Addis Ababa UniversityCollege of Health SciencesSchool of Public Health

Treatment Outcome and Associated Factors of Road Traffic Accident at EmergencyDepartmentof Trauma Treatment Centers of AddisAbaba, Ethiopia

By: YoditMershaW/Hanna

A Thesis submitted toAddis Ababa University,College of Health Sciences School of Public Healthin Partial Fulfillment of the Requirements for Master Degree in PublicHealth

Addis Ababa Ethiopia

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DECLARATION

I the undersigned declared that this is my original work it never been presented in this or other university, and that all the resource and material used for the dissertation, have been fully acknowledge.

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ACRONYMSAND ABREVIATIONS

AAPC	Addis Ababa Police Commission
ALERT	ALERT African Leprosy and Epilepsy Rehabilitation Training
CI	Confidence Interval
DALY	Disability Adjusted Life Year
ED	Emergency Department
ICU	Intensive Care Unit
MEWS	Modified Early Warning Score
RTA	Road Traffic Accident
RTC	Road Traffic Crash
RTI	Road Traffic injury
SPSS	Statistical Package for Social Science
WHO	World Health Organization

ABSTRACT

Background: Road Traffic Accident (RTA) is a collision between two or more vehicles, between vehicles and pedestrians, passenger and driver, between vehicles and animals or between vehicles and fixed obstacles. Every year about 1.3 million people die because of RTA. Ethiopia was experienced a tremendous loss of life and property each year as one of the leading countries of the world with death rate of 37.28 per 100,000.

Objective: This study aimed to assess the treatment outcome and associated factors of RTA at emergency department (ED) of trauma treatment centers of Addis Ababa, Ethiopia.

Method: Cross sectional study design, using retrospective data that covers the period of January 1, 2016 – December 31, 2017 at ED of trauma treatment centers,Usingsingle proportionsample size determinationformula,a412RTA medical records selected by systematic random sampling. A structured pre-tested data abstraction format was use to gather the required data. The collected data analyzed using SPSS version 23.Descriptive statistics used to showthe distribution of variables.The associated factors with dependent variabledetermined by multivariable logistic regression with its corresponding (CI: 95%).

Results:Results: Among 542 admitted RTA victims to ED of trauma treatment centers: 40.4 % were discharged with medical advice, 5 % died, 0.74% defaulted and the rest 53.6% transfer to surgical department, orthopedic department , ICU and refer to other health facility. RTA victimsthose admitted to ED of trauma treatment center were found in Addis Ababa ,delayed presentation and had comorbid condition: (AOR: 3.470, 95 % CI (1.210-9.955), (AOR:12.932, 95 % CI (3.004-55.674) and (AOR : 6.255 95% CI(1.676-23.348)were more likely to die. RTA victims who were not received first aid service (AOR: 4.848, 95% CI (1.430-16.439) significantly associated with death. In addition,injury severities were predictor of death.

Conclusion: The study revealed that RTAis significant public health problem, which cause injury and death among the victims and not receiving first aid, delayed presentation, severity of injury and co-morbid conditionwere statistically significant factors that influence death of RTA victims. Hence,properly managed sever cases, pre-hospital car availability and readiness is essential to deduce the poor outcome of RTA.

Keywords- roadtraffic accident, outcome, trauma treatment center,Addis Ababa.

1. INTRODUCTION

1.1. Background

World Health Organization defines road traffic accident (RTA) is a collision between two or more vehicles, between vehicles and pedestrians, between vehicles and fixed obstacles(1).

Worldwide an estimateof 1.3 million peoples were killed in road crashes each year and more than half of all road traffic deaths occur amongyoung adult's ages 15-44 years. Over 90% of all road fatalities occur in low and middle-income countries, which have less than half of the world's vehicles(2).

Projections show that, between 2000 and 2020, road traffic deaths will decline by 30% in high-income countries but increase substantially in low-income and middle-income countries.Unless appropriate actions taken, road traffic accident are predicted to become the fifth leading cause of death by 2030(1).

The issue of road traffic injury has already become critical in Ethiopia- a country with low rate of motorization. The number of people killed and injured as a result of traffic accidents has been steadily increasing and the country were experiencing a tremendous loss of life and property each year as one of the leading countries of the world with worst accident record (3).

Moreover, the largest proportion of series injury in Ethiopia comes from road traffic accident and become major causes of death in the emergency room among trauma victims(4).

Addis Ababa City Administration is concerned about diminishing the total death rate from the current 13.8/100,000 to 9.6 /100,000 and also hope to decrease by 50 percent by 2023(3).

1.2. Statement of the Problem

Globally, RTA incur permanent disability, through amputation, head injury or spinal cord injury and treated as a major epidemic of non-communicable disease in the present century. This catastrophic loss and injury causes numerous family tragedies and represent a serious economic loss to the community and death of young people(2).

Data from the WHO global burden of disease study in 2002 shows that, those injured severely enough to require attention from a health facility, almost one quarter had traumatic brain injury, one tenth had open wounds and most other injuries accounted by fractured bones(5).On top of this high death in RTA is attributable to the high incidence of RTA victims with moderate to severe injuries (6).

According to WHO study conducted in 2017, about three-quarters (73%) of all road traffic deaths occur among men. In addition, those dying on the world's roads are "vulnerable road users" pedestrians, cyclists and motorcyclists and account for half of all road traffic deaths around the world (2).

Delay in provision of prompt medical care to the victims of road traffic accidents were identifying as the potential risk factors in the causation or amplification of the aftermaths in the accidents(7).A study done in metro area India indicate time taken for RTA victims to health facility and unavailability of emergency services were significantly associated with death ($p= 0.00$)(8).

