



doi <https://doi.org/10.58256/rjmhs.v4i1.971>



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Research Article

Section: Health Sciences



Published in Nairobi, Kenya  
by Royallite Global.

Volume 4, Issue 1, 2023

#### Article Information

Submitted: 20th December 2022

Accepted: 11th January 2023

Published: 14th January 2023

Additional information is available at the end of the article

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ISSN: 2958-7557 (Print)

ISSN: 2958-7565 (Online)

To read the paper online,  
please scan this QR code



#### How to Cite:

Hailu, E., Shewangizawe, Z., Tesema, E., & Abagero, A. (2023). Road traffic accident risk indicators among traumatized patients visiting emergency outpatient clinics in public hospitals in Addis Ababa, Ethiopia. *Research Journal in Medical and Health Sciences*, 4(1). <https://doi.org/10.58256/rjmhs.v4i1.972>



## Road traffic accident risk indicators among traumatized patients visiting emergency outpatient clinics in public hospitals in Addis Ababa, Ethiopia

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#### Abstract

This study sought to assess the magnitude and factors associated with road traffic accidents among traumatized patients attending at emergency outpatient departments of public hospitals in Addis Ababa. Facility-based cross-sectional study design was employed on 381 samples. All traumatized patients who attend at emergency department of public hospitals in Addis Ababa city was population of the study. Systematic random sampling technique were employed to select study unites. The data was entered and cleaned by Epi-info version 7 and analyzed using SPSS for windows version 23.0 and presented using tables and figures. A total of 373 samples were collected in the study and the most of samples were in the 30–40 years of age range. The magnitude of the road traffic accident was 57.1%. Most of the study participant (64.83%) were male and the maximum age was 79 with a mean of age is (+/- 34 years) responders. Road traffic accident is more prevalence among the most productive and economically active age group. Being Females are 0.48 times higher protective for RTA than Males. Occupation (driver) 5.3 times higher risk to road traffic accident than students, weather condition (cloudy) 0.4 times protective than sunny for RTA and driving at a day time 2.1 times higher risk for RTA than at night. Improve the traffic system and community-based awareness creation could decrease the incident of car accident.

**Keywords:** magnitude, patients, public hospitals, road traffic accidents

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### Introduction

World Health Organization (WHO) Road traffic Accident defined as street activity accident/injury as the damage that happened on a way or road open-to-open activity, brought about in one or more people being murdered or harmed and at slightest one moving vehicle was included. In this way, street activity mischance is collisions between vehicles, between vehicles and people on foot, between vehicles and creatures or between vehicles and settled impediments (1). Road traffic accident are the eighth leading cause of death globally and the leading cause of death for young people aged 15–29 (2). Universally, around 1.35 million individuals died each year on the streets, and another 20 to 50 million support nonfatal wounds because of street activity crashes, among these 85% happened in low- and middle-income countries. This implies more than 3,400 passing claims on an everyday premise because of street activity wounds. Undoubtedly, it comes about in a 3% misfortune of the net residential item around the world and up to 5% in low and middle-income nations. African nations had the most noteworthy mortality rate, with 28.3 passings per 100 000 populations. The issue is expanding at a quick rate in African nations due to quick motorization and other factors (2).

In these design effective prevention strategies, there are requirements of discoveries about the magnitude of injury and its associated factors. Considering the expanding commitment of violence, accident and medical emergencies to the burden of disease, the Ethiopian Health Sector Development Program clearly gives more attention to injuries and violence among other non-communicable diseases. To materialize this, the ministry of health has prepared a national multi-sectorial Strategic Plan in coordination with various sectors. Road traffic accident, fire burn, falls and other work-related injuries are priorities in the plan. In any case, there's a scarcity of comprehensive information on the magnitude and pattern of RTA in Ethiopia. Without solid data, health care planner at all levels are incapable to apportion assets so as to realize the most prominent effect in preventing injuries, treating and restoring harmed people (3).

