



## Treatment Outcomes and Associated Factors Among Road Traffic Accident Victims in Public Hospitals of the East Wollega Zone, Western Ethiopia.

Original Article

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### Abstract

### Article Information

**Background:** In 2018, the World Health Organization reported that deaths from road traffic crashes have increased to 1.35 million a year. The treatment outcomes related to road traffic accidents were carried out in those admitted at the emergency OPD, and other studies did not address factors such as investigation, management, or time between admission and initiation of care. Hence, this study assessed treatment outcomes and their associated factors among road traffic victims in East Wollega hospitals. Western Ethiopia.

**Methods:** A cross-sectional study design was used. The study was carried out from March 15 to April 15, 2020, in five hospitals of East Wollega. A computer-generated simple random sampling technique was used to select the study participants. The data were collected retrospectively from registries and patient charts of road traffic injury victims who attended the hospital in 2019 by the help of an abstracted format, then finally the data were cleaned and entered into Epi-Info version 8 and exported to SPSS version 24 for analysis. Bivariate and multivariable binary logistic regression analyses were performed. Adjusted Odds Ratio (AOR) with 95% CI was used to identify factors associated with road traffic victims. Those variables with  $p$ -value  $\leq 0.25$  in bivariable analysis were analysed by multivariate logistic to control the confounding. Variables having  $p$ -values  $< 0.05$  in the multivariate logistic regression were considered significantly associated.

**Results:** A total of 490 road traffic accident victims were studied of which 41(8.4%) Road Traffic Accident victims died during treatment, and 449 (91.6%) survived. RTA victims came by police car (AOR=18.59, 95% CI: 1.15, 29.49), victims came by other transportation (private car, public transport) (98.7%) die than those came by ambulance (AOR=0.013, 95% CI: 0.002, 0.957), having co-morbidity (AOR=14.00, 95% CI: 1.22, 21.11), head injury (AOR= 8.77, 95% CI: 2.35, 15.44), B/P (AOR=20.32, 95% CI: 1.37, 30.58) and trunk injury (AOR= 6.86, 95% CI: 1.38, 14.93) were significantly associated with road traffic victims' treatment outcome. On the other hand, victims who stayed in the hospital more than 1 week were less likely to die than those who stayed for less than one week (AOR=0.003, 95% CI: 0.01, 0.48).

**Conclusion:** The road traffic accident was a major public health problem, with which mortality rate was 8.4%. Type of transportation, having comorbidity, type of injury, and length of hospital stay were significantly associated with the treatment outcomes.

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## INTRODUCTION

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

According to the WHO report 2018, the RTA is the 8<sup>th</sup> leading cause of death (2). In 2018, road traffic injuries globally resulted in an estimated 50 million disability-adjusted life years (DALYs) lost and 1.35 million deaths and in sub-Saharan Africa, 231,000 were killed by RTA; DALYS was 14,156,508. In Ethiopia, the RTA death rate in 1990 was 42/100000, and in 2010 it was 37.3/100000 (2).

Burden of road traffic injuries on health (latest estimates show that road traffic crashes were responsible for 24 percent of all injury-related deaths globally and pose to disability); economic costs to individuals, families, and societies (the tangible costs; direct costs, such as medical costs, and indirect costs, including lost productivity and economic opportunity, can be estimated in economic terms; the intangible costs associated with suffering and pain, often are more difficult to assess) to the community and individual. However, those that do exist show that road traffic crashes and resultant deaths or disabilities can take a heavy toll on families and friends of injured persons, many of whom experience adverse financial, physical, social, and psychological stresses (3-7). In response, the United Nations released the Global Plan for the Decade of Action for Road Safety 2011 - 2020 in 2011 and included road traffic injury prevention as Target 3.6 of the Sustainable Development Goals (SDGs) in 2015 (4). In Africa and South-East Asia, the rates of road traffic deaths were higher than the global rate, with 26.6 and 20.7 deaths per 100,000 population, respectively (5).

Many deaths in the early period are due to severe life-threatening injuries such as pneumothorax, flail chest, abdominal

hemorrhage, and Pelvic and long bone injuries. Late deaths occur as a result of infection and multiple organ failure (6). EDHS 2016 indicated that the occurrence of RTAs among 75,271 members of the 16,650 households showed that 123 casualties, 28 were fatal injuries, making the 37% road traffic fatality rate (7).