Moreover, a comprehensive analysis of the road safety problem in Ethiopia showed that traffic accident fatalities progressively increase with the growth in populations, despite, limb and head injury were the most common type of injury sustained and significantly influenced mortality (9,10).

The pattern of injuries in Addis Ababa also found 27% of all emergency visits, 5% of all hospitalizations, and 3% of deaths (11).

There for the study, attempt to assessthe treatment outcome and associated factors of RTA at emergency department of AaBET and ALERT trauma treatment centers of Addis Ababa, Ethiopia.

1.3. Significance of the Study

Concerning on the treatment outcomes and associated factors of road traffic accident certain research were done in Regional and Addis Ababa emergency department of higher hospitals, especiallyroad traffic accident in trauma treatment center were an under researched area.Cognizant, of this fact the study is able to shed a light on the treatment outcome and associated factors of RTA at emergency department of trauma treatment centers andthe study providethe treatment outcome of RTA in the site.

Therefore,the information derived from the study will have imminence contribution to enhance the preparedness of emergency care service practice of RTA,halt premature death and platform for future study.

2. LITERATURE REVIEW

2.1.Outcome of Road Traffic Accident

According to the study done in Spain, 15% of those who survive a road traffic accident were treating in hospitals as in-patients (12). Another study conducted at emergency department of Ahmedabad city, In reveled out of 150 RTA victims 65 (43.33%) were discharged,10(6.67%) required urgent operation, admitted to ward and intensive care unit (ICU) account : 57 (38.00%) and 16 (10.67%) respectively. and for two (1.33%) cases the outcome were death (13).

Based on, the study done in Iran, found that from 1520 road traffic admission the outcome of 60(3.9%) victims were death (6). A tertiary care center, Lucknow ,India, also revealed, among 267,admission of road traffic accident victims 35(13.1%) were died during the course of treatment (14).

Retrospective descriptive data Analysis of road traffic accident at Al-Jalaa hospital- Libya; between; 2001 to 2010 found that; from 21,753 RTA cases 41% of these cases needed to undergo surgery. Overall, 1262 (5.6%) cases were died(15).

A cross sectional study conducted at ED of Tikur Anbesa specialized hospital concerning on injury characteristics and outcome revealed that in all RTA victims reaching hospital, males outnumbered females by a sex ratio of 2.6:1. From these victims about 7.4% and 92.6% were died and discharged respectively (10).

Anotherstudy done at ED of Tikur Anbesa specializehospital victims admitted to surgical and orthopedic wards account 81 (61.8%) and the remaining injuries 50 (38.16%) were treated and discharged (16).

A cross-sectional study conductedat hospitals Wolaita Zone, SNNPR, showed most of the victims presented to the hospitals within 24 hours .Of all victims reached hospital, 23 (6%)

died, 48 (12.5%) survived withlong- term disability on discharge and 313 (81.5%) survived without long-term disability on discharge (17) .

Furthermore,a cross sectional study done using retrospectiveat emergency department of Zewuditu Memorial Hospital: indicate more than half of RTA cases the severity of patients categorized under yellow modified early warning score (MEWS). Related to this outcomes of admission were 68%,17%,17% and 1% cases were discharged, hospitalized, referred and died respectively (18).

A study conducted in Dilchora referral hospital, Dire Dawa on treatment outcome of road traffic accident reported that 90.5% victims were manage as conservative while 9.5% of them were managed surgically.About 75.6% of patients were improving without any sequel, 15% were discharging with some disabilities and 9.4% of them were dead of RTA(19).

2.2. Factors Associated with Death of Road Traffic Accident

2.2.1 Scio-demographic characteristics

The WHO reports indicate that age and sex is an important factor which determines the occurrence of the crash and as well as its outcome(2).

A cross sectional study conducted at ED of Tikur Anbesa specialized hospital comprised of 71.7 % men and 28.3 % women RTA victims, resulting in a male to female ratio of 2.6:1.death rate was higher Beta value ($ß = 0.16$, $p < 0.05$) with adult age (10).

According to multivariate analysis in police report from Akaki to Adama road showed that women were more likely to perpetrate fatal road traffic accidents than male (AOR= 4.7; 95% CI: 1.5-15) .Other study conducted in north Ghana, being urban residence were predictors of road traffic accident , (AOR: 1.74, 95% CI (1.06-2.08)(20,21).

2.2.2Characteristics of RTA victims during admission

Moreover, a study conducted northern Irantime for admission - (P< 0.01, χ^2 – 5.99) also predictor of death, while effects of time to admission was higher in rural region but severity of the accident had more effect on mortality in urban region in comparison with rural ones(6).

The study done in ED of Osmania General Hospital Hyderabad, India showed that time factor (to reach hospital) is very crucial for increase the chance of survival among RTA victims, death rate significantly low among those who reached within 30 minutes in comparison to those who took more time to reach the hospital (22).

2.2.3 Clinical Characteristics of RTA victims during admission

The studies done in northern Iran found that, those road traffic accident victims severely injured were significantly associated with death (P<0.01 , χ^2 – 9.19) (6).

A tertiary care center Lucknow ,India, study indicate the proportion of death was significantly higher in those patients who got first aid in 30 minutes to 60 minutes (p-value =0.465) as compared to those patients who got it in less than 30 minutes (p-value =0.006). The time gap between RTA and admission to emergency department death were also significant (p-value =0.001)(14).

Moreover, a 5-year retrospective study done in India, which road traffic related cases of emergency room mortality reviewed severe injuries and delayed presentation, contribute to road traffic crash-related mortality (23).

Moreover, the study done in tertiary health care delivery institute in western Nepal indicated from 360 RTA victims, Those who had chronic diseases were significantly associated with death (χ^2=7.31, P<0.01) (24).