In 2013, about 246,718 people killed because of road traffic injuries in Africa. This number was approximately a fifth of the global total number of deaths (4). Also in Africa, road traffic injuries constitute 25% of all injury related deaths. Moreover, road traffic injuries is responsible for almost one in ten deaths of young men (aged 15-29) in the region (5)

Ethiopia is, a country with a low vehicle/population ratio(two cars per 1,000 people) according to 2020 federal transport authority report the registered car in Addis Ababa were 630,444 most of the cars are taxis but Ethiopia is one of the country worst affected by road traffic injuries. This is mainly due to poor road safety plans and the failure of drivers to abide by the traffic rule (6). In Addis Ababa, around 88% of road traffic accident can affect the pedestrians. The main problem in urban area were the absence of adequate pedestrians facilities, excessive speeding, drink driving, inadequate street light at night, poor land use planning, as well as poor adequate legal regulatory framework and enforcement of existing laws and regulation(WHO,2013).

Therefore, this research is intended to fill the knowledge gap by providing data on magnitude of accident and associated factors in patients visiting the Emergency Department of Addis Ababa public hospitals, Ethiopia.

## Designs and Methods

### Study Setting and area

This study was conducted at one selected general and teaching referral hospitals and serves the country as secondary care and three tertiary referral hospitals that is serves as Tertiary care provide higher education in different health and related fields including specialty and sub-specialty and known to be Trauma Centers in the city and in the country as well. Namely: Minillik II, AaBET, Alert and Tikur Anbessa, Hospitals that selected for this study. The annual report of selected hospitals from emergency department for trauma patient is 10136, 29629, 21900 and 24082 respectively (48).

### Study population

All traumatized patient those who are treating in four, three from federal and tertiary level trauma center and one from regional and secondary level trauma center selected hospitals with in Addis Ababa.

### Study period

Data was collected from March 09/2020 to January 30/2021.

### Study Design.

Facility based cross sectional study was used to assess Magnitude and Factors Associated with Road Traffic Accident among Traumatized Patients Attending at Emergency Departments of one from secondary and three from tertiary trauma center hospitals in Addis Ababa Town, Ethiopia.

### Data Collection Tools.

A pre-tested and structured interviewer-administered questionnaire was used for data collection. Questionnaires were adapted and modified from related articles to collect data through self-administered questionnaire (40). The questionnaire mainly focused on Socio-demographic characteristics, Human, Road, Vehicle and environmental related factor.

**Data Analysis.** First, we were see the completeness of the data, data entry was performed using Epi Info 7 software. Checked for their consistency of the data entered and export the data in to SPSS 23 for analysis. Frequency distributions and cross tabulations was used to describe the variables of the study. First Level of significance was determined using independent variables with  $p$ -value less than or equal to 0.2 at the bivariate level and select the significant variables and by the use of multiple logistic regression models we see the significance variable for the dependent variables to control potential confounding variables. Statistical significance was declared if  $p < 0.05$  and 95% CI. Adjusted odd's ratios was used to identify any association between the dependent and independent variables.

**Results**

**Demographic characteristics**

From three hundred seventy three (373) injury patients, there were 242(64.8%) males and 131 (35.2%) females. More injured age groups were 30-39 years old group that accounts 109(29.2%) followed by those 20-29 years 105(28.1%). The least injured age group was below 10-19 age groups 77(20.6%) in Table 1.