A systematic review and meta-analysis on the burden of road traffic injury among trauma patients in Ethiopia indicated that the pooled prevalence of RTI among trauma patients in Ethiopia was 31.5% of which the pooled prevalence of RTI in the region of southern nation, nationalities, and peoples (SNNPR) was 58.3%, 33.3% in Addis Ababa and 22.2% in Oromia (8).

High-quality treatment and interventions for rehabilitation during the period of hospitalisation immediately following an injury are very important, to prevent life-threatening complications(9).Pre-hospital care, as well as subsequent transportation of the victims to a health facility, may reduce negative injury outcomes.

The health sector has an important role in providing evidence-based emergency trauma services, both at the pre-hospital and hospital phases, as well as rehabilitation services. The response to preventing death and disability in vulnerable road users' needs to be multispectral, and the participation of the transport, justice, education sectors and nongovernmental organizations are considered essential (10).As well as World Health Organization strategies like exposure control, crash prevention, behavioral modification, injury control and Post-crash management needed to be performed (11-117).

In previous studies, treatment outcomes related to RTA were carried out in those admitted at emergency OPD and other studies did not address some factors like investigation, management, and time between admission and surgical procedure. Research on treatment

outcome and its associated factors among road traffic accident victims during the treatment course at hospitals found in East Wollega has not been conducted yet, and there is minimal research conducted on RTA in Ethiopia. Hence, this study aimed to assess treatment outcome and its associated factors among road traffic accident victims during treatment in hospitals of East Wollega Zone, Western Ethiopia, in 2020.

## METHODS

### Study area and Period

The study was carried out in public hospitals of the East Wollega Zone. The zone is bounded on the southwest by Ilubabor Zone, on the west by the Didessa River, which separates it from West Wollega Zone, on the northwest and north by the Benishangul-Gumuz Regional Government Administration, on the northeast by Horro Guduru Wollega Zone, on the east by West Shewa, and the southeast by the Gibe River, which separates it from Jimma Zone (18). Based on the 2007 Census conducted by the Central Statistical Agency, this zone has a total population of 1,213,503, of whom 606,379 are men and 607,124 women; with an area of 12,579.77 square kilometres, with a population density of 96.46. While 162,854 or 7.72% are urban inhabitants, a further 28 persons are pastoralists (11,12).

Nekemte is at the centre of the road network for south-western Ethiopia. Roads to Debi Dollo, Assosa, and Bedelle pass through East Wollega Zone.

The zone has five hospitals namely Nekemte Comprehensive Specialized Hospital, which has 168 beds, Wollega University Comprehensive Specialized Hospital, which has 256 beds, Arjo Primary Hospital, which has 49 beds, Gida General Hospital, which has 48 beds and Sibu Sire Primary Hospital, which has 47 beds. All hospitals provide trauma care. A study was conducted from March 15 -April 15, 2020.

### Study design

An institution-based cross-sectional study was conducted.

### Population

All RTA victims admitted to public hospitals in East Wollega Zone were a source population, and all RTA victims admitted to public hospitals in East Wollega Zone from January 1, 2019, to December 31, 2019, were the study population.

RTA patients' medical records not completed, referred to other health facilities, and defaulted during treatment were excluded from the study.

### Sample size and sampling technique

The sample size was estimated using a single proportion formula with an assumption 95% confidence interval, a 4% margin of error, and a 28.6% treatment outcome of RTA from a previous study conducted in Addis Ababa, Ethiopia (13). Based on these assumptions, the sample size was estimated as 490. There are five public hospitals in the East Wollega Zone. The required sample size was proportionally allocated to each health facility according to their client load served in that month. After the sample was proportionally allocated to each hospital, a simple random sampling technique was used to select samples from each hospital. The sample unit was selected by the table of random numbers starting from 1 to the number of RTA victims at each hospital.

### Study Variables

Dependent variable: Treatment outcome

### Independent variables

Socio-demographic characteristics: Injury-related characteristics such as injury type, injury severity, and site of injury. Health service variables such as first aid before arrival to hospital, first aid after arrival to hospital, surgical procedure, type of investigation, and pain management; time-related characteristics such as time between RTA and admission, length of hospital stay and length of time from

RTA victims' arrival & initiation of service performed.