The study done in Tanzania indicate, limb and head injury also the most common type of injury sustained which predisposed RTA victims to prolonged hospitalization and mortality, respectively(25).

2.3 Conceptual Framework

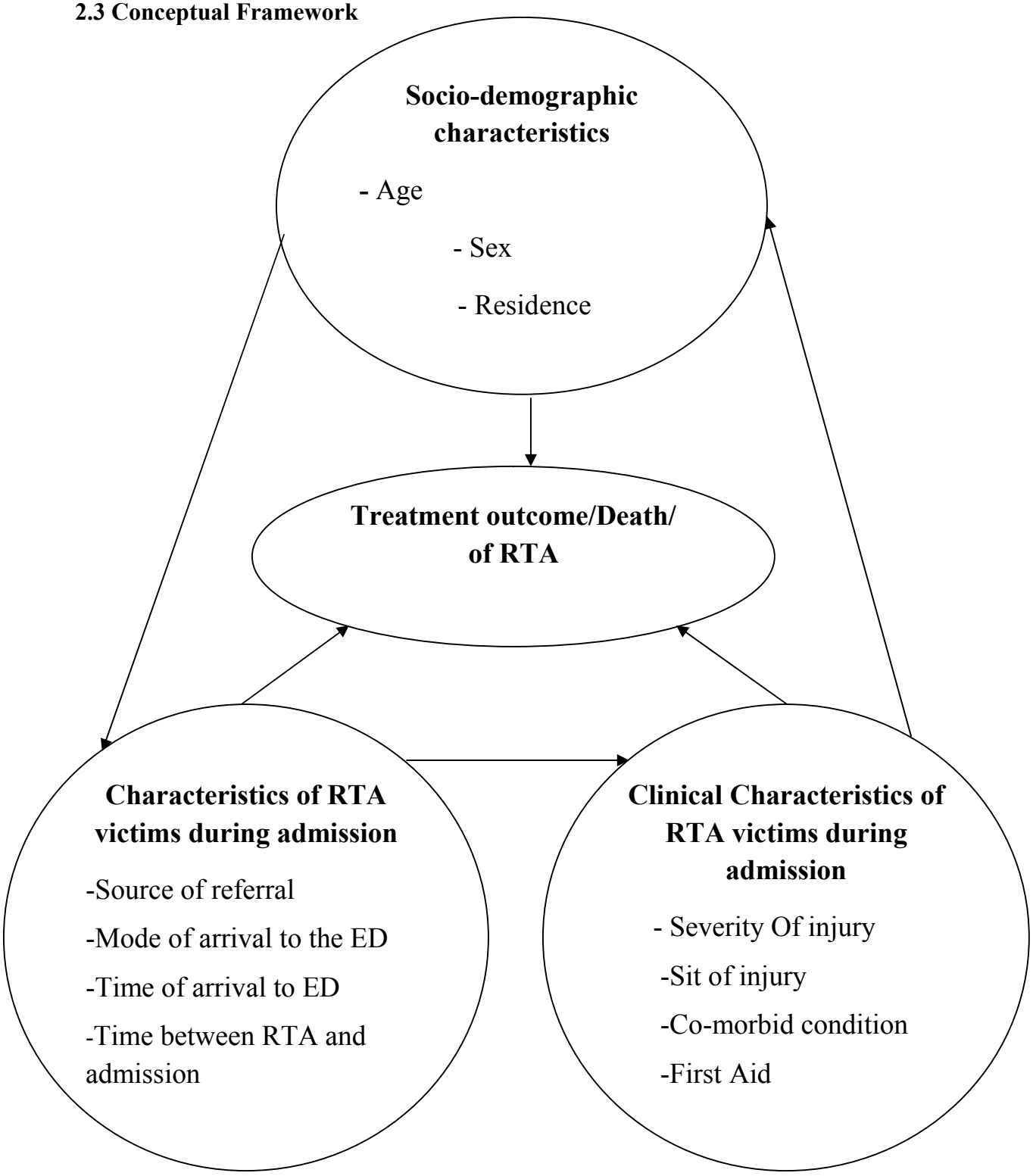

Figure 1: Diagrammatic presentation of the conceptual framework developed by reviewing related literatures(10,17,18,24).

3. OBJECTIVES

3.1. General Objective

To assess the treatment outcome and associated factor of road traffic accident at emergency department of trauma treatment centers of Addis Ababa during the period of January 1, 2016 – December 31, 2017.

3.2. Specific Objective

-To assess the treatment outcome of road traffic accident at emergency department oftrauma treatment centers, Addis Ababa.

- To identify factors associated with death among road traffic accident victims at emergency department of trauma treatment centers, Addis Ababa.

4. MATERIALS AND METHODS

4.1. Study Area

Addis Ababa is the capital city of Ethiopia.Itconsists of estimated population of 6.6 million in 2017,as per the 2007 population enumeration,with yearlygrowth rateof 3.8%.The city has, 527 km^2, area (26). It has 10 sub-cities and 116 woredas and has different governmental health institution including 14hospitals and 95 public health centers. In addition to these,36 private hospitals,4 non–governmental hospital,31NGO's clinics and more than ,700privet owned clinics were found in the city .From the above health facilities,8hospitalsincluding the two trauma treatment centers were under ministry of health.

