

Trend and Fatality of Road traffic injury and Associated Factors of patients  
Admitted to Emergency Departments of St. Luke Hospital, South West Shewa  
Zone, Central Ethiopia, 2019



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## **Abstract**

**Background:** Road traffic injury is a major global public health problem that causes about 1.3 million people die and 20-50 million people injured each year on the world's roads. This study aimed to identify factors contributed for road traffic injury fatality and develop targeted interventions and preventive measures to improve road safety among road users.

**Objectives:** The aim of this study was to determine trend and fatality of road traffic injury and associated factors of patients admitted to emergency departments of St. Luke hospital, South West Shewa Zone, Central Ethiopia, 2019.

**Methods:** An institution based cross sectional study was conducted from July 10 to 30, 2019 in St. Luke hospital, South West Shewa, Central Ethiopia. We conducted trend of road traffic injury monthly bases. A total of 364 road traffic injured victims participated in the study. The study subjects were selected by using simple random sampling technique of secondary data and included to the study until the sample size obtained. A structured data abstraction format was used to gather the required data. We conducted binary logistic regression and multivariate logistic regression to determine the association between outcome and explanatory variables. Adjusted odds ratios and 95% confidence intervals were used to report independent variables associated with fatality of road traffic injury.

**Results:** A total of 364 road traffic injury victims admitted to emergency department of St. Luke hospital were included in the study. Trend of road traffic injury fatality vary from month to months which showed that 15.6% of fatality occurred in November, 2018. The average annual road traffic injury fatality was 8.34% death/month. We conducted magnitude of road traffic injury fatality 8.79%. Of all victims visited the hospital 75.5% was male. The median age of the victims was 26 which ranged from 6 to 70. 51.6% of victims were age between 15-29 years. The identified risk factors for road traffic injury fatality were lack of ambulance for transportation to hospital after accident (AOR=7.093, 95%CI 1.950-25.793 P=0.003) and head injury (AOR=2.515 95%CI 1.075-5.885, P=0.034).

**Conclusion:** Road traffic injury fatality is an important public health problem which needs special attention. The factors contributing for fatality of road traffic injury were shortage of ambulance service for transportation and injury site related to head injury. So, it is important to establish and strengthen advanced pre-hospital care and an effective ambulance system for transportation of victims of road traffic injury.

**Key words:** *Road traffic injury, road traffic injury fatality, factors, South West Shewa.*

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## Acronyms

AOR	Adjusted Odds Ratio
COR	Crude Odds Ratio
ED	Emergency Department
EDHS	Ethiopia Demographic Health Survey
GDP	Gross Domestic Product
hr	hour
RTA	Road Traffic Accidents
RTI	Road Traffic Injuries
SPSS	Statistical Package for Social Sciences
St.	Saint
US	United States
WHO	World Health Organization



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# **1 Introduction**

## **1.1 Background**

Road transportation provides great benefit both to nations and to individuals by facilitating the movement of goods and people. It enables increased access to jobs, health care, economic markets, education and recreation which in turn have direct or indirect positive impact on the health of population. However, road transportation has also placed a considerable burden on people's health in the form of road traffic injury and the consequences of the injury(1). Although World Health Organization (WHO) reported that the overall trend in number of fatalities of road traffic collision in low- or middle-income countries it showed a rising trend since 2010 (2).

Road traffic injury(RTI) is defined as fatal or non-fatal injury that occur as a result of a road traffic crash that occurs on a way or street open to public traffic involving at least one moving vehicle(3,4). It is a major global public health problem occurring due to collision between vehicles, between vehicles and pedestrians, between vehicles and animals, or between vehicles and geographical or architectural obstacles which have been a leading cause of mortality for many years and require concerted efforts for effective and sustainable prevention (3,5–8).

The factors for increase in global road traffic injury fatality is the growing number of motor vehicles, speeding, not using seat belts and helmets by motorcyclists, alcohol and other substance uses, road type, weather condition and other human related factors(9). Without proper planning, growth in the number of motor vehicles can lead to problems for pedestrians and cyclists. In fact, where there are no facilities for pedestrians and cyclists, increasing numbers of motor vehicles generally lead to reductions in walking and cycling(10). Road traffic injury problem observed in developed countries shows decrement in RTA while injury trend are notably increasing in middle and low income countries including Ethiopia(1).

Out of ten lives lost in traffic injury, nine are lost in low- and middle- income countries. But the number of road traffic deaths is on the rise again even in some countries with impressive road safety improvements. The increasing share of vulnerable road users such as pedestrian, drivers, cyclists and motorcyclists that become victims of road traffic raises particular concerns(11). Road traffic injury is a growing public health issue, disproportionately affecting vulnerable groups of road users, including the poor(2). Ninety percent of the world's

fatalities on the roads occur in low and middle-income countries, even though these countries have approximately 54% of the world's vehicles(12).

Unless immediate action is taken, the number of global deaths and injuries from road traffic accident will be the third leading cause of death by 2020 (13). Deaths from RTA also projected to increase from 1.2 million in 2004 to 2.4 million in 2030, primarily due to the increased motor vehicle ownership and use associated with economic growth in low and middle income countries(14).

The 2015 WHO report on road safety highlights that the situation is worst in low-income countries, where rates are more than double those in high-income countries and there are a disproportionate number of deaths relative to the lower level of motorization. The African Region continues to have the highest road traffic death rates, while the lowest rates are in the European Region, notably among its high income countries, many of which have been very successful at achieving and sustaining reductions in death rates despite increasing motorization(15). Road traffic injury poses a high burden over the entire life course in sub-Saharan Africa, impacting not just young adults but also children and the elderly. Nigeria, Ethiopia, South Africa and Sudan together account for half the road traffic injury death of Sub-Saharan Africa(16).

Ethiopia Demographic Health Survey (EDHS) 2016, also showed that road traffic accidents in Ethiopia accounted for the highest percentages of accidental injuries and deaths which account (23%) of all injury. Females and males were equally likely to have been injured or killed in a road traffic accident. However, urban residents (32%) were more likely than rural residents (20%) to have been injured or killed in a road traffic accident(17).

## 1.2 Statement of the Problem

The World Health Organization (WHO) estimates that 1.3 million people die each year on the world's roads and between 20 and 50 million people are left injured or disabled worldwide due to road traffic injury(11,12,18). Globally because of RTA, over 3400 people die on the world's roads every day and is a leading cause of death among young people, and the main cause of death among those aged 15–29 years(15). According to WHO road safety report in 2015, road traffic injuries were the leading cause of adolescent death among 10–19-year-old, resulting in approximately 115,000 adolescent deaths and also older adolescent boys aged 15–19 years experienced the greatest burden(19). Most young people killed in road traffic injuries are vulnerable road users such as pedestrians, cyclists and motorcyclists(20).