### Operational definitions

The type of injury was categorised as single when only one body region is affected, and Multiple when more than one body organs are affected (15). Severity of injury was classified based on Kampala Trauma Score (KTS II) injury severity level (16) as KTS II of 9–10 = Mild injury, KTS II of 7–8 = Moderate injury, and KTS II of 6 or less ( $\leq 6$ ) = Severe injury. The level of consciousness was measured depending on the mental status of the victims and categorised into (15) unconsciousness (GCS 3–13) and consciousness (GCS 14–15). First aid is the immediate treatment or care given to a person suffering from an injury until more advanced care is provided (16,17).

### Data collection and tools

The data abstraction format was adapted from previous studies (19,20) and reviewing other relevant standardised tools (1, 10,19-23) to the problem under study, to include all the possible variables that address the objective of the study. The format was designed to obtain information on variables included in the study such age, sex, address, occupation, co-morbid condition, injury type, injury severity, length of hospital stay, site of injury, medical care (first aid, surgical procedure, type of investigation, pain management), mode of arrival, time between RTA and admission. Additionally, medical records were reviewed to obtain information regarding body site of injury, types of injury, level of mental status, surgical procedures performed, first aid, type of investigation, co-morbidity, length of RTA victims' arrival and initiation of services performed, pain management, length of hospital stay and the treatment outcome of the victims. Finally, variables like age, sex, address, occupation, mode of arrival, time between RTA and admission, and time between arrival and being seen by triage were collected from the Emergency Department Registration Book. The severity of injury was determined by using the

Kampala trauma score II (KTS II) adopted from an earlier study. The patient's injury severity was classified as mild injury (KTS II of 9–10), moderate injury (KTS II of 7–8), and severe injury (KTS II of  $\leq 6$ ).

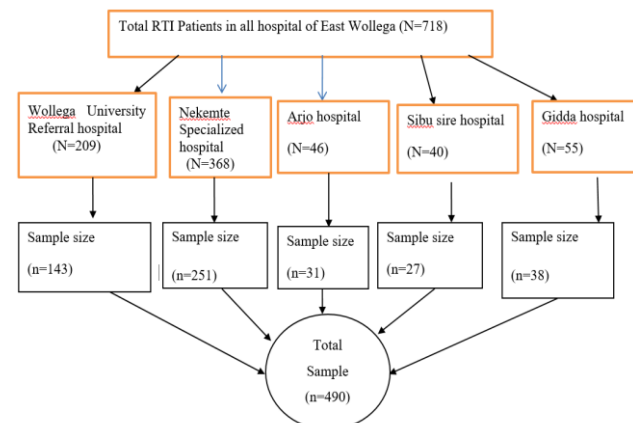


Figure 1: Diagrammatic presentation of Sample size of RTA victims at hospitals of East Wollega Zone, 2020

### Data Collection procedure and quality management

The data for the study were reviewed from routinely registered client medical records and the emergency department registration book. The data was collected by trained BSC Critical and Emergency nurses /BSc Clinical nurses by using a data abstraction format according to the inclusion criteria and exclusion criteria. During the data collection, record keepers sorted out all the RTI cases from log books and medical records according criteria. Data collectors traced and collected data from randomly identified charts of RTI cases using a checklist. Seven data collectors and two supervisors were involved in the data collection process from EOPD of Wollega University Referral Hospital, Nekemte Specialised Hospital, Arjo Primary Hospital, Sibu Sire Primary Hospital, and Gida General Hospital. Two data collectors were assigned for Wollega University Comprehensive Hospital and Nekemte Comprehensive Specialised Hospital; one supervisor for both hospitals. Two days of training were given on data collection techniques and instruments. Daily information exchange by telephone was a means used to correct problems during the course of the data

collection. Consent for the survey was obtained, and confidentiality was assured to improve the quality of data. Data consistency and completeness were ensured throughout the data collection, data entry and analysis. Another method to ensure data quality was conducted by conducting a pretest on 5% of the total sample. Any error found during the process of pre-test was corrected, and modification was made to the final version of the data abstraction format.