AaBET and ALERT hospitals were a trauma treatment center that gives trauma managements at highest-level .Mainly serve patients who came from Addis Ababa and neighborhood regions.Theywork 24 hours a day, 7 days a week, with a capacity of 290and185 beds respectively. Both hospitals have more than634 and 272 health workers, including health professional, administrative staff and supportive staffs.Trauma Treatment Center have access to specialist and nursing care including emergency medicine, trauma surgery, critical care, neurosurgery, orthopedic surgery, anesthesiology and radiology, as well as highly sophisticated surgical and diagnostic equipment.It has different departments like, OPD, ICU, adult orthopedic ward, pediatrics orthopedic ward, burn unit and physiotherapy. In emergency department treatment, also provide by general practitioners and nurse on duty; after admission; filling a triage sheet that include socio-demographic and inset information. The condition of a patient evaluate by triage score that coded by color.In addition,there are two emergency units in the hospitals: one designated for pediatrics aged <14 years and the other for adults' aged ≥15 years. (Source: hospitals human resource)

4.2. Study Period

A two years, (January 1, 2016 – December31, 2017) registered data was used. The data collection conducted from, January 2018 up to March 2018.

4.3. Study Design

Cross- sectional study usingretrospective data was conducting atemergency department of AaBET and ALERT trauma treatment centers.

4.4 Population

4.4.1. Source population

All medical records of RTAvictims admitted at emergency department ofAaBET and ALERT trauma treatment centers.

4.4.2. Study population

All medical records of RTA victims admitted at emergency department of Trauma Treatment Centers: since January 1, 2016 – December 31, 2017.

4.5. Selection Criteria

4.5.1. Inclusion criteria

All RTAvictims admitted from January 1, 2016 – December 31, 2017at ED of AaBET and ALERT trauma treatment centers were included in the study based on the sample size.

4.5.2. Exclusion criteria

Those RTA victims death happened during arrival were excluding from the study.

4.6. Sample Size and Sampling Technique

4.6.1. Sample size

Sample size is calculated using single proportion formula:

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

Where: n=Sample size

Z= is the standard normal value at the level of confidence, 95% confidence level

d= Desired degree of error

To determine the sample size, using the following assumptions:

-From the existing evidence an averages of RTA admitted victims with discharged outcome were taken94%, p= 0.94(17).

- The Z statistics value =95% (1.96) confidence interval
- In order to maximize level of precession of my study the possible minimum margin of error(d) was used 2 %

Hence, $n=\frac{(1.96)^2*0.94(1-0.94)}{(0.02)^2}$

$n=\frac{3.8416*0.94*0.06}{0.0004}$

$n=\frac{0.21666624}{0.0004}$

n=542

4.6.2. Sampling Technique

Using systematic random sampling, first, the total sample size (542) divided proportionally to each hospital. Secondly, all RTA victims registered from anuary 1, 2016 – December 31, 2017 at emergency department of trauma treatment centers was list based on the sequence of their card number. Study units were selected through proportional allocation to size of each hospital by calculating the interval from the sampling frame, N and sample size n (k=N/n) interval, (k=18) is similar for each hospital. The first number to start with selected randomly.

Table1: Distribution of sample size across trauma treatment center with their admission periodtotal noof RTA admitted

Period	Total No of RTI admitted		No of sample selected		Total no of SampleSelected
	AaBET	ALERT	AaBET	ALERT	
2016	2519	1292	137	70	207
2017	3101	3078	168	167	335
Total	5620	4370	305	237	542

4.7. Study Variables

4.7.1. Dependent variable

Treatment outcome of road traffic accident / death /

4.7.2. Independent variable

Socio demographic characteristics:-

- Age
- Sex
- Residence

Characteristics of RTA victims during admission to ED:-

Source of referral

- Mode of arrival to the ED
- Time of arrival to ED
- Time between RTA and admission

Clinical characteristics at admission:-

- First Aid
- Severity of injury
- Sit of injury
- Co-morbid condition

4.8. Data Collection

4.8.1. Data collection instrument

The data abstraction format was developed in reference to objective of the study, ED registration book, medical records and other standardized tools injury surveillance guideline document of WHO developed in 2001 and base line previous study (10,17,18,25).The data abstraction format had been prepared in English language (annex1).

4.8.2. Data collection process

The data for the study was review from routinely registered client medical record and ED registration book. The data was collected by trained clinical nurses using a data abstraction format according to the inclusion criteria, the format contain question regarding; socio-demographic, characteristics of RTA victims during admission to ED,clinical characteristics at admission,treatment outcome.

4.8.3. Data collectors

Four data collectors and twosupervisors were involved in the data collection process from AaBET and ALERT ED of trauma treatment center, their educational level is clinical nurse for data collector and BSC nurse for supervisor. Training was give on data collection techniques and instruments.

4.9. Data Analysis

The collected data was analyzed using SPSS version 23. Frequency distribution, percentage calculation, means and standard division used to describe the variable. By using odds ratios with its corresponding 95% CI and p-value the association between individual variable and outcome variable were determined by binary logistic regression, those variables found to have p-value <0.25 taken to multivariable logistic regression Variables having p- values < 0.05 in the multiple logistic regression models considered as significantly associated with the dependent variable.

4.10. Data Quality Control

To ensure the data quality, pretest conducted on 5% of the total sample. Any error found during the process of pre-test was correction and modification had made into the final version of the data abstraction format. Finally, the data cleaning were doing by running frequency and sorting by SPSS version 23.

4.11. Dissemination of Research Finding

The study result will be present to Addis Ababa University,College of health sciences, school of public health and the document will disseminated to all responsible bodies including each trauma treatment centers, ministry of health and police commission. Additionally, the finding will publish in peer reviewed scientific journals.