**Table 1: The Demographic Data Variables of traumatized Patients Visited to Addis Ababa public hospitals Jan. 2021**

Personal Characteristics	RTA Frequency	%	Not RTA	%
<b>Sex</b>				
Male	157	73.7	85	53.1
Female	56	26.3	75	46.9
Total	213	100	160	100
<b>Age group</b>				
10-19	41	19.2	36	22.5
20-29	70	32.8	35	21.8
30-39	65	30.5	44	27.5
Above 40	37	17.3	45	28.2
Total	213	100	160	100
<b>Occupation</b>				
Driver	55	25.8	10	6
Daily laborer	20	9	42	26
Employed	56	26.6	46	28.7
Merchant	37	17.3	18	11.2
Student	36	17.3	36	22.3
Other	9	4	8	5
Total	213	100	160	100
<b>Education status</b>				
Illiterate	11	6	13	8.3
Primary(1-8)	36	16.9	29	18
Secondary (9-12)	82	38.1	44	27.5
Diploma and above	84	39	74	46.2
Total	213	100	160	100
<b>Marital status</b>				
Married	148	69.4	102	63.7
Never Married	65	30.6	58	36.3
Total	213	100	160	100
<b>Mean Age</b>		32.7		

**Role of the Victims at the time of road traffic accident**

Most of traumatized patients secondary to road traffic accident were pedestrians which covers 86(40.4%) from the total RTA patients and followed by those driver 59(27.7%). The least traumatized groups were

assistant driver which count 15(7%).

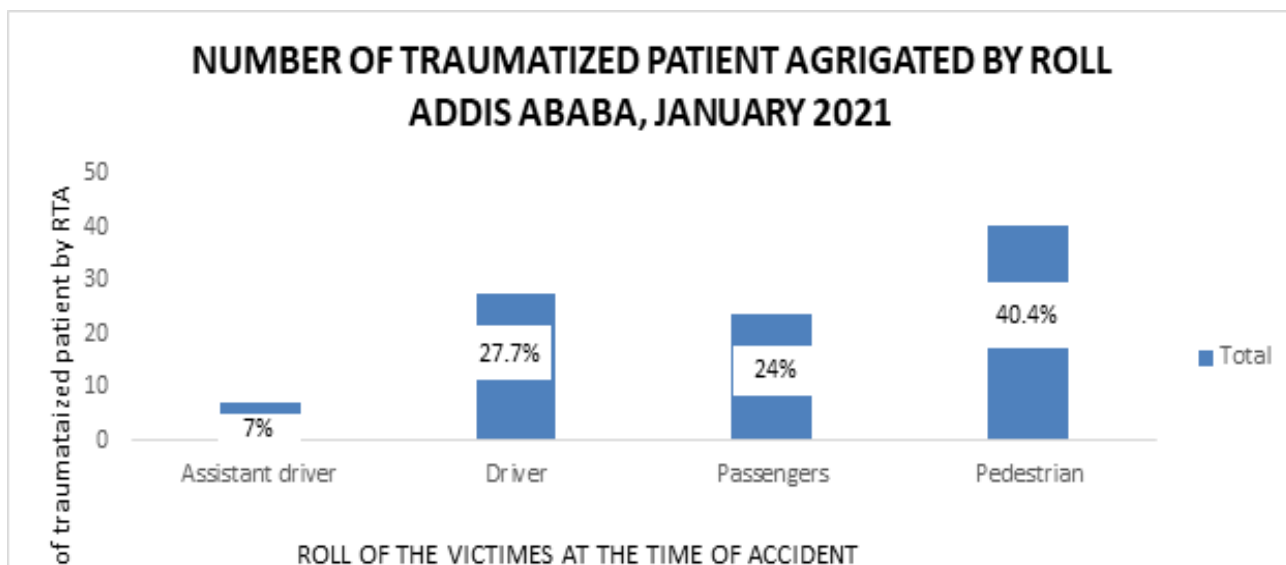


Figure 1; Number of traumatized patient aggregated by roll in Addis Ababa, Jan. 2021

Vehicle type that caused road traffic accident

Among 213 car accidents 43(20.1%) of the cases caused by Automobile (code 2) crashes and followed by 35 (16.4%) due to code3 public taxi (Dolphin, 5L and Abadula) and the least cause due to Lada which cover 11(5.1%) of the trauma.