### Data Analysis

The collected data were cleaned and entered into Epi-Info version 8; then exported to SPSS version 24 for analysis. Both descriptive statistics and inferential statistics were used for summarisation and to show the association between dependent and independent variables. In descriptive statistics, the mean (average), frequency distribution, and standard deviation were calculated and presented by table, bargraph, and pie chart. In inferential statistics bivariate logistic regression was used to explore the association of each independent variable with the dependent variable, with assumptions of normal distribution ( $Z=1.96$ ) and a 95% CI was used. Initially, the crude odds ratio (COR) and AOR for each independent variable were calculated at a 95% confidence interval (CI). All variables with a p-value of  $< 0.25$  were considered for multivariate logistic regression to control for the effect of other confounders. Variables having p-values  $< 0.05$  in the multiple logistic regression models were considered significantly associated with the dependent variable.

### Ethical Consideration

The ethical approval and clearance for the study, before data collection, were obtained from the Wollega University, Institute of Health Sciences. The permission to conduct a study was obtained from all hospital administrations. Privacy and confidentiality were maintained during data collection. The data collectors were informed that the information obtained from the source would not be disclosed to a third party.

## RESULTS

### Socio-demographic characteristics

490 road traffic victims were included in the study, with a response rate of 100%. Out of the total victims (490) who were visited East Wollega Hospitals, three hundred thirty-eight (69%) were males and 152(31%) were females, resulting in a male to female ratio of 2.2:1. The patients' ages ranged from 1 to 83 years with the mean and standard deviations of 28.17 and  $\pm 13.682$  years respectively. The median and the mode were 25 and 25 years, respectively. Regarding residence of road traffic accident victims, 237 (48.4 %) of them live in urban areas and 253(51.6%) reside in rural. Lastly, the majority of the victims' mode of arrival at the treatment centre was by ambulance (261(53.3%)), followed by others (205(41.8%)) (Table 1).

According to this finding, the majority of the road traffic victims were students (185 (37.8 %)), followed by farmers (128 (26.1 %)) (Fig. 2).

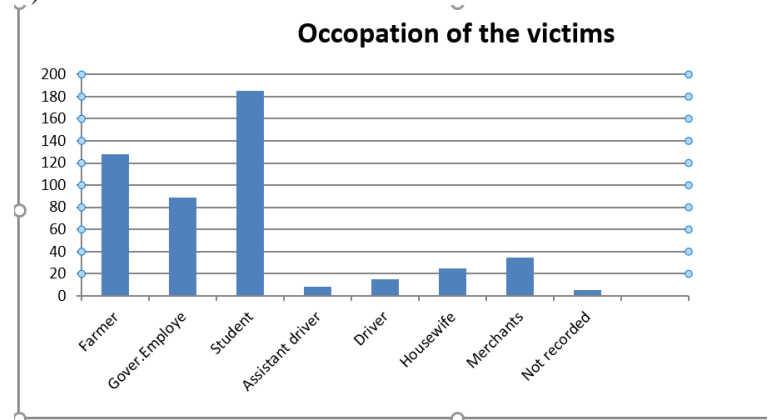


Figure 2.Occupation of RTA victims visited in East Wollega hospitals, Ethiopia, January 1, 2019-December 31, 2019.

**Table 1:** Socio-demographic characteristics of RTA victims visited in East Wollega Hospitals, Ethiopia, 2019.

Variables	Category	Frequency	Percentage (%)
Sex	Male	338	69.00
	Female	152	31.00
Age (yrs.)	< 14	51	10.40
	14-25	198	40.40
	26-35	136	27.80
	36-45	63	12.90
	>45	42	8.60
Residence	Urban		
	Rural	237	48.40
		253	51.60
Mode of arrival	Ambulance	261	53.30
	Police car	24	4.90
	Private car	139	28.37
	Bajaj/three-wheel car	34	6.94
	By foot	26	5.31
	Not recorded	6	1.22

**Site of injury**

Out of 490 RTA victims, 217(33.49%) had head injuries, Neck injury accounts

37(5.71%), upper extremity injury (106 (16.36%)), Chest injury accounts 97(14.97%), lower extremity (146 (29.8%)) and others were abdominal and pelvic sites (Table2).