WHO projection in 2004 on traffic fatalities showed that, in high-income countries, the annual number of road traffic deaths is projected to decrease by 27% from 2000 to 2020. Whereas in the six regions, low-income and middle-income countries are concentrated, the annual number of road traffic deaths is projected to increase by 83% from 2000 to 2020(8). Road traffic injuries place a huge economic burden on low- and middle-income countries and are estimated to cost US \$518 billion globally and US \$65 billion in low-income and middle-income countries which is approximately 3% of Gross Domestic Product(GDP) and up to 5% in low- and middle-income countries(21,22).

RTI place a heavy burden, not only on global and national economies but also household finances. Many families are driven deeply into poverty by the loss of breadwinners and the added burden of caring for members disabled by road traffic injury(23). In many low-income and middle-income countries, the burden of traffic-related injuries is such that they represent between 30% and 86% of all trauma admissions(24).

In Africa, the numbers of road traffic injuries and deaths have been increasing over the last three decades(25). According to the 2015 global status report on road safety, the WHO African Region had the highest rate of fatality from road traffic injuries worldwide at 26.6 per 100,000 population for the year 2013 and the lowest in the European region 10.3 per 100,000(1,25). In African Region, young men are the most vulnerable road users and also, pedestrians, cyclists, and persons travelling on motorized 2- and 3-wheelers are at great risk of death and injury on the roads(26).

In Africa, RTI is responsible for almost one in ten deaths of young men aged 15 to 29. The rate of road traffic deaths is 19.5 per 100,000 population in the Region's middle-income countries and 12.7 per 100,000 population in low-income countries due to increasing motorization and economic development are major attributers to the increasing number of deaths in middle-income countries(27). Sub-Saharan Africa has the world's most dangerous roads, with a road traffic fatality rate of 24.1 per100,000 people, and yet as Africa's economy grows, supported by expanded road infrastructure, and as more and more vehicles are imported into the continent, the risk of RTI increases every day(28).

According to the latest WHO data published in 2017 Road Traffic Accidents Deaths in Ethiopia reached 27,140 or 4.27% of total deaths and age adjusted Death Rate is 36.36 per100,000 of population and Ethiopia ranks 22 in the world(29). Since Ethiopia millennium the number of road traffic accident in Ethiopia was in alarming state. From 2007/2008-2017/2018 the number of road traffic accident was estimated around 291,577. From those traffic accident 36,796, 54, 731, 58, 987 and 141, 063 road traffic accident were fatality, serious injuries, light injuries and property damage respectively(30).

The Federal Police Commission of Ethiopia crash report in 2012/13 provides a breakdown by region, Oromia region had the highest road traffic injury followed by Addis Ababa City and Amhara region, contributing 25.3%, 23.4%, and 22.2% of road traffic injury respectively(31). The road traffic injuries happening on the road continued being huge public health problem which resulted in, many lives lost, many faced disabilities, and many properties damaged.

The aim of this study is to assess trend and fatality of road traffic injury and associated factors in emergency department of St.Luke Hospital, South West Shewa Zone, Oromia Region, Central Ethiopia. Even though there is the problem of road traffic injury, no study so far has been conducted with regards to trend and fatality of road traffic injury and associated factors particularly in the selected study area. Since the majority of road traffic injury fatality is preventable, a clear understanding of the prevalence and contributing factors related to road traffic accident and fatality is essential for designing prevention strategies. Therefore, this study will give base line information for local road safety measures and stake holders to identify priorities and develop targeted interventions and preventive measures to improve road safety among road users.

## **2 Literature Review**

The number of road traffic injury occurring is still increasing in developing countries, although it has shown a decreasing trend in developed countries in the last decade. WHO 2015 report has shown that in 68 countries (of which 85% are low-or middle income countries) have seen a rise in the number of road traffic deaths since 2010(15).

Road traffic injury fatality is still increasing in developing countries, although it has shown a decreasing trend in developed countries in the last decade(15). Low- and middle-income countries have only half of the world's vehicles, they have (90%) of the world's road traffic deaths(2).

A study conducted in Tikur Anbesa specialized hospital on injury characteristics and outcome revealed that in all RTI victims reaching hospital, males to females by a sex ratio of 2.6:1 from these victims about 7.4% and 92.6% died and discharged respectively(32). Another study conducted at hospital in Wolaita Sodo , showed most of the victims presented to the hospitals within 24 hours, of all victims who reached hospital, (6%) died, (12.5%) and (81.5%) survived with long- term disability and without long-term disability respectively(33).

Furthermore, a cross sectional study done using retrospective design at emergency department of Zewuditu Memorial Hospital indicated that outcome of RTA admission cases 54%,25%,6% and 1% cases were discharged, hospitalized, referred and died respectively and other 13% of victims outcome was not recorded (34).

### **2.1 Factors Associated with Road Traffic Injury Fatality**

#### ***2.1.1 Socio- demographic characteristics***

Even though both males and females are at risk of road traffic injury fatality, males predominantly involve in road traffic injury fatality as evidences have shown from different studies. A study conducted in Gambia in 2017, has reported that the outcome of road injury victims who were admitted, transferred, or died were more likely to be male (AOR=1.48, 95% CI=1.2–1.9) (35). A Cross sectional study conducted in Iran in 2016, showed that males accounted for almost 78.7% of road traffic fatality among victims dead by road traffic injury(36). Similarly, a study conducted in Tanzania in 2012, also showed that male to female ratio of road

traffic injury fatality was 2.1:1(37). A cross sectional study conducted at 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(32). Inconsistent to this, a study conducted from Akaki to Adama road showed that women were more likely to be exposed to fatal road traffic accidents than male (AOR= 4.7; 95% CI: 1.5-15)(38).

According to WHO global road traffic safety report, road traffic injuries are the number one cause of victims among those aged 15–29(15). According to a study in India in 2016, age group 30-44 years was the most vulnerable to road accident fatality and accounted (35%) followed by age 15-29 which accounted (29.9%)(39). According to a study done in India in 2013 highest number of victims of road traffic injury fatality (51.8%) were 16 – 30 years of age followed by (25.1%) age 31 – 45 years(40). Similar study conducted in Burrayyu town 2016, also showed that age 18-30 accounted (59%) followed by 31-50 which accounted for (20%) total death due to road traffic injury (41).