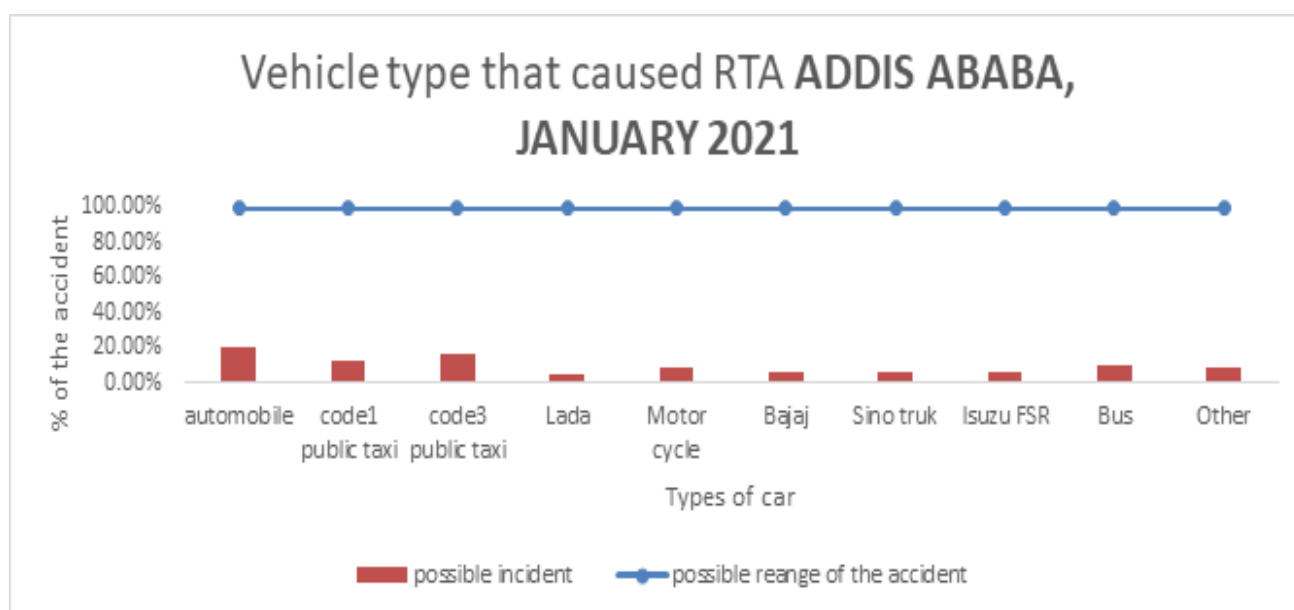


Figure 2: Number of traumatized patient aggregated by types of car in Addis Ababa, Jan. 2021  
Magnitude of road traffic Accident

Among all traumatized patients Road traffic accident is the leading causes of accident which accounts 213(57.1%) from the total trauma patients. Fig. 1