**Table 2:** Injury site of RTA victims at East Wollega Hospitals, Ethiopia, 2019.

Injury Site	Frequency	Percentage
Head	217	33.49
Neck	37	5.71
Upper extremity	106	16.36
Chest	97	14.97
Abdominal	36	5.56
Pelvic	9	1.38
Lower extremity	146	29.8
Total	648	100

**Clinical characteristics**



Of 490 RTA victims, the majority had no co-morbid conditions (431(88.00%)) while 59 (12.0%) had a history of co-morbid conditions. Regarding the level of consciousness of RTA victims, 339(69.20%) were conscious during arrival at the treatment centre, and 151(30.8%) were not conscious. In addition, the majority of the initial blood pressure (systolic) at the arrival at the hospital were 90 to 139 mmHg (438(89.4%)) and < 90 mmHg (41(8.40%)), > 139 mmHg (11(2.20%)), respectively (Table 3).

**Table 3:** Clinical characteristics of RTA victims of East Wollega Hospital, Ethiopia, 2019.

Variables	Category	Frequency	Percentage (%)
Co-morbid	Had co-morbid	431	88.00
	No co-morbid	59	12.00
Level of consciousness	Conscious	339	69.20
	Not conscious	151	30.80
Initial B/P (systolic)	<90 mmHg	41	8.40
	90 – 139 mmHg	438	89.40
	>139 mmHg	11	2.20

### Injury type

Out of 490 RTA victims, the majority (338, 69%) of their injury type was single, and the rest was multiple (152, 31%).

### Injury severity

Regarding the severity, 264 (53.9%) were mild, 138(28.2%) were moderate, and 83(16.9%) were severely injured.

### Health service

Regarding first aid, about two third (325, 66.30%)) did not receive first aid before arrival to the hospital Table 3) and 474(96.70%) of the victims received first aid intra-hospital (CPR (42, 8.90%)), insertion of oral/nasal airway (20, 4.20%)), IV infusion (405, 85.40%), Stop bleeding (449, 94.7%) respectively (Table 4).

Out of 490 RTA victims, (9, 4.10%)) had head injuries treatment with Skull traction, Surgical treatment of open depressed skull fracture (20 (9.20%)), and Surgical treatment of closed depressed skull fractures (2(.9%)). Similarly, patients with upper extremity injury presented in hospitals of East Wollega Zone, more than fifty per cent of upper extremity immobilisation were performed, and the rest were by operative wound management (19, 17.90%)) and other basic treatments. For chest injury of all RTA victims, anti-pain medication was given. As well as 47(48.80%) of chest injury patients' chest tubes were inserted, and 93 (95.9%) x-rays were performed.

**Table 4:** First aid services given to RTA victims of East Wollega Hospitals, Ethiopia, 2019.

Variables	Frequency	Percentage (%)
<b>First aid intra-hospital</b>		
CPR	42	8.9
No CPR	432	91.1
Total	474	100.0
Insertion of oral/nasal tube	20	4.2
No Insertion of oral/nasal tube	454	95.8
<b>Total</b>	<b>474</b>	<b>100.0</b>
Endotracheal intubation done	1	.2
No Endotracheal intubation done	473	99.8
Total	474	100.0
Suctioning Performed	48	10.1
No Suctioning Performed	426	89.9
<b>Total</b>	<b>474</b>	<b>100.0</b>
Stop bleeding performed	449	94.7
No Stop bleeding performed	25	5.3
Total	474	100.0
IV infusion done	405	85.4
No IV infusion done	69	14.6
<b>Total</b>	<b>474</b>	<b>100.0</b>

For 36 (5.56%) abdominal injury RTA victims, 36(100%) of them clinical assessment performed, and for 17(47.20%), a laparotomy was performed. In the case of the lower

extremity, the majority of management performed was immobilisation (107(73.30%)) followed by Operative wound management (35(24%)) (Table 5).