According to 2017 study conducted in Addis Ababa, urban residents (35.6%) were more seriously injured than rural residents (13.7 %) due to road traffic crash(42). Similar study conducted in Arba Minch in 2017 also showed that road traffic injury in urban areas accounted (66.07%), whereas rural areas was (33.93%)(43).

According to a study conducted in Iraq the distribution of road traffic injury fatality showed that pedestrians accounted (49%) followed by car users (46.3%) and motorcycle users(3.7%) and the rest (0.8%) were unknown(44). According to the study conducted in Black lion hospital in Addis Ababa 2014, the majority of victims were pedestrians which accounted(71.7%), followed by passengers who consisted of (13%) and drivers which constituted (12.2%), and the rest were assistants of the drivers(45). Other study conducted in Addis Ababa zone in 2017, showed victims were pedestrians (87.1%), followed by passengers (9.4%) and drivers which constituted (3.6%)(46). A study conducted in central Ethiopia 2013 showed that fatality by road users was pedestrians(34.78%), passengers(32.12%) and drivers(7.84%) by road traffic injury(38).

## **2.2 Factors influencing fatality of injuries**

A study conducted in Iran 2013, showed that 63% of the patients affected by road traffic injury were transported to the hospital by means of transportation other than ambulance, and only 13% were transported by ambulances(47). Similar study conducted in Kenya 2011, showed that only

3% of road traffic injury victims were transported by ambulance to hospital after RTI occurrence(48).

According to a study conducted in Iran in 2014, the proportions of road traffic crash which led to injury were 24.44% at sunrise and 27.16% at sunset compared with 5.43% and 1.43% deaths at sunrise and sunset respectively (49). Another study conducted in Addis Ababa in 2017, also revealed that, road traffic injuries that occurred during the morning and the evening time were 35.11% followed by the afternoon time 25.95%(45).

According to the Study conducted in Dilchora referral hospital in 2015, fatality of road traffic injury related to Site of injury showed that head injury accounted 52.63% followed by lower extremities, upper extremities and Neck & Back injury which accounted 15.8% each respectively(50). Other study conducted in India in 2017, showed that road traffic injury fatality resulted due to head injury accounted 59.3% followed by thorax, maxilo facial region, upper limb injury and lower limb injury which accounted 15.25%,13.6%, 6.8% and 5.08 respectively(51). The study done in Tanzania indicated, limb and head injury were also the most common type of injury sustained which predisposed RTA victims to prolonged fatality(37).



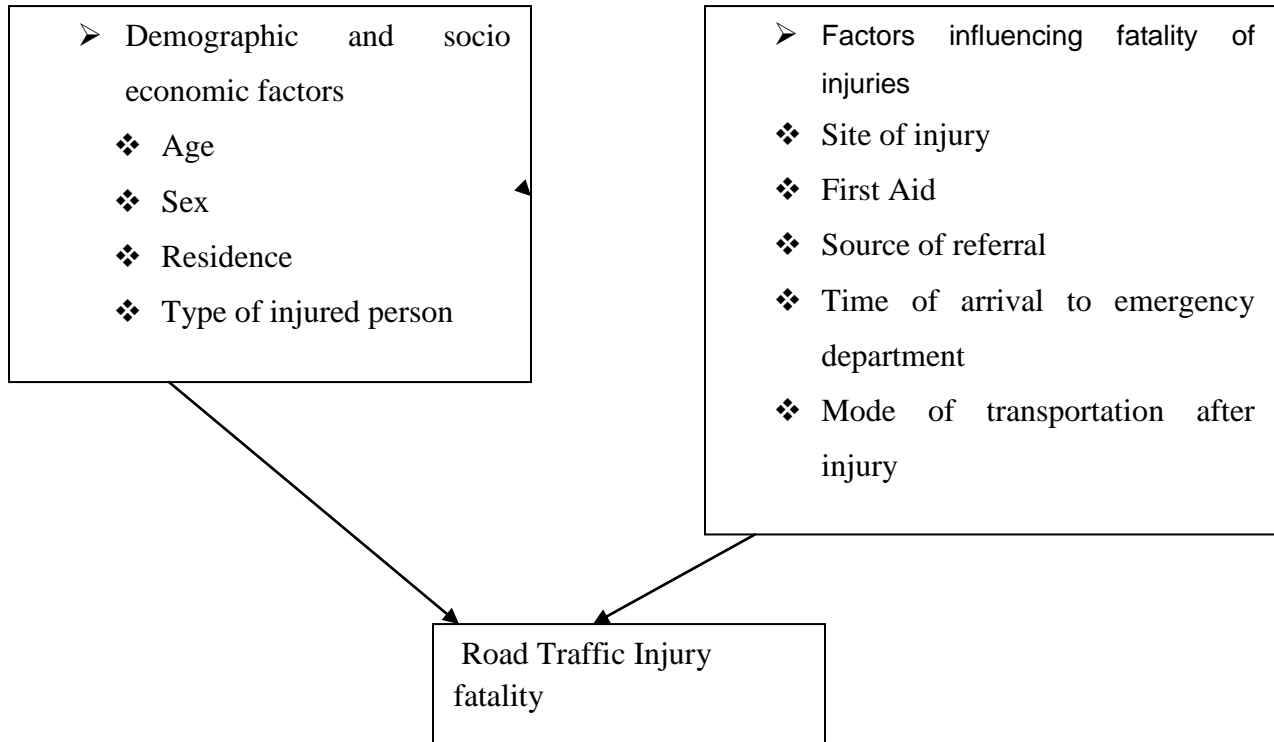
### **2.3 Significance of the study**

Identifying the risk factors that contribute to road traffic injury fatality is important in identifying interventions that can reduce the risks associated with those factors.

This finding may serve as reference for the policy makers to develop evidence-based interventions in order to overcome impact on road traffic injury fatality in the study area. It will help the community by identifying the most important factors that contribute to road traffic injury fatality and recommend possible interventions that minimize the impact of road traffic injury fatality. It may also provide a baseline data for researchers who will be interested to conduct further studies on road traffic injury fatality prevention.

## 2.4 Conceptual framework of the study

The Conceptual framework of the study is developed after reviewing previous similar studies to conceptualize the whole research process and to aid as guide for tool development and analysis.



**Figure 1:-**Conceptual Framework shows factors related to road traffic injuries.

**Source:** Adopted from WHO-Road Traffic Injury Prevention: Training Manual, 2004 and different Literatures(10).

### **3 Objectives**

#### **3.1 General Objective**

To assess trend and fatality of road traffic injury and associated factors of patients admitted to emergency departments of St. Luke hospital, South West Shewa, central Ethiopia, 2019.