4.12. Operational Definition

- **Road traffic Accident:** is a collision between two or more vehicles, between vehicles and pedestrians, between vehicles and animals or between vehicles and fixed obstacles. (1).
- **Modified early warning score (MEWS):**-a simple triage tool used by emergency medical services, to quickly assess a person's risk of death(27).
- **Green color coding :**- mild pain level, keep in waiting area with frequent re-triage(27).
- **Yellow color coding:**- moderate pain level keep in waiting area with frequent re-triage(27).
- **Orange color coding :**- sever pain level and urgent priority taken (27).
- **Red color coding:-**injury take immediate priority(27).
- **First aid:**is the immediate treatment or care given to a person suffering from an injury from RTA until more advanced care is provided (28).
- **Co-morbidity :** additional medical problem with RTA (29).
- **Vulnerable road users:** more or most likely to expose to the chance of being attack or harmed by RTA(30).

- **Pedestrian:** a person involved in an accident that was not at the time of the accident riding or on any mechanically or electrically powered device (30).
- **Passenger:** is any occupant of a transport vehicle other than the driver (30).
- **Driver:**a person who drive a vehicle ,a wheel or other part in a mechanism that receives power (30).
- **Road traffic death:** death due to traffic accident were immediately or within 30 days after the accident(30).

4.13. Ethical Consideration

Before starting data collection and preliminary study, ethical clearance was obtain from Addis Ababa University College of health science school of public health ethical review committee. In addition to this permission obtained from each Trauma Treatment Centers, Addis Ababa. To ensure confidentiality, name and other identifiers of patients, physicians and other health care members who made the recommendation was not recorded on the data abstraction format.

5. RESULTS

5.1. Socio- Demographic Characteristics

From 542 RTAvictims admitted to trauma treatment centers 373 (68.9 %) were male, with M: F ratio of 2.2: 0.5.The patients' ages ranged from1 to 85 years with the mean and standard deviations of 31.21 and ± 15 years respectively. About 283(52.22 %) of RTA victims were found out of Addis Ababa.

Table 2: Distribution of demographic characteristics of RTAvictims at emergency department of trauma treatment center Addis Ababa, fromJanuary 1, 2016 – December 31,2017

Variable	Category	Frequency	Percent
Age	<15	41	7.5
	15-30	294	54.4
	31-50	145	26.7
	>50	62	11.4
	Total	542	100.0
Sex	Male	373	68.9
	Female	169	31.1
	Total	542	100.0
Residence	Addis ababa	259	47.8
	Out of Addis Ababa	283	52.2
	Total	542	100.0

5.2.Characteristicsof RTA victims during admission to ED

Table 3: Characteristics of RTA victims during admission at EDof trauma treatment centers,Addis Ababa, from, January 1, 2016 – December 31, 2017

Variable	Category	Frequency	percentage
Mode of arrival	Ambulance	132	24.3
	Taxi	157	29.1
	Privet Car	138	25.4
	Other /carries ,walking /	61	11.2
	Unknown	54	10
Time of arrival to ED	00:00-00:60	51	9.5
	00:60-12:00	293	54
	12;00-18:00	176	32.4
	18:00-24:00	9	1.7
	Unknown	13	2.4
Time gap between the injury and ED admission	<24hr	260	48
	1-3 days	114	21
	4-7 days	92	17
	>1week	43	8
	Unknown	33	6

In 157 (29.1%) admitted RTA victims the mode of arrival was taxi followed by privet car 138 (25.4%) and ambulance putted at the third level it accounted 132 (24.3%) while 61(11.2%) use other means of transportation**.**

Time between RTA and admission: about 260(48%) victims arrive at ED of trauma treatment center less than 24hr after injury and in 114(21%) ,92 (17 %),43 (8%),33 (6%) of the victims taken 1-3 days,4-7 days and beyond week and unknown arrival respectively. In addition 293 (54%) RTA victims reached to ED of trauma treatment center in 00:60-12:00 am and nine (1.7 %) of RTA victims time of arrival were 18:00-24:00.