**Table 5:** Injury management of RTA victims at East Wollega hospital, Ethiopia, 2019.

Injury management	Frequency	Percentage (%)
Head injury		
Skull traction	9	4.1
Surgical treatment of open depressed skull fracture	20	9.2
Surgical treatment of closed depressed skull fractures	2	0.9
Other management	186	85.7
Total	217	100
Neck injury		
External control of hemorrhage	31	83.8
Other	6	16.2



Total	37	100
Upper extremity injury		
Basic immobilisation	57	53.8
Operative wound management	19	17.9
Others	30	28.3
<b>Total</b>	<b>106</b>	<b>100</b>
Chest injury		
Chest tube inserted	47	48.80
No chest tube inserted	50	51.20
Total	97	100
Anti-pain given	97	97
No anti-pain given	0	0
<b>Total</b>	<b>97</b>	<b>100</b>
Abdominal injury		
Clinical assessment	36	100
<b>Total</b>	<b>36</b>	<b>100</b>
Laparotomy	17	47.2
No laparotomy done	19	52.8
<b>Total</b>	<b>36</b>	<b>100</b>
Lower extremity injury		
Immobilisation	107	73.3
No Immobilization	39	26.7
Total	146	100
Operative wound management	35	24
No Operative wound management	111	76
<b>Total</b>	<b>146</b>	<b>100</b>

CT scan totally did not perform, whereas x-ray (161(74.20%)) and other investigations (CBC (72(33.18%)) and 67(30.88%)) were performed for head injury victims. External control of hemorrhage of neck injury accounts 31(83.80%). Laryngoscope test and Bronchoscope test were not performed in all hospitals, but 29(78.40%) patients with neck

injury x-ray were performed. Relatively, two-thirds of upper extremity injury patients, basic investigations like x-ray performed. And 35(97.20%) ultrasound was performed. For lower extremities, the majority of investigations were x-ray (125(85.60%)) (Table 6).

**Table 6:** Investigation performed for RTA victims in East Wollega Hospitals, Ethiopia, 2019.

Investigation	Frequency	Percentage
<b>Head injury</b>		
x-ray	161	74.2

No x-ray	56	25.8
<b>Total</b>	217	100
<b>Neck injury</b>		
X-ray	29	78.40
No x-ray	8	21.60
<b>Total</b>	37	100
<b>Upper extremity injury</b>		
X-ray	77	72.6
No x-ray	29	27.4
<b>Total</b>	106	100
<b>Chest injury</b>		
X-ray	93	95.9
No x-ray	4	4.1
<b>Total</b>	97	100
<b>Abdominal injury</b>		
U/S	35	97.20
No U/S	1	2.80
<b>Total</b>	36	100
<b>Lower extremity injury</b>		
X-ray	125	85.60
No x-ray	21	24.40
<b>Total</b>	146	100

Generally, 451(92%) RTA victims Cleaning (248(50.6%)) and Tetanus prophylaxis (349(71.20%)) was given (**Table 7**).  
and dressing regularly was performed followed by minor surgical (clean, suture)

**Table 7:** Wound management of RTA victims at East Wollega hospitals, Ethiopia, 2019.

Wound management	Frequency	Percentage
Clean and dressing done	451	92
No cleaning and dressing done	39	8
Total	490	100
Minor surgical (clean, suture)	248	50.6
No Minor surgical (clean, suture)	242	49.4
Total	490	100
Major surgical debridement and repair were done	115	23.5
No Major surgical debridement and repair done	375	76.5
Total	490	100.0
Tetanus prophylaxis given	349	71.2
No Tetanus prophylaxis given	141	28.8
Total	490	100.0

### Time related characteristics

More than ninety percent of the victims came to the hospitals within 24 hours and relatively for one third of them surgical procedure was performed within one hour of admission. The average hospital stay of the RTA victims was 8.9 days, Standard deviation of 12.15 days, and the range of hospital stay was 1-72 days. The majority of them stay for one week (351(71.6%)) (Table 8).

### Treatment outcome

Of all victims reaching hospitals, 41 (8.4%) died, and 449 (91.6%) survived during treatment.

### Predictors of fatalities among victims

Table 9 shows bivariate and multiple regression analysis performed to investigate the association between variables like sociodemographic factors, clinical characteristics, health care and time related characteristics with treatment outcome. In the first step, bivariate logistic regression was performed and those with p-value <0.25 were transferred to multiple logistic regression to control confounding.

RTA victims who came by police car were 18.59 (AOR=18.59 (1.154, 29.497)) times more likely to die than those who came by ambulance. But on the other hand, victims who came by other transportation (private car, public transport) were less likely (98.7%) to die than those who came by ambulance (AOR=.013 (.002- .95)).