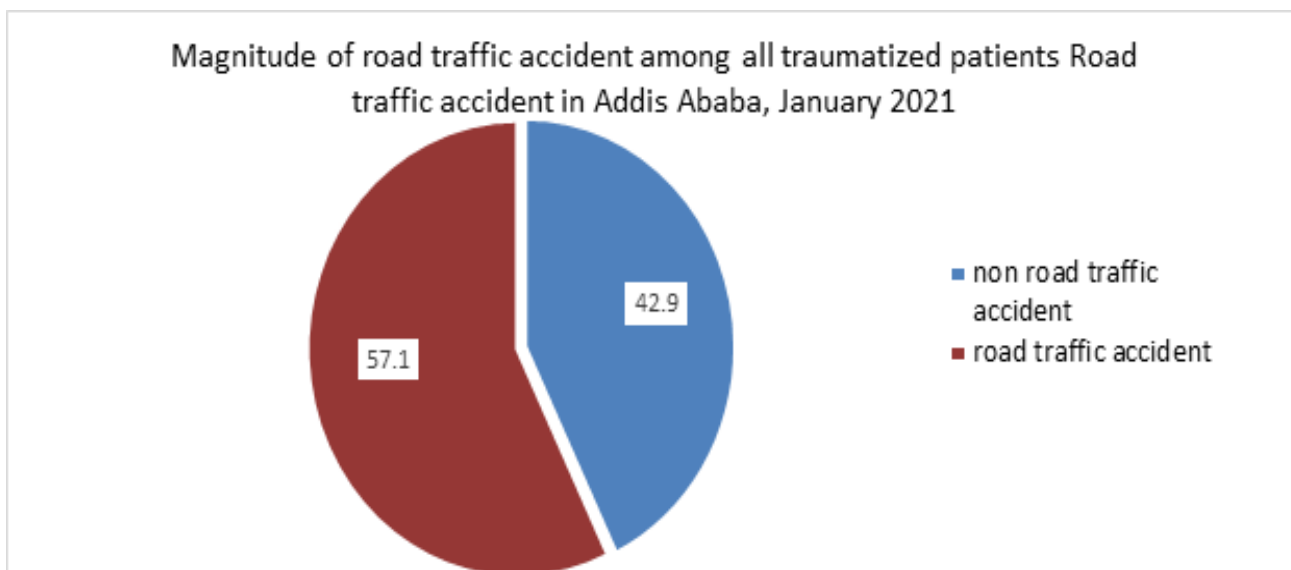
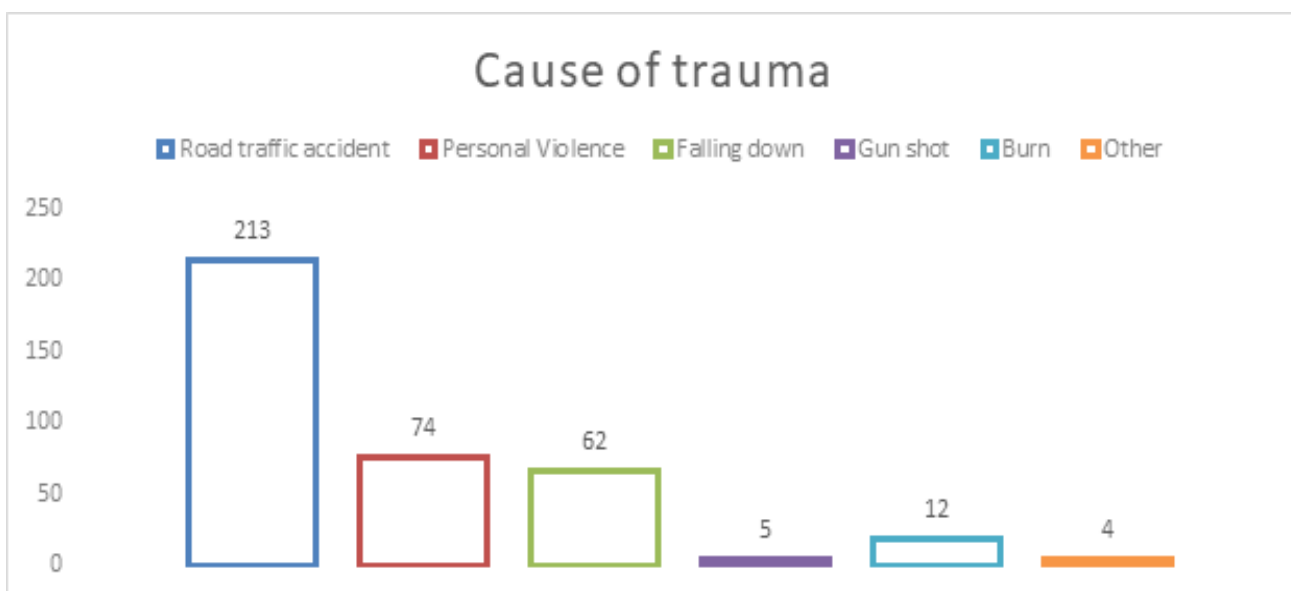


Fig3: Magnitude of trauma among all traumatized patients Road traffic accident in Addis Ababa, Jan. 2021

RTA the leading cause of trauma and followed by personal violence, which is account 74(19.8%). Trauma caused by other things like cutting by different type of machine and falling of heavy materials on the body is the least cause of accident, which is cover 4(1.1%).