#### **3.2 Specific Objectives**

- ✓ To determine trend of road traffic injury victims admitted to emergency department.
- ✓ To determine prevalence of road traffic injury fatality among road traffic injured victims admitted to emergency department.
- ✓ To identify factors associated with road traffic injury fatality among victims of road traffic accident in the study area.

## **4 Materials and Methods**

### **4.1 Study area and period**

This study was conducted in St.Luke Catholic Hospital and college of Nursing and Midwifery located in Woliso town of Oromia Regional State. The hospital has 200 beds and serves more than 400 outpatients per day. It is the only referral Hospital in South West Shewa Zone serving a population of approximately 1.3 Million people. The outpatient department is fully operational five days a week for routine outpatient consultations and with Emergency Room services available 24 hours every day with one health officer on duty, 3 nurses and one surgeon and one internist on call(52).

The study was conducted from July 10 to 30, 2019 at St.Luke Hospital in South West Shewa Zone, Oromia, Ethiopia.

### **4.2 Study design**

Institution based cross-sectional study was conducted.

### **4.3 Source population and Study Population**

#### ***4.3.1 Source Population***

All road traffic injury patients who attended emergency department of St. Luke Hospital from January 1, 2018–December 31, 2018.

#### ***4.3.2 Study Population***

All road traffic injury patients who attended emergency department of St. Luke Hospital admitted from January 1, 2018 to December 31, 2018 that fulfills the inclusion criteria.

### **4.4 Eligibility criteria**

Inclusion criteria-

- All road traffic injured patients who attended Emergency Department, St.Luke hospital from January 1, 2018 - December 31, 2018.

Exclusion criteria-

- Those road traffic injured patients, who were transferred immediately to other Hospitals and without outcome variables, were excluded.

## 4.5 Sample size and Sampling technique /Sampling procedures

### 4.5.1 Sample size determination

Sample size was determined based on single population proportion formula. Based on the study conducted in Dilchora Hospital in 2016, the magnitude of road traffic injury fatality was 9.4% (50). The level of confidence ( $\alpha$ ) was taken as 95% ( $Z_{\alpha/2} = 1.96$ ); to maximize the sample size the margin of error was taken as 0.03.

$$n = \frac{(Z_{\alpha/2})^2 * p(1-p)}{d^2} = n = \frac{(1.96)^2 * 0.094(1-0.094)}{0.03^2} = 364$$

Where:-

P= prevalence of RTI fatality among injured patients.

$Z_{\alpha/2} = 95\%$  confidence interval two tailed test is= 1.96

d = margin of error taken as 3%= 0.03

Then, the calculated sample size is n=364

To determine the required sample size for the second specific objective of this study different factors which are significantly associated with road traffic injury were considered with the following assumption; 95% confidence level and power of 80% using an Epi Info version 7.2.2.2 software program, The calculated sample size for selected variables and maximum sample size is taken for the final required sample size.

Table 1:-Sample size for factors associated with road traffic injury fatality, 2019

Associated factors	%Outcome of unexposed	AOR	Confidence Interval	Power	P-value	Sample size calculated Fleiss w/CC	References
Sex(Female)	66.7	4.74	(1.5 -15)	80%	0.001	126	(38,53)
Weather Condition(Rainy)	15.9	6	(1.4-25.4)	80%	0.001	96	

Finally, the required sample size of this study was determined by taking the maximum sample size from the first objective 364 with magnitude of road traffic injury fatality.

#### ***4.5.2 Sampling Technique and Procedure***

The study subjects were selected using simple random sampling technique and included to the study until the sample size was obtained. First, the card numbers of 866 victims from (January 1, 2018-December 31/2018) were collected from emergency room registration book to get the main files of the patients in record room. Next, using medical record numbers of patients, cards were collected from the card room. Road traffic injured victims registered from January 1, 2018 – December 31, 2018 at emergency department were listed based on the sequence of their card number monthly. To select chart of victims, sampling frame was developed from victims' registration book and each road traffic injury patient card was accessed based on simple random sampling technique. The injured patient charts were selected by lottery method within the sampling frame.