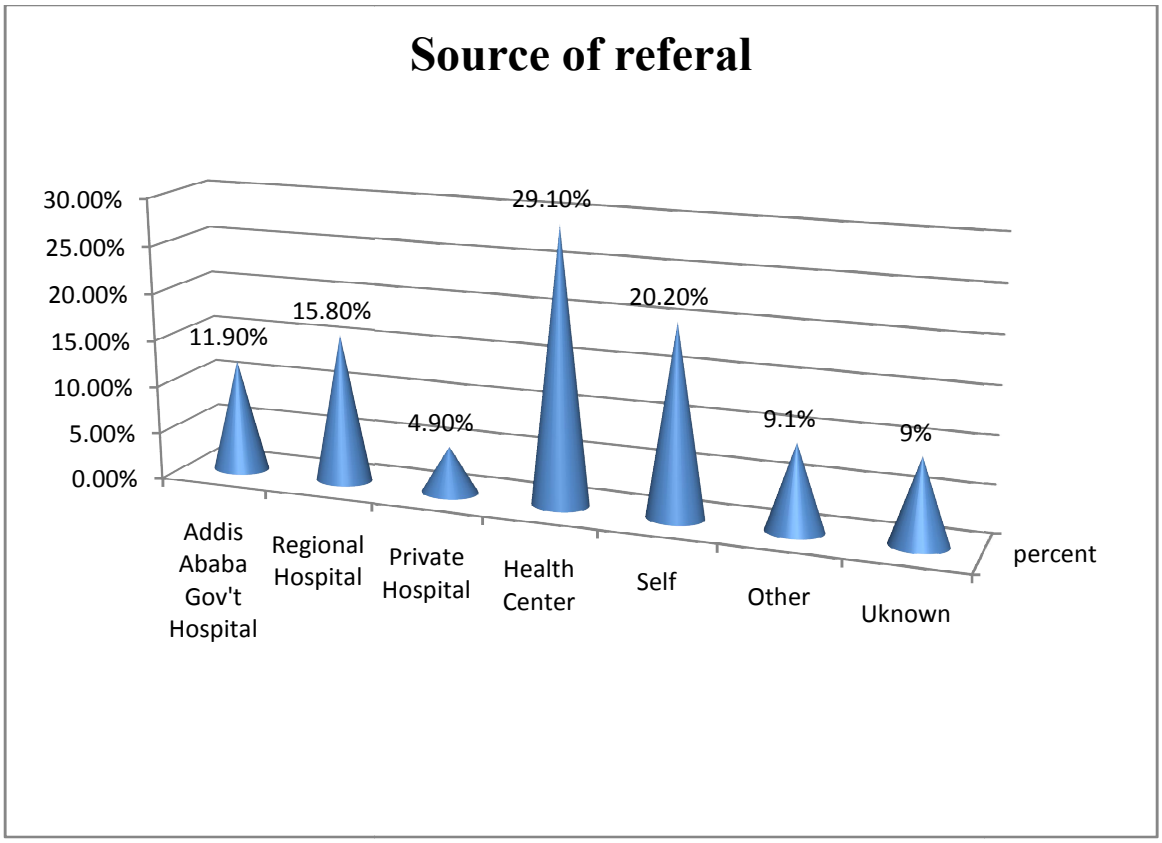

Figure 2: Source of referral in RTA victims at Emergency Department of trauma treatment centers, Addis Ababa, Ethiopia from January 1, 2016 – December 31, 2017.

In 29.10% RTA victims the source of referral were health center and 20.20 % and 9.1 % victims were self-referrals and from other source of referrals (privet clinics, police) respectively. (Figure 2)

5.4. Clinical characteristics of RTA victims at admission

Table 4 : Clinical characteristics at admission at ED of trauma treatment centers Addis Ababa, Ethiopia from January 1, 2016 – December 31, 2017.

Variable	Category	Frequency	percent
First Aid	Yes	335	61.8
	No	155	28.6
	Unknown	52	9.6
Injury severity	Green color coding	123	22.6
	Yellow color coding	246	45.3
	Orange color coding	79	14.6
	Red color coding	51	9.5
	Unknown	43	8.0
Site of injury	Head injury	144	26.5
	Upper extremity	86	15.8
	Chest injury	38	7.1
	Abdominal injury	14	2.6
	Pelvic injury	20	3.6
	Lower extremity injury	211	39
	Other /multiple organ injury, spinal cord injury/	29	5.4
Co-morbid condition	Yes	30	5.6
	No	512	94.4

Among 542 RTA victims admitted to ED of trauma treatment center frequently injured body region were lower extremity 211 (39 %) and head 144 (26.5%). For the reaming RTA victims, the injury involves the upper extremity, chest, pelvic, abdomen, other: 86 (15.8%), 38 (7.1%), 20 (3.6%), 14 (2.6%) and 29 (5.4 %) of the victims correspondingly.

When we look on the level of severity 123 (22.6%) mild, 246 (45.3%) moderate, 79 (14.6%) sever pain level were had and 51 (9.5 %) victims classified as needing immediate intervention. Were as335 (61.8%) RTA victims were receiving first- aid and 155 (28.6%) RTA victims did not receive the service in the present study, in addition 30(5.6%) of RTA, victims admitted to ED had co-morbid condition.

5.5 Treatment outcomes of road traffic accident victims at ED

Out of 542 RTA victims about 219 (40.4 %) were discharged with medical advice and 27 (5 %) were died during the course of the treatment. The remaining 256 (47 %) transferred to other department, 36 (6.6 %) referred to other health facility and four (0.74%) were defaulters. Among 256 (47 %) victims transferred to other department, 146 (26.9 %) were admitted to surgical department, 93(17.2%) and 17 (3.16%) admitted to orthopedic department and ICU respectively.