**Table 8:** Time-related characteristics of RTA victims of East Wollega Hospital, Ethiopia, 2019.

Time-related variable	Category	Frequency	Percentage
Time between RTA and admission(day)	< 1 day	449	91.6
	1 -7 day	37	7.6

	> 7 days	4	.8
Time between admission and surgical procedure (hr)	Within one hour	167	34.1
	More than one hour	323	65.9
Length of hospital stay(days)	1 – 7 days	351	71.6
	8 – 14 days	44	9.0
	15 – 21 days	14	2.9
	22 – 28 days	27	5.5
	≥29 days	54	11.0

Co-morbidity (AOR=14.00 (1.22, 21.11)), head injury (AOR=8.77 (2.35, 15.44)), blood pressure (AOR =20.32 (1.37, 30.58)) and trunk injury (AOR=6.86 (1.38, 14.93)) were significantly associated with treatment outcome(death). On the other hand, victims who stayed in the hospital for more than 1 week were less likely to die than those who stayed for less than 1 week (AOR=0.003 (0.001, 0.48)).

**Table 9:** Bivariate and multivariable analysis of factors with Treatment outcome of RTA victims visited in East Wollega hospitals, Ethiopia, 2019.

Variable	Category	Treatment outcome		COR (95%)	AOR (95%)
		Death No (%)	Survived No (%)		
Mode of arrival	Ambulance	23(4.7%)	238(48.6%)	1	1
	Police car	6(1.2%)	18(3.7%)	3.44(1.24,9.54)	18.59 (1.15, 29.49) *
	Other	12(2.4%)	193(39.4)	0.64(0.31,1.32)	0.01 (0.01, 0.09) *
Initial B/P (Systolic)	90 mmHg - 139 mmHg	10(2%)	428(87.4%)	1	1
	<90 mmHg and > 139 mmHg	31(6.3%)	21(4.3%)	13.18(2.36,25.8 5)	20.32 (1.37, 30.58) *
Injury severity	Mild	6(.4%)	261(53.3%)	1	1
	Non mild	35(8.0%)	188(38.3%)	7.07(3.45,13.50)	10.04 (1.53,18.46)*
Time between RTA occurrence and admission	1-24hrs	32(6.5%)	9(1.8%)	1	1
	>24hr	9(1.8%)	440(89.9%)	0.006(.002, 0.016)	.001(.0002– 0.42) *
LHS	1- 7 days	36(7.3%)	315(64.3%)	1	1

	> 7 days	5(1.0%)	134(27.4%)	0.32(0.12,0.85)	0.003 (.001, .482) *
Sex	Female	7(1.4%)	145(29.6%)	2.31(1.00,5.351)	0.41 (0.02- 6.82)
	Male	34(6.9%)	304(62.1%)	1	1
Comorbid	Had comorbid	30(6.1%)	401(81.8%)	3.06(1.44, 6.504)	14.00(1.22, 21.11)*
	No comorbid	11(2.2%)	48(9.9%)	1	1
Level of consciousness	Conscious	10(2%)	329(67.1%)	1	1
	Not conscious	31(6.3%)	120(24.6%)	5.49(4.04 ,6.86)	3.18 (0 .14,7.27)
First aid done before arrival	Yes	10(2%)	155(31.7%)	1	1
	No	31(6.3%)	294(60%)	1.63(0.78, 3.42)	9.98(0 .68, 14.89)
First aid done intra hospital	Yes	35(7.6%)	437(89.2%)	1	1
	No	6(.8%)	12(2.4%)	3.93(1.20, 12.81)	10.560(.0002 ,5)
Time between admission and surgical procedure(hr. )	within1 hr.	34(6.9%)	289(59%)	1	1
	More than1hr	7(1.4%)	160(32.7%)	0.37(0.16,0.85)	0.93 (0.11,7.54)
Injury type	Single	30(6.1%)	122(24.9%)	1	1
	Multiple	11(2.2%)	327(66.8%)	0.13(0.06, 0.28)	2.57 (0.27,4.32)
Main treatment done	Yes	36(7.3%)	434(88.6%)	1	1
	No	5(1%)	15(3.1%)	4.01(1.38 ,11.68)	18 (0.005,34)
Basic Investigation done	Yes	23(4.7%)	198(40.4%)	1	1
	No	18(3.7%)	251(51.2%)	1.62(0.85, 3.08)	0.38 (0.03,3.91)
Head injury	Yes	32(6.5%)	185(37.8%)	5.07(2.36 ,10.88)	8.77(2.35, 15.44) *
	No	9(1.8%)	264(53.9%)	1	1
Trunk injury	Yes	21(4.3%)	116(23.7%)	3.01(1.57, 5.76)	6.86(1.38 ,14.93) *
	No	20(4.1%)	333(67.9%)	1	1

## DISCUSSION

This study focused on treatment outcome and its associated risk factors among road traffic accident victims attending East Wollega Hospitals, specifically in five public hospitals.