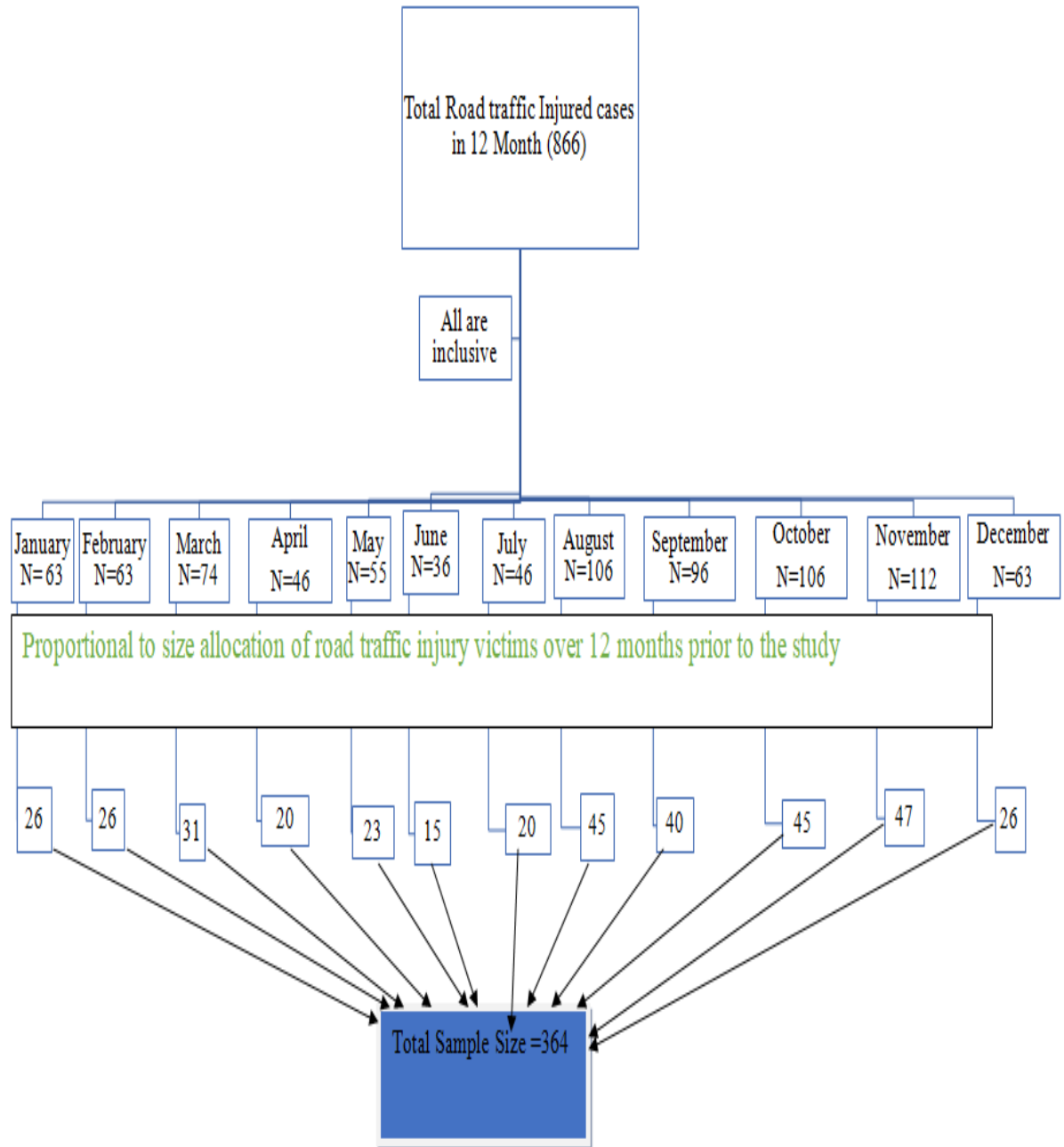


Figure 2:- Schematic presentation of the sampling procedure from January 1, 2018 to December, 30, 2018 monthly Road traffic patients, St.Luke Hospital, South West Shewa Zone, Oromia, 2019.

## **4.6 Data collection tools and procedures**

The data for the study was extracted from routinely registered client medical record and emergency department registration book. Data was collected using a pretested format from the sample population according to the inclusion criteria. Data collection tool was adapted from injury surveillance guideline document of WHO developed in 2004(54). Data was collected and supervised by 2 diploma holders and 1 degree holder nurses respectively.

## **4.7 Study variables**

Dependent Variable

- ❖ Road traffic injury fatality

Independent Variables

- **Demographic and socio-economic factors**
  - Age
  - Sex
  - Residence
  - Type of injured person(Pedestrian, passenger, driver, motorbike driver)
- **Environmental factors: -**
  - ❖ Mode of transportation to hospital after injury occurred
- **Characteristics of RTI victims during admission**
  - ✓ Site of injury
  - ✓ First Aid
  - ✓ Source of referral
  - ✓ Time between RTA and admission

## **4.8 Data quality management**

To ensure the quality of data the format was pre-tested using (5%) of sample size which is 18 in Tulubollo hospital before the actual data collection. Necessary modifications were made based on the pretest findings. To maintain data quality, one day training was given for data collectors and a supervisor. The completeness and consistency of the data was checked both by the



supervisor and by the principal investigator daily. Correctly completed formats were collected from data collectors and entered in to the EpiData manager 4.4.2 software.

## **4.9 Data processing and analysis procedures**

### ***4.9.1 Data Processing Procedure***

The collected data was entered in EpiData manager 4.4.2 and then exported to SPSS version 23.0 for statistical analysis. Data was checked for completeness, inconsistencies, cleaned and coded. The quantitative data was entered in to EpiData manager 4.4.2 and was cleaned and edited. The frequency distribution of variables was examined to check for data entry errors.

### ***4.9.2 Data Analysis procedures***

Descriptive analysis was done by computing proportions and summary statistics. Simple frequencies, summary measures, tables and figures were used to present the data. Binary logistic regression was used to describe the association between each independent variable with the dependent variable. Variables with P-value of  $< 0.25$  were used for multivariate logistic regression model to control the effect of other confounders and finally the variables which have association with road traffic injury fatality were identified on the basis of AOR, with 95%CI and p-value less than 0.05. The variables were entered in the multivariate model using the Backward Stepwise regression method. Model fitness was checked by using Hosmer and Lemeshow goodness of a fit test. Finally adjusted odds ratios (AOR) and 95%confidence intervals were used to report independent variables associated with road traffic injury fatality.

## **4.10 Ethical consideration**

Ethical clearance was secured from Research Ethics Committee (REC) of Institute of Health Jimma University. Support letter was written from South West Shewa Zonal health office to St.Luke hospital. Then, letter of permission was obtained from St.Luke hospital.

The Card room workers and emergency department staffs were informed about the purpose of the study. To ensure confidentiality, name and other identifiers of patients, physicians and other health care workers recommendation were not recorded on the data abstraction format.

#### **4.11 Dissemination plan**

At the end of study, the result of the study will be disseminated to Jimma University, South West Shewa Zone Health Office, St.Luke hospital, Police office and transport office to provide information about factors associated with road traffic injury fatality among patients admitted to emergency department of St.luke hospital. Further efforts will be made to publish the findings on peer reviewed scientific journal.

#### **4.12 Operational definitions**

- ✚ Injury: visible or invisible damage on the body because of accident occurred intentionally or unintentionally.
- ✚ Road traffic injury: visible or invisible injury that occurs when vehicles collide with other vehicles, with pedestrian and with other stationary obstacles.
- ✚ Pedestrian: A person walking rather than travelling in a vehicle
- ✚ Fatality:- person died as a result of road traffic accidents
- ✚ Road traffic injury fatality: death due to road traffic injury immediately or within 30 days after the accident.

## 5 Results

A total of 364 road traffic injury victims were included in the study. Of all victims visited the hospital, 275(75.5%) were male. The median age of the victims was 26 which range from 6 to 70. The highest number of victims 188(51.6%) aged between 15-29 years followed by age 30-44 years 92(25.3%). RTA victims presenting to hospital more commonly occurred in victims coming from out of Woliso 242(66.5%) than from Woliso 122 (33.5%) (Table 2).

Table 2:-Socio-demographic characteristic of RTA victims from January 1, 2018 to December 30, 2018 in St.Luke Hospital,South West Shewa Zone, Oromia Region, 2019.

Variables		Frequency(n=364)	Percent(%)
Age	5-14	25	6.9
	15-29	188	51.6
	30-44	92	25.3
	45-59	40	11.0
	60 and Above	19	5.2
Sex	Male	275	75.5
	Female	89	24.5
Place of Residence	From Woliso	122	33.5
	Out of Woliso	242	66.5

From the total victims of RTA participants in the study 177(48.6%) of them were pedestrian followed by passengers and motorbike drivers which accounted 130(35.7%) and 49(13.5%) respectively (Figure 3).