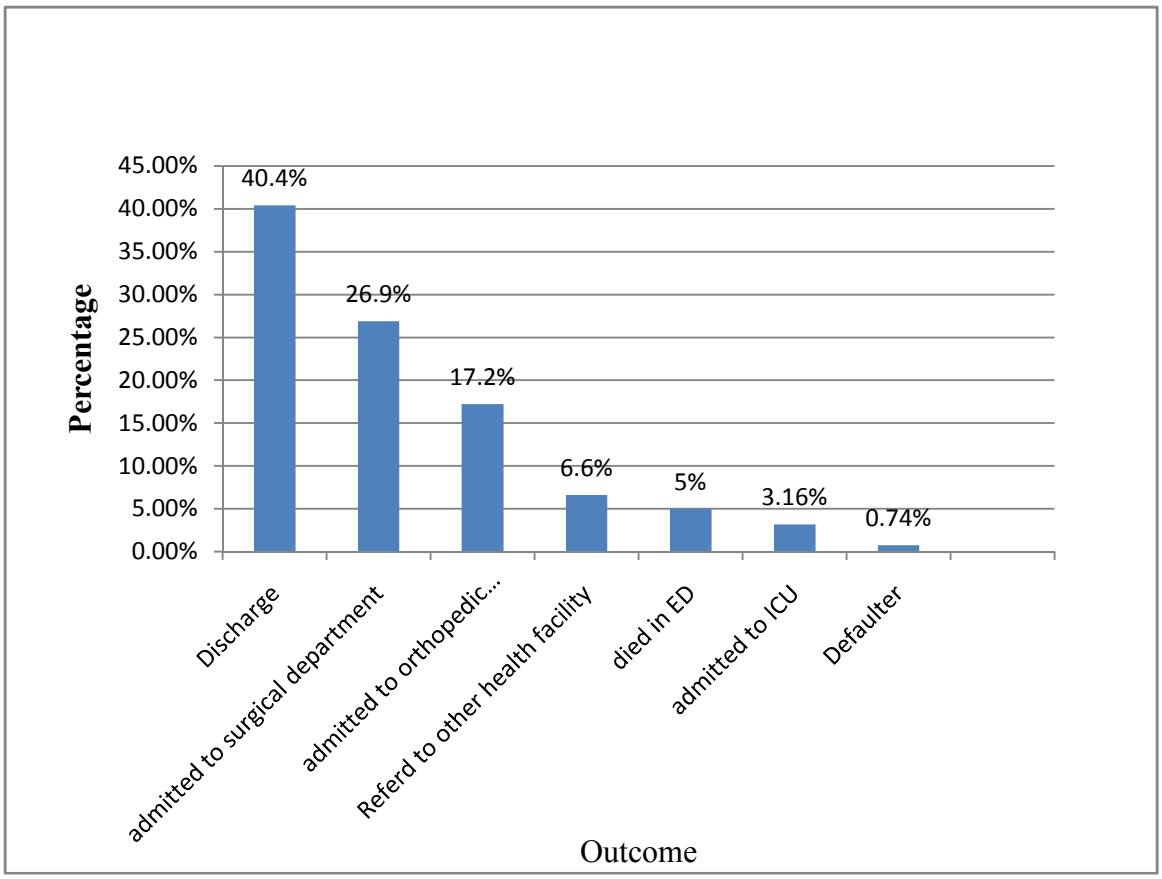

Figure 3: Outcome of RTA victims at Emergency Department of trauma treatment centers, Addis Ababa, Ethiopia from January 1, 2016 – December 31, 2017

5.6 Factors associated with RTA related death

Using binary logistic regression - socio demographic characteristics, circumstances at the time of RTA, characteristics of victims during admission and clinical characteristics with the dependent variable analyzed individually. Those variables found to have p-values of <0.25 in the bivariate analysis; residence, the time gap between RTA and admission, first aid, co-morbid condition and injury severity taken to multivariable logistic regression model. Variables having p-value < 0.05 at 95% CI in the multivariate logistic regression model considered statistically significant.

Table 5 : Factors associated with death among RTA victims at emergency department of trauma treatment centers, Addis Ababa, Ethiopia from January 1, 2016 – December 31, 2017

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variable	Category	Outcome (246)		COR 95%CI	AOR95%CI
		Alive during Discharge No (%)	Death No (%)		
Residence	Addis Ababa	99(40.2)	19(7.7)	2.879(1.209 -6.857)	3.470(1.210-9.955)*
	Out of Addis Ababa	120(48.7)	8(3.23)	1	1
The time gap between RTI and admission at ED	<24hr	92(37.4)	5(2)	1	1
	1-3 days	52(21.1)	5(2)	1.769 (.489 -6.398)	1.985(.463 -8.501)
	4-7 days	42(17)	7(2.8)	3.067(.920 -10.225)	2.725(.691-10.743)
	>1week	14(5.7)	8(3.5)	10.514 (3.010 -36.730)	12.932(3.004-55.674)*
	Unknown	19(7.7)	2(0.8)	1.937(.349-10.736)	1.982(.297-13.206)
First Aid	Yes	109(44.3)	5(2)	1	1
	No	90(36.6)	17(6.9)	4.118(1.462-11.597)	4.848(1.430-16.439)*
	Unknown	20(8.13)	5(2)	5.450(1.444 -20.568)	5.246(1.057-26.041)*
Injury severity	Green and Yellow color coding	150(60.9)	11(4.5)	1	1
	Orange color coding	25(10.2)	5(2)	2.727(.873-8.517)	5.690 (1.318-24.565)*
	Red color coding	15(6)	7(2.8)	6.364(2.148-18.854)	6.303 (1.720-23.093)*
	Unknown	29(7)	4(1.6)	1.881(.560-6.317)	2.558 (.626-10.446)
Co-morbid condition	Yes	8(3.3)	5(2)	7.536 (2.387-23.789)	6.255(1.676-23.348)*
	No	211(85.7)	22(8.9)	1	1

6. Discussion

The study revealed that the treatment outcome of 5 % RTA victims those admitted to ED of trauma treatment centers were death. As compared the outcomes with other study done at hospitals Wolaita Zone, SNNPR 6 %(17) almost the finding is align. Higher death outcome also observed in this study as compared to the studies in Zewuditu memorial hospital (1%)(17), Ahmedabad city, India (1.33%) (12) and (3.9%) in Iran (6).Since the studies set up was trauma treatment center and many victims were link from other health facility, due to this patient over load and life-treating cases may lead for higher deaths. However, it is lower than report from previse study conducted in Dilchora referral hospital, Dire Dawa (9.4%) (19), (7.4%),Tikur Anbesa specialized hospital (10) and (13.1%) at tertiary care center, Lucknow, India(14).It might be in the study area trauma management were given at the highest levels.

The study result showed that there is no significant association between sex, age, source of referral, mode of arrival, time of arrival and site of injury with emergency department treatment outcome /death / of RTA victims.

Road traffic accident victims those live in Addis Ababa, were 3 times more likely to died, (AOR=3.470:95% CI: 1.210-9.955), than RTA victims came to the ED of trauma treatment center from out of Addis Ababa. This result in line with the studies done in North Ghana, death rate were 2 times increased from those came from rural area (AOR: 1.74, 95% CI (1.06-2.08) (21).While, another study done on risk factors of road traffic accidents associated mortality in northern Iran also indicate. Effects of time to admission was higher in rural region but severity of the accident had more effect on mortality in urban region in comparison with rural ones (6). This might be justifying the fact that in urban area due to rapid motorization, recklessness-driving behavior and over loading of patients in trauma treatment center were increases the severity of the injury and poor outcome of RTA victims.

