ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF MEDICINE

Clinical Patternand management outcomes among Road Traffic Accident Victims attending Emergency Department of Jimma University Medical Center, Jimma,Southwest Ethiopia

A Thesis Submitted to Addis Ababa University, College of Health Sciences, Department of Emergency Medicine and Critical Care in Partial Fulfillment ofthe Requirements for the Degree of Master in Emergency Medicine and Critical Care Nursing

May, 2021

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Investigator:Dereje Endale (BSc)

Advisors: Dr. TemesgenBeyene (Emergency Physician, Assistant Professor)

Mr. AsmamawAbebe (BSc, MSc, Lecturer)

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Approval Form

I. The undersigned MSc student declared that he has submitted his original work on a title _____ for the examination.

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This thesis work has been submitted for examination with my approval as an advisor.

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Name of Co-Advisor Signature Date

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Acronyms

ASD – Acute Stress Disorder

DALYs – Disability-Adjusted Life Years

ED – Emergency Department

GNP – Gross National Product

LAMA – Left Against Medical Advice

LMIC– Low and middle-income countries

LOS – Length of hospital Stay

RTA– Road Traffic Accident

RTIs – Road Traffic Injuries

RTCs– Road Traffic Collisions

SPSS – Statistical Packages for the Social Sciences

UNEC – United Nations Economic Commission

USA – United States of America

USD – United States Dollars

WHO – World Health Organizations

Abstract

Background: Road Traffic Accident is an incident on a way or street open to public traffic that becomes one of the most significant public health problems in the world especially in developing countries. In Ethiopia, RTA is the major public health problem even though studies indicate clinical pattern and management outcomes among these victims are limited. The aim of this study is to assess clinical pattern and management outcomes among road traffic accident victims who attended emergency department of Jimma University Medical Center, Jimma Ethiopia, 2021.

Methods: Hospital based retrospective cross sectional study design was implemented based on patients' record review for one year. Records of patients were revieweduntil the calculated minimum sample size (357) attained. Systematic random sampling technique was applied to recruit the records. Pretested checklist was used to collect data. Descriptive statistics were used to show the distribution of variables under the study.Independent factors associated with management outcomes were assessed using binarylogistic regression using SPSS version 26 at $p<0.05$.

Results: Among 357 cases reviewed, the median age was 27 ± 13.71 years and male victims accounted for 75.6%. The largest proportion was pedestrians (49.6%) injured by motorcycle (42.9%) and sustained fracture (60.5%). More than half of victims (58%) never got any type of prehospital care. On triage paper, majority were classified as Red needing urgent/immediate intervention (38.7%) of which 71.4% of themwere managed surgically. Regarding management outcomes, 84.9% were discharged with improvement, referred (1.7%) and died (12.6%). Using multivariate logistic regression analysis,anatomical sites (head injury) (AOR=16.61: 95% CI; 3.85,71.71),mechanism of injury (AOR= 0.23; 95% CI: 0.08, 0.68), time elapsed to reach nearby health facility (AOR= 3.30; 95 CI (1.13, 9.60), time of the day (AOR= 2.79; 95% CI; 1.06, 7.34), condition of patient at ED (AOR= 7.78; 95% CI: 2.33, 26.06), GCS at admission(AOR= 20.12; 95% CI: 7.23,55.96) and days spent in hospital (AOR= 6.85; 95% CI 5.81, 8.06) were independent predictors of unfavorable outcome.

Conclusion: This study finding can help reducethe mortality and disability from RTA by appropriately identifying the priority patient and giving appropriate intervