulance: _____ Branch: _____

Section 1. Socio Demographic Characteristics

No	Questions	Coding	Skip
101	Sex	Male …….1 Female ……..2	
102	Age in year	……..years old	

Section2. Time Related Questioner

No	Questions (please write in local time	Coding	Skip
201	Dispatch time		
202	Arrival on the scene		
203	Scene leave time		
204	Destination arrive time		
205	Total trip time		
206	Total trip distance		

Section3. Case Related Questioner

No	Questions	Coding	Skip
301	Location and type of incidence		
302	Number of causality	One……1 Two……2 Other(specify)…….....3	
303	Nature of the case	trauma ……1 medical……2 obs/gyni……3 if obs/gyni specify……4 paediatrics case……5 Other (specify)……..6	

304	If trauma	RTA …….1 Fall down……..2 Fighting…….3 Gunshot……4 Stab……5 Other (specify)……..6	
305	If medical	Chest pain …….1 Respiratory problem…….2 GIT……3 Loss of consciousness……4 Other (specify)……5	

Section4. Primary (ABCDE) Assessment and Emergency Treatment Given

No	Questions	Coding	Skip
401	Scene safety assessed?	yes.....1 No.....2	
402	If yes specify	……	
403	Personal protective equipment used?	yes.....1 No.....2	
404	If yes which one?	Gloves…….1 Apron……..2 Face shield…....3 google……4 Other specify……5	
	Airway		
405	Airway assessed	yes.....1 No.....2	
406	If yes	Clear ……1 Partly blocked …….2 Completely blocked……..3 (If blocked write the thing)…….	

407	If it is secretion Is it sectioning?	yes.....1 No.....2	
408	If trauma patient c collar apply and immobilize	yes.....1 No.....2	
409	Manual air way manoeuvres done?	yes.....1 No.....2	
410	Oral airway protection for unconscious patient	Yes.....1 No.....2	
411	Nasopharyngeal protection for conscious patient	Yes.....1 No.....2	
	Breathing		
412	Breathing assessed?	Yes.....1 No.....2	
413	If yes Have Breathing	Yes……1 No …….2	
414	If no breathing Ambubag used?	Yes.....1 No.....2	
415	Have Difficult of breathing	Yes……1 No …….2	
416	Oxygen given initially	Yes…….....1 No 2	
417	If yes write the amount and device	..... L/min…….device	
	Circulation		
418	Circulation assessed?	Yes.....1 No.....2	
419	If yes Cardiac arrest	Yes……1 No …….2	

420	If yes	1.CPR done yes..... 1.1 No……. 1.2 2. AED used yes.....2.1 No……2.2	
421	Is there any Bleeding part?	Yes……1 No …….2	
422	If yes Controlled bleeding	Yes……1 No …….2	
423	IV line secured	yes.....1 No.....2	
424	IV fluid given?	yes.....1 No.....2	
425	Type of IV fluid	NS.....1 Ringer.....2 Other(specify)…….3	
	Disability		
426	Disability assessed?	yes.....1 No.....2	
427	If yes Causality responsiveness	Alert……1 Response to Voice ……2 Response to Pain ……3 Unresponsiveness ……..4	
428	Random blood sugar checked?	yes.....1 No.....2	
429	If yes, RBS level of a patient is	…….mg/dl	
430	Dextrose given?	yes.....1 No.....2	
	Exposure		
431	All body exposed and assessed?	yes.....1	

		No.....2	
432	If yes write any finding	…….	
433	If trauma patient log roll done?	Yes.....1 No.....2	
434	Is the patient covered to prevent hypothermia?	Yes.....1 No.....2	

Section5. Miscellaneous

No.	**Questions**	**Codes**		**Skip**
	Vital sign recorded	**Initial**	**During handover**	
501	Record Respiratory rate	If Yes write…....1 NR……2	If Yes write…....1 NR……2	
502	Record Pulse rate	If Yes write…....1 NR……2	If Yes write…....1 NR……2	
503	Record Blood pressure	If Yes write…....1 NR……2	If Yes write…....1 NR……2	
504	Record Temperature	If Yes write…....1 NR……2	If Yes write…....1 NR……2	
505	Record Partial oxygen saturation(Spo2)	If Yes write…....1 NR ……2	If Yes write…....1 NR……2	
	Others			
506	Emergency drug given?	Yes.....1 No.....2		
507	If yes write name of the drug	……..		
508	Was First aid given before ambulance arrived?	Yes……...1 No ……2		
509	Any procedure done by ambulance crew? Like	Needle decompression…….. Other write……		
510	Have Documented all activities in a patient format?	Yes……...1 No ……2		

Appendix 2 Budget break down

1. Personal Cost					
Title	Qualification	Quantity	Duration	Rate	Total(ETB)
Supervisor	EM&CCN(MSc)	4	15	100birr	6000birr
Data collector	Emergency&CCN	5	30days	150birr	22,500birr
Training			3 days	-	-
2. Equipment and Supplies					
Note book					
Pen	Packet	1		3	150birr
Print and bind					300birr
Duplication					200birr
3. Transportation					
Taxi					500birr
4. Other					
Mobile card					300birr
Water					200birr
Tea/coffee					100birr
5. Grand total					**30,250birr**