RTA victims those, had co-morbid conditions, were 6.3 times more likely to die than RTA victims who had not co-morbid conditions (AOR: 6.255 95% CI (1.676-23.348). Previous

study done in tertiary health care delivery institute in western Nepal (24) also support thefinding as co-morbid conditions (χ^2=7.31; P<0.01) was significantly associated with high death rate. A co-morbid condition by itself suppresses the immunity and hinder recovery might be lead to death.

According to the study RTA victims who had not received first aid (AOR=4.848:95% CI: 1. 430-16.439) and those had unknown status concerning first aid (AOR=5.246 95% CI 1.057-26.041) were more likely to die in which the odds of death increased by five times respectively. A tertiary care center Lucknow, India ; study indicate the proportion of death was significantly higher in those patients who got first aid in 30 minutes to 60 minutes (p-value =0.465) as compared to those patients who got it in less than 30 minutes (p-value =0.006) (14). This might be justify, not reserving first aid were decreased the chance of survival by complicated the case.

In the study, 48.9% of victims visited the ED within 24 hour after RTA. Whereas 7.5% of cases admitted to the emergency department after one week of RTA this victims were12.9 times more likely to die than those come early,(AOR: 95% CI,12.932(3.004-55.674) . Different study conducted in India support this finding ,death rate significantly low among who reach early at ED and delayed presentation also contribute to road traffic crash related death (22,23).Moreover, the study done in Iran found that time for admission also (p<0.01, x^2-5.99), predictor of death (6). Late arrival to ED after RTA were by delay treatment and exacerbate complication, may lead for death. So; this indicate timing of admission to ED is crucial in saving the life of the victims there for an effort should made to increase the infrastructure including availability and accessibility of health facility and aware the community about the importance of early treatment .

RTA victims who were severe pain level and victims with immediate intervention need injury were 5.7 (AOR=5.690; 95% CI (1.318-24.565) and 6.3 (AOR=6.303; 95 % CI (1.720-23.093) times more likely to die. The finding was similar with the study done in Iran, those RTA victims severely injured were 9.19 times more likely to die (P<0.01, χ^2 – 9.19) (6). A 5-year retrospective study done in India , also stated that severity of injuries causes road traffic

death(23).This might be justifying because of physiological, anatomical and psychological trauma that caused by RTA lead for unsatisfactory response for treatment modality.

7. Conclusion and Recommendation

7. 1 Conclusion

Deaths in the study were almost similar; with most of the researches referred but some studies found that death rates low compared with this finding. The study revealed among hundred RTA victims five deaths was happen. Co-morbid condition, delayed presentation to emergency department, residence, severity of injury, not received first aid service were statistically significant factors increases death of RTA victims.

7. 2 Recommendation

Based on the above finding the following recommendations are forward for the concerned bodies

- For AaBET and ALERT trauma treatment center health care provider and health facilities management.
  - The health care providers should give emphasis for those RTA victims' with co-morbid condition and sever injury.
- For Addis Ababa health bureau and federal ministry of health
  - Focusing onthe availability and accessibility of pre- hospital care service
- For stake holders
  - By working in different media and community mobilization combat RTA
- For researcher
  - As this, a hospital based secondary data analysis; further studies will need to identify factors for treatment outcome of RTA.

8. Strength of the study

This study is able to over view the associated factors of death among RTA victims at emergency department of trauma treatment centers by retrieving secondary data in our setting where such information was scarce.

9. Limitations of the study

First, the study did not assess the outcome and associated factors of those RTA victims admitted to other department /surgical department, orthopedic department, ICU etc.../.
Secondly, due to incomplete nature of secondary data variable like characteristics of crash, length of stay at emergency department which might be contribute on death were not addressed in this study.

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ANNEX I

Data Abstraction Format

Name of data collector :			
Hospital name :			
Date of data collection :			
Data abstraction format Identification number : / / /			
No	**Questions**	**Choice**	**Remark**
Part 1 -socio –demographic characteristics			
1.1	Age	----------year	
1.2	Gender	1.Male	
		2.Female	
		3.Unknown	
1.3	Residence	1.Addis Ababa	
		2.Out of Addis Ababa	
		3.Unknown	
Part 2– Characteristics of RTA victims during admission			
2.1	Time of arrival to ED	1.00:00-00:06	
		2.06:60-12:00	
		3.12;00-18:00	
		4.18:00-24:00	
		5.Unknown	
2.2	Mode of arrival	1.Ambulance	
		2.Taxi	
		3.Privet Car	
		4.Other /carrying, walking/	
		5.Unknon	

2.3	First aid	1.Yes 2.No 3.Unknown	
2.4	Source of referral	1.Addis Ababa government hospital 2.Regional hospital 3.Privet hospital 4. Health center 5.Self 6.Other /privet clinics , police/ 7.Unknown	
3.Clinical characteristics of RTA victims at admission			
3.1	Co-morbid condition	1.Yes 2.No 3.Unkown	
3.2	First aid	1.Yes 2.No 3.Unknown	
3.3	The severity of a patient's condition (MEWS)	1.Green color coding 2.Yellow color coding 3.Orang color coding 4.Red color coding 5. Unknown	

3.4	Injury sit	1.Head injury 2.Upper extremity 3.Chest injury 4.Abdominal injury 5.Pelvic injury 6.Lower extremity injury 7.Other /multiple organ injury ,spinal cord injury/ 8. Unknown	
4.Treatment Outcome Of ED Admission			
4.1	Outcome of ED admission	1.Discharged with medical advice 2.Admitted to surgical department 3.Admited to orthopedic department 4. Admitted critical care unit /ICU 5. Referred to another health facility 6.Death 7.Deafaulter 8.Uknown	

Checked by supervisor; Name----------, Signature ----------