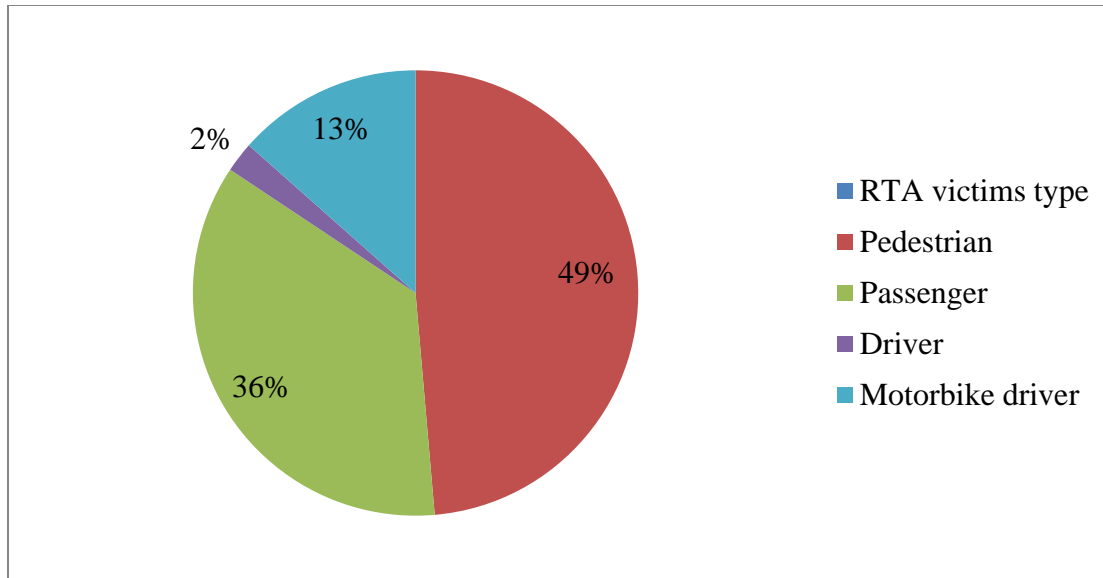


Figure 3:-RTA victims type road user from January 1, 2018 to December 30, 2018 in St.Luke Hospital, South West Shewa Zone, Oromia Region, 2019.

The highest road traffic injury occurred on weekday 136(37.36%) (Table 3).

Table 3:- Distribution of RTA in each day of the week from January 1, 2018 to December 30, 2018 in St.Luke Hospital, South West Shewa Zone, Oromia Region, 2019.

Variable		Frequency(n=364)	Percent(%)
Day in the week	Weekend	136	37.36
	Weekday	228	62.64
	Total	364	100

From total 364 cases affected by road traffic injury only 16(4.3%) were transported by Ambulance to the hospital whereas 11(3%) and 337(92.6%) were transported to hospital by police car and other method of transportation respectively (Table 4).

### Factors influencing outcome of injury victims during admission

Out of total RTA victims who participated in this study 199(54.7%) were admitted to emergency department of the hospital within less than 1hr and 165(45.3) of them were admitted from 1hr - 12hr after more than one hour following the occurrence of accident. From those admitted to hospital, 27(7.7%), 128(35.2%) and 208(57.1%) were referred from the hospital, health center and without referral, respectively. One hundred ninety one (52.5%) of the admitted RTA victims got first aid before they were sent to hospital.

According to the injury site of the Victims head injury accounted the highest 196(53.8%) followed by lower extremity injury 162(44.5%) (Table 4).

Table 4:- Distribution of injury site of RTA from January 1, 2018 to December 30, 2018 in St.Luke Hospital, South West Shewa Zone, Oromia Region, 2019.

Variable		Frequency(n=364)	Percent (%)
Head Injury	Yes	273	75.0
	No	91	25.0
Upper extremity	Yes	103	28.3
	No	261	71.7
Chest Injury	Yes	45	12.4
	No	319	87.6
Abdominal Injury	Yes	83	22.8
	No	281	77.2
Pelvic Injury	Yes	27	7.4
	No	337	92.6
Lower Extremity injury	Yes	161	44.2
	No	203	55.8
spinal cord injury	Yes	62	17.0
	No	302	83.0
Unknown	Yes	14	3.8
	No	350	96.2

### Trend of Road Traffic Injury fatality

The trends of road traffic injury fatality vary from month to month; the highest number of road traffic injury was recorded in November followed by August and October 2018.

Eight hundred and sixty six RTI occurred during the period of January 2018 to December 2018. The trends of road traffic injury fatality vary from month to month and also vary seasonally.

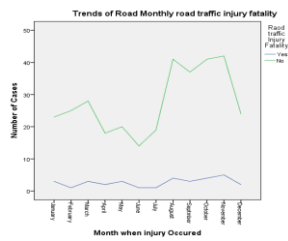


Figure 4:- Trends of Road traffic injury from January 1, 2018 to December 30, 2018 in St.Luke Hospital, South West Shewa Zone, Oromia Region, 2019.

## 5.1 Factors Associated with Road Traffic Injury Fatality

In binary logistic regression analysis, road traffic injury fatality was significantly associated with variables like, victims type, day injury occurred, duration at which injured patients reached hospital after the occurrence of injury, location of injury (head, upper extremity, chest, abdomen, pelvis, lower extremity) and spinal cord injury at  $p\text{-value} < 0.05$ .

Table 5:-Binary logistic Regression of factors associated with RTI fatality from January 1, 2018 to December 30, 2018 in St.Luke Hospital, South West Shewa Zone, Oromia Region, 2019.