\*\* Others include trauma by machine and falling down of heavy material on the body.

Figure 4; Cause of trauma among all traumatized patients Road traffic accident in Addis Ababa, Jan. 2021

**Factors associated with road traffic accident**

As shown in Table 2, bivariate analyses revealed several variables associated with road traffic accident, and multiple regression analyses presented a positive or negative relation. sex (Female) has significant statistical association with road traffic accidents (AOR=0.48 95%CI: 0.2,0.7).The other factors which had a significant statistical association with the development of road traffic accidents were Age between 20 to 29 and 30 to 39 (AOR= 3.032 95%CI: (1.5,6) and (AOR= 2.008 95%CI: 1,3.9). Occupation being driver (AOR=5.3 (95%CI: 1.8, 15.3), Time Light during Accident (Day) (AOR= 2.1 95%CI: 1.2, 3.5), Weather Condition (Cloudy) (AOR= 0.2 95%CI: 0.4,0.8) are also the other significant factors of RTA.

**Table 2. Result of Multivariate Analysis for the Selected Behavioral and Environmental Factors Related to RTA January 2021.**

Factors Yes		RTA		COR(95%CI	AOR(95%CI	P-value
		No				
Sex	Female	56	75	0.41(0.26,0.6)	0.48(0.2,0.7)	0.004*
	Male	157	85	1	1	
Age group	10-19	41	36	1.4(0.7,2.5)	2.158(0.8,5.4)	.104
	20-29	70	35	2.4(1.3,4.4)	3.032(1.5,6)	.002*
	30-39	65	44	1.8(1.007,3.2)	2.008(1,3.9)	.043*
	Above 40	37	45	1	1	
Educational level	Illiterate	11	13	0.745(0.3,1.7)	1.39(0.4,3.9)	.526
	Primary(1-8)	36	29	1.094(0.6,1.9)	1.704(0.8,3.5)	.158
	Secondary (9-12)	82	44	1.642(1.01,2.6)	1.732(0.9,3.2)	.083
	Diploma and above	84	74	1	1	
Occupation	Driver	55	10	5.5(2.4,12.4)	5.3(1.8,15.3)	.002*
	Daily laborer	20	42	.476(0.2,0.9)	.411(0.1,1.1)	.081
	Other	9	8	1.125(0.3,3.2)	1.452(0.4,5)	.560
	Employed	56	46	1.217(0.6,2.2)	1.665(0.7,3.8)	.238
	Merchant	37	18	2.056(0.9,4.2)	2.335(0.8,6.3)	.096
	Student	36	36	1	1	
Day of trauma	Friday	23	26	0.57(0.28,1.1)	.679(0.2,1.5)	.357
	Monday	35	23	1.03(0.5,2.05)	1.083(0.4,2.4)	.849
	Saturday	32	20	1.08(0.5,2.2)	1.268(0.5,2.9)	.578
	Sunday	25	19	0.936(0.4,1.9)	1.156(0.4,2.8)	.750
	Thursday	27	20	0.9(0.4,1.8)	.793(0.3,1.8)	.587
	Tuesday	25	21	0.8(0.3,1.6)	.756(0.3,1.7)	.512
	Wednesday	46	31	1	1	

Time Light during Accident	Day	135	85	1.5(1.006,2.3)	2.1(1.2,3.5)	0.004*
	Night	78	75	1	1	
Weather Condition	Cloudy	167	111	0.6(0.4,1.04)	0.4(0.2,0.8)	0.01*
	Sunny	46	47	1	1	