Regarding the treatment outcome, of all victims reaching hospitals, 41(8.4%) died, and 449 (91.6%) survived during treatment.

**Factors associated with treatment outcome among road traffic accidents**

Regarding mode of arrival, those RTA victims who came by police car were 18.59 times more likely to die than those who came by ambulance (AOR=18.594 (1.15, 29.49)). The main reason behind this occurrence was lack of emergency medical professionals with a police car and lack of timely arrival. But on the other hand, victims who came by other transportation were less likely (AOR=.013 (0.002, 0.09) die than those who came by ambulance (AOR=18.594 (1.15, 29.49)). This may be a quick arrival at the treatment centre.

In this study, co-morbidity was associated with treatment outcome (AOR=14.00). Victims with co-morbidity were more likely to prone complications, delay in wound healing, and immune suppression, which leads to death.

Blood pressure(initial) was statistically associated with treatment outcome(AOR=20.324 (1.379 -30.589)), which was similar to a prospective hospital-based study on injury characteristics and outcome of road traffic accident among victims at the Adult Emergency Department of Tikur Anbessa Specialised Hospital, Addis Ababa (26). That means victims with low and high blood pressure are more likely to die than those with normal blood pressure, which is due to a lack of oxygen supply to the tissue.

According to this study, both head injury and trunk injury were statistically associated with treatment outcome

(Head=AOR=.8.77(2.35,15.44)), Trunk=AOR=6.86 (1.38,14.93). That is, victims with head and trunk injuries were high probability to die than other injury sites, which is similar to other studies (28). The main reason for this risk is main organs are

present in the head (skull) and trunk (heart, lungs, stomach, intestines, kidneys, etc.), and they can be damaged, which leads to death.

Victims with moderate and severe injuries were about 10 time more likely to die than mild victims (AOR=10.04 (1.53, 18.46)). The main reason for the death of severely injured patients may be due to complications, unavailability of medical equipment's and manpower. This finding is similar to a study done in AaBET and ALERT hospitals in Addis Ababa from January 1, 2016, to December 31, 2016 (20). A retrospective study carried out on 120 RTAs in the Department of Surgery, Rohilkh and Medical College and Hospital, Bareilly, during a period of 2 months from May 1st, 2014 to June 30th, 2014 on road traffic accidents - injury characteristics, management and outcome in India (31), and study conducted in Northwestern Tanzania between March 2010 and February 2011 on Injury characteristics and outcome of road traffic crash victims at Bugando Medical Centre(32).

In this study, victims who arrived before 24 hrs. were less likely to die than patients who arrived within 24 hours (AOR=0.001). The reason may be that patients severely injured were referred to higher institutions in a short period of time and individuals with mild and for medico legal issue may come slowly. Relatively, for one-third of RTA victim's surgical procedures were performed within one hour of admission.

Regarding the average hospital stay of the RTA, victims who stayed more than 1 week were less likely to die than those who stayed for less than 1 week (AOR=0.003(.001, 0.48).

## CONCLUSION

This study showed that among all RTA victims who arrived at the hospital, 91.6% of victims survived while 8.4% of them died during treatment at the Hospitals of East Wollega Zone, Oromia, Ethiopia.

Different factors, such as type of transportation, having comorbidity, type of injury, and length of hospital stay, were significantly associated with the treatment outcomes.

### Recommendation

Based on the findings of the study, the following recommendations were forwarded.

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### Health Care Providers

Health care providers should give special attention and emphasise when providing care for victims having comorbidities, moderate and severe injuries.

### Public Hospitals of East Wollega Zone

Public Hospitals of East Wollega Zone shall stay with the victims for more than 1 week.

### Zonal Health Bureau

The East Wollega Zonal Health Bureau should give emphasis to the strategic plan that increases ambulance services for victims.



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