Variables		Road traffic Injury Fatality(n=364)		COR(95% CI)	P-Value
		Yes (%)	No (%)		
		Residence of Injured patients	Woliso		
	Out of Woliso	25(10.2)	219(89.8)	1.84(0.77,4.39)	0.168*
Gender:	Male	26(9.5)	249(90.5)	1.44(0.71,5.09)	0.199*
	Female	6(6.7)	83(93.3)	1	
Age of Victims	5-14	3(12)	22(88)	0.30(0.04,1.71)	0.16*
	15-29	20(10.5)	170(89.5)	0.31(0.07,1.37)	0.12*
	30-44	7(7.6)	85(92.4)	0.44(0.09,2.20)	0.32
	45 and Above	2(3.5)	55(96.5)	1	
Victims type:	Pedestrian	10(5.6)	167(94.4)	1	
	Passenger	10(7.7)	120(92.3)	0.72(0.29,1.78)	0.475
	Driver	1(12.5)	7(87.5)	0.42(0.05,3.75)	0.437
	Motorbike driver	11(22.4)	38(77.6)	0.21(0.08,0.52)	0.001*
Day in the week	Work week	20(8.8)	208(92.2)	1.01(0.48,2.13)	0.99
	Weekend	12(8.8)	124(92.2)	1	

Season injury Occurred	Winter	7(8.4)	76(91.6)	1	
	Spring	7(9)	71(91)	0.93(0.31,2.80)	0.90
	Summer	7(8.2)	78(91.8)	1.03(0.34,3.07)	0.96
	Autumn	11(9.3)	107(90.7)	0.90(0.33,2.42)	0.83
Mode of transportation after accident to hospital	Ambulance	5(31.3)	11(68.8)	1	0.446
	Police care	1(9.1)	10(90.9)	4.55(0.45,45.86)	0.199*
	Public transport	26(7.7)	311(92.3)	5.44(1.76,16.84)	0.003*
Duration at which injured patient reached Hospital	<1hr	12(6)	187(94)	2.15(1.02,4.54)	0.045*
	1hr - 12 hr	20(12.1)	145(87.9)	1	

COR=Crude Odds Ratio, CI=Confidence Interval

P-value <0.05 which is significantly associated by binary logistic regression

**\*P-value <0.25 Candidate for multiple logistic regressions**



Table 6:-Binary logistic Regression of factors associated with RTI fatality related to environmental and Characteristics of RTI victims during admission from January 1, 2018 to December 30, 2018 in St.Luke Hospital, South West Shewa Zone, Oromia Region, 2019.

Variables		Raod traffic Injury Fatality(n=364)		COR(95% CI)	P-Value
		Yes(%)	No(%)		
Source of Referral	Hospital	2(7.1)	26(92.9)	1	
	Health Center	4(3.1)	124(96.9)	2.39(0.42,13.71)	0.33
	Without referral	26(12.5)	182(87.5)	0.54(0.12,2.40)	0.42
First aid before admitted	Yes	7(18.9)	151(81.1)	1	
	No	25(7.6)	181(92.4)	0.34(0.14,0.79)	0.01*
Head Injury	Yes	19(7)	254(93)	2.23(1.05,4.72)	0.04*
	No	13(14.3)	78(85.7)	1	
Upper extremity	Yes	4(3.9)	99(96.1)	2.97(1.02,8.70)	0.047*
	No	28(10.7)	233(89.3)	1	
Chest Injury	Yes	4(8.9)	41(91.1)	0.99(0.33,2.96)	0.98
	No	28(8.8)	291(91.2)	1	
Abdominal Injury	Yes	10(12)	73(88)	0.62(0.28,1.37)	0.24
	No	22(7.8)	259(92.2)	1	
Pelvic Injury	Yes	4(14.8)	23(85.2)	0.52(0.17,1.61)	0.26
	No	28(8.3)	309(91.7)	1	
Lower Extremity injury	Yes	10(6.2)	151(93.8)	1.84(0.84,4.00)	0.126*
	No	22(10.8)	181(89.2)	1	
Spinal cord injury	Yes	10(16.1)	52(83.9)	0.41(0.18,0.91)	0.029*
	No	22(7.3)	280(92.7)	1	
Unknown	Yes	2(14.3)	12(85.7)	0.56(0.12,2.63)	0.47
	No	30(8.6)	320(91.4)	1	

COR=Crude Odds Ratio, CI=Confidence Interval

P-value <0.05 which is significantly associated by binary logistic regression

**\*P-value <0.25 Candidate for multiple logistic regressions**

The result of multivariate analysis showed that mode of transportation after the occurrence of injury to hospital and head injury were independently associated with road traffic injury fatality (Table 7).

Table 7:- Multivariate logistic Regression of factors associated with RTI fatality from January 1, 2018 to December 30, 2018 in St.Luke Hospital, South West Shewa Zone, Oromia Region, 2019.

Variables		Raod traffic Injury Fatality		AOR(95% CI)	P-Value
		Yes (%)	No (%)		
Mode of transportation after accident to hospital	Ambulance	5(31.3)	11(68.8)	1	
	Police care	1(9.1)	10(90.9)	8.781(0.726,106.160)	0.088
	Public transport	26(7.7)	311(92.3)	7.093(1.950,25.793)	0.003
First aid before admitted	Yes	7(18.9)	30(81.1)	1	
	No	25(7.6)	302(92.4)	2.529(0.901,7.096)	0.078
Head Injury	Yes	19(7)	254(93)	2.515(1.075,5.885)	0.034
	No	13(14.3)	78(85.7)	1	
Upper extremity	Yes	4(3.9)	99(96.1)	3.129(0.985,9.943)	0.053
	No	28(10.7)	233(89.3)	1	
Lower Extremity injury	Yes	10(6.2)	151(93.8)	2.348(0.970,5.686)	0.059
	No	22(10.8)	181(89.2)	1	

## **6 Discussion, Conclusion, Recommendation and Limitation of the study**

### **6.1 Discussion**

The trend of road traffic injury fatality in this study showed that between January 2018 and December 2018 there were about 32 deaths which were 3 deaths/month on average. The highest road traffic injury was observed during the month of November which accounted 13% of total injury compared to an average 8.3% per month during the study period. Similar study conducted in emergency department of Zewditu Memorial Hospital showed that between September 2014 and August 2015 about 779 road traffic injury cases were admitted to emergency department which was about 8.34% cases per month on average(55). The main reasons for the increment of RTI may be the increase in number of vehicle ownership, the risky driving behavior of the drivers, poor enforcement of traffic safety rule, and poor road using behavior of the pedestrians. This study revealed road traffic injury fatality was 32(8.79%) out of those 364 study participants admitted to ED of the hospital by road traffic injury. Higher death was observed in this study as compared to a study conducted in Tikur Anbesa specialized hospital on injury characteristics and outcome that revealed that in all RTI victims reaching hospital,7.4% died (32) .Other studies conducted at Wolaita Sodo hospital and Zewditu Memorial Hospital indicated that 6% and 1% of them died respectively (55,56). Fatality in this study was lower than report from the same study conducted in Dilchora referral hospital, Dire Dawa (9.4%)(50) and (13.1%) at tertiary care center, Lucknow, India(51). Since the hospital in which the study conducted was used as a referral center and many victims were linked from other health facility, life threatening cases may lead for higher deaths.