**Discussion**

**Socio demographic and Magnitude of RTA**

This study has illustrated the magnitude and associated factors responsible for RTA among patients visiting the Emergency Department of Addis Ababa public hospital during the study period. This study has illustrated the magnitude and associated factors responsible for RTA among patients visiting the Emergency Department of Addis Ababa public hospital during the study period. Our study shows that RTA is the leading cause of trauma in Addis Ababa which is cover (57.1%) of trauma and followed by personal violence and falling down. A study conducted at the university Gonder hospital in Gonder is supported our findings it shows RTA is at the top with different trend (38) but this finding higher than the study was conducted in Addis Ababa (2) and Arbaminch city, Arbaminch hospital (30) which was 22.8% and 47% respectively. This is maybe due to study design and unit also the presence of high traffic flow in urban area. But most of the studies show that the leading cause of trauma is RTA followed by personal violence and falling down, which is similar to our finding.

This study revealed that RTA exposure was significantly associated with age of between 10-19 years 11(19.2%), 20-29 years 70(32.8%) and 30-39 65(30.5%). This is consistency with the study done Addis Ababa, Ethiopia. (38).The most commonly affected age group, accounting for 41%, was the 20-29 years followed by 30-39 years (18%). This is similar to other studies Tanzania (47). In addition, elsewhere, were young men are reported to be largest consumers of the hospital emergency trauma services between 20-29 years (68%). The higher susceptibility of males to injuries is recognized to be due to risk taking behaviors.

In this study most of traumatized patients secondary to road traffic accident were pedestrians which covers 87(56%) from the total RTA patients and followed by those driver 60(16%) which is consistence to the study done in Addis Ababa (4). This is also supported by research the World health report 2008. However, the contradictory with the study from Arbaminch hospital (30) that the passengers were more traumatized groups. This is likely to the presence of high density of population in the city, which are not used car, and shortage of road. Second most common of traumatized patients were drivers this may be due to the reason which is most of them are owners and the risky behavior of the occupation.

Automobiles owned vehicles used for family transport or business oriented vehicles had important role as a cause of accident in this study. City taxi (including Ladas and minibuses), buses, Bajaj’s, Motor cycle, FSR and Isuzu were the vehicle types mainly involved as accident causing vehicles however ambulances,”Garies” which are classified under other type of vehicles in this study were also not free of causing the accidents. According to the findings of the current study different types of vehicles involved in road traffic accidents among which the majority, 41(19.2%), were due to Automobiles followed by code 3 public taxi( 5L,abadula,dolphin..) 35(16.4%), Minibus 28(13.14%), Bus(public bus and long distance traveler bus) 20(9%) , Motor cycle 18(8.4%), Isuzu, Sino truck 14(6%), Bajaj 12(5.6%), Ladas 11(5.1%) however 17(8%%) victims were injured by other type of vehicle(“Gari”,Ambulance) this



finding were contradicted with the finding of the study conducted in Arbaminch hospital (30) which motorcycle 45(40%) is the leading type of vehicles to cause collision which is similar to the with study of medico-legal autopsies of RTAs in south India in which heavy motor vehicles (35.2%) were most common offending agents in road traffic accidents(25).

This study revealed that RTA exposure was significant in male rather than female. This finding is consistency with the study was conducted in Arbaminch city, Arbaminch hospital (30). This is also supported by research done at Tanzania (47). However, the contradictory with the study from Albania that highlighted the women were more victims in the injuries.

This study revealed that RTA exposure was higher in the age of between 20-29 years 91(40%) and between 30-39 years 64(30%). This is consistency with the study done Addis Ababa, Ethiopia. (38). The most commonly affected age group, accounting for 41%, was the 20-29 years followed by 30-39 years (18%). This is similar to other studies Tanzania (47). Possible explanation may be that this age group is the active working years of life, time for practicing independent life out of parental supervision. In turn, this may predispose them to use substances. This signifies the possible economic impact of injury as the productive age group of the society is primarily affected. The majority of the patient came from urban area to Addis Ababa public hospitals and which showed most injured patients came from urban area that counts 97.4% from the total respondents.