In this study both males and females were exposed to road traffic injury fatality. The study result showed that males were highly affected by road traffic injury fatality which accounted for 26(81.25%) among road traffic injury victims. It is in line with Similar study conducted in Iran in 2016, that showed males accounted for almost (78.7%) of road traffic injury(36). Similarly, a study conducted in Tanzania in 2012, also showed that male to female ratio of road traffic injury fatality was 2.1:1(37). A cross sectional study conducted at 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(32). The death of more males than females by road traffic injury may be explained

by the movement of males to support their family and exposure in high risk activities among male individuals.

According to this study fatality of road traffic injury was higher among those aged 15–29 20(10.5%) followed by age 30-44 that accounted for 7(7.6%). Similar study done in India in 2013 also showed that highest number of victims of road traffic injury fatality (51.8%) were from 16 – 30 years of age followed by (25.1%) in the age 31 – 45 years(40). The study conducted in Burrayu town 2016, also showed that age 18-30 accounted (59%) followed by 31-50 which accounted (20%) of total death(41). More vulnerability of 15-29 age may be due to the fact that productive age groups, in the effort of earning income for their family and themselves, expose themselves to traffic injury. In contrast to this study, a study in India in 2016, showed that age group 30-44 years is the most vulnerable to road accident fatality (35%) followed by age group 15-29 which accounted (29.9%)(39).

This study revealed that RTA victims referred to hospital, who had not gotten ambulance as a mode of transportation after the occurrence of injury were more than 7 times likely to die by road traffic injury when compared to those who got ambulance (AOR=7.093, 95%CI(1.950,25.793). According to 2013 road safety report in the WHO African region, five countries have no ambulance services. In 22 countries (50%), experts estimate that less than 10% of seriously injured patients benefitted from ambulance evacuation. In only nine of the 44 countries (22%) is a reasonable proportion (50% and above) of injured patients taken to hospital by ambulance(26).This may be because of those who got ambulance got first aid before they reach hospital to minimize further death.

Injuries to the head are the main cause of death by road traffic injury. This study showed that RTA victims who had head injury were more than 2 times more likely to die when compared to those who had no head injury (AOR=2.515, 95%CI(1.075,5.885). This finding is less than the study conducted in Taiwan in 2016 showed that those who had head injury were more than 14 times likely to die when compared to those who had no head injury (AOR=14.6 95%CI(7.7,27.8)(57). A study done in Tanzania also reported that head injuries are the most common types of injury sustained which predisposed victims to prolonged hospitalization and mortality(37).This may be due to the seriousness of head injury which have potential to cause death on the injured victims.

The study result showed that there is no significant association with residence of victims, gender, age, source of referral, injury characteristics like chest injury abdominal injury, upper and lower extremity injury with emergency department treatment fatality of RTA victims.

## **6.2 Limitation**

Secondly, due to incomplete nature of secondary data variable like characteristics of crash, Drivers behaviors like using substances (alcohol, khat and other) were not allocated. The records also lack some important data like driver's level, quality of roads, utilization of seatbelt, helmets, and mobile phone.

## **6.3 Conclusion**

Road traffic injury fatality is an important public health problem. Trends of road traffic injury were varying from month to month and the highest death occurred from August – November, 2018. The highest numbers of road traffic injury fatality was among age 15-29 years. Fatality was higher among males than females. Lack of ambulance service for transportation road traffic injury victims to hospital after the occurrence of accident and injury to the head were the main cause of death by road traffic injury.

## **6.4 Recommendations**

Appropriate preventive measures targeting at reducing the occurrence of RTI is necessary to reduce death from road traffic injury and to reduce the number of families which are exposed to social crisis due to death of their family member due the accident of road traffic injury.

### **➤ For Oromia Regional Health Bureau and Ministry of Health**

- ✓ They should organize availability and accessibility of pre- hospital care service for road traffic injury victims.
- ✓ They should also organize availability of ambulance service for victims after the occurrence of road traffic accident.

### **➤ For Transport Authority and Traffic Polices**

- ✓ They should work with other stakeholders and take an appropriate measure to reduce the problems caused by RTIs in the region.

- ✓ They should work on provision of important messages to all members of the community regarding knowledge and practices of road safety measures like appropriate use of road by pedestrians and avoiding risky driving behaviors.
- ✓ Besides this, the traffic police and transport authority should make use of motorcycle helmets compulsory for motorbike user as mode of transportation method to decrease road traffic accidents.

➤ **Further research**

- ✓ Further research should be conducted in order to explore the risk factors that hinder and/or aggravate the frequency of RTAs in the community.

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## Annex

Annex 1: Data collection tool: Questionnaires (English version)

### Trend and fatality of road Traffic Injuries and Associated Factors among Patients Admitted to Emergency Departments of Hospitals in South West Shewa Zone, 2019

Name of supervisor \_\_\_\_\_ Date \_\_\_\_\_ Signature \_\_\_\_\_

Name of Data collector \_\_\_\_\_ Date \_\_\_\_\_ Signature \_\_\_\_\_

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Patient code _____			
Individual survey identifications			
Woreda _____		Health facility name _____	
Part 1: Demographic and Socio economic characteristics			
Code	Question	Option (Measurements)	Skip
101	Gender of the injured patients	1. Male 2. Female	
102	Age of the injured patients	_____ year	
103	Place of Residence	1. Woliso 2. Out of Woliso	
203	In which type you classify the victim?	1. Pedestrian 2. Passenger 3. Driver	

		4. Motorbike driver	
Risk Factors			
201	Day injury occurred	1. Monday 2. Tuesday 3. Wednesday 4. Thursday 5. Friday 6. Saturday 7. Sunday	
202	Date when injury Occurred	_____	
203	Source of Referral	1. Hospital 2. Health Center 3. Without referral	
204	Mode of transportation after accident to hospital	1. Ambulance 2. Police care 3. Others/ Specify_____	
205	Duration at which the injured patient reached hospital after the occurrence of accident.	1. $\leq$ 1 hr 2. 1hr – 12 hr 3. 12 hr – 24 hr 4. 24 hr – 1 wk 5. $\geq$ 1 wk	
206	First aid before admitted	1. Yes 2. No	
207	Where was the Site of injury in the body after sustained RTA? (More than one answer is possible)	1.Head injury 2.Upper extremity 3.Chest injury 4.Abdominal injury 5.Pelvic injury 6.Lower extremity injury 7.Spinal cord injury 8. Unknown	
208	Road traffic injury fatality	1. Yes 2. No	