#### **Factor associated with road traffic accident**

A binary logistic regression was done to identify the association between road traffic accidents injuries and independent variables. In the bi-variety analysis Khat and Alcohol consumption, educational level, Marital status, occupation, days of trauma, sex, Age, time (light) of accident, and Weather condition were identified to be factors significantly ( $p < 0.2$ ) associated with road traffic accidents. However, the outcome of the multiple logistic regression analysis was sex (Female), Weather condition (cloudy) and time of accident (night) has protective effect and weather condition, Age group (reproductive age) and occupation being driver and daily laborer were statistically significant variables.

In adjusted analysis age is between, 20-29 years and 30-39 years has significant statistical association with road traffic accidents (AOR= 3.032 95%CI: 1.5,6) and (AOR= 2.008 95%CI: 1,3.9). The age between 20-29 and 30-39 3.03 and 2.01 higher time risk than age group that are greater than 40.

This is also supported by research done at Black lion Specialized Referral Hospital in the multivariate analysis, characteristics that were significantly associated with injury of assault age. Similarly, those reporting their age as under 40 years old were significantly associated with injury of assault {(P= 0.004, AOR 3.271,95%CI (1.451-7.375)} (38). This age group were active working years of life and the risky taking behavior.

In adjusted analysis, sex (Female) has significant statistical association with road traffic accidents (AOR=0.48 95%CI: 0.2, 0.7). Being Females are 0.48 times higher protective for RTA than Males. This is also supported by research done at Black lion specialized Referral Hospital in the multivariate analysis; characteristics that were significantly associated with injury of assault include patient sex. It was found that odds of injury of assault to be increased for male {(P= 0.037, AOR, 2.528, 95%CI (1.058-6.037)} (38). Similarly research conducted in Arbaminch hospital also supported the finding sex is a significance variable [COR=18.16 (7.83-42.13)] (30). The higher susceptibility of males to injuries

is recognized to be due to risk taking behaviors.

The other factors that had a significant statistical association with the development of road traffic accidents were time light during accident (Day) (AOR= 2.1 95%CI: 1.2, 3.5). The finding is supported by the research conducted in Black lion hospital (36) the majority 156 (67.9 %) of road traffic accidents occurred during the daytime. It is happening due to there is a high traffic flow at the daytime in urban areas.

In adjusted analysis occupation being driver 5.3 times higher risk for RTA than students (AOR=5.3 (95%CI: 1.8, 15.3). This result similar with the study conducted in Tiruneshe Beijing hospital Addis Ababa (34). This may be due to the risky behavior of the occupation.

### **Conclusion**

RTA is the highest cause of trauma. Of the total 373 traumatized patients males were more victims of the than females. Automobile is the primary cause of RTA. Pedestrians were the most exposed group followed by driver. Sex, Age group, Occupation being driver and daily laborer, Time Light during Accident (night) and weather condition were significantly associated with the RTA.

### **Abbreviations**

AOR-Adjusted Odds Ratio, ARM-Annual Review Meeting, CI-Confidence Interval, ED-Emergency Department, EOPD-Emergency outpatient department ICU-Intensive Care Unit, LMIC -Low- Middle- Income Country, OR-Odds Ratio, PI-Principal Investigator, RTA-Road Traffic Accident, RTC-Road traffic collision, U.S.A-United States of America, WHO-World Health Organization.

### **Declarations**

#### **Ethics approval and consent to participate**

The study was approved by the Ethical Committee of Kotebe Metropolitan university Minillik II health science college. All participants signed the informed consent before answered the questionnaire.

#### **Consent for publication**

All authors have agreed with the content and approved the submission of the manuscript.

#### **Acknowledgments**

We thank all trauma patients who participated in our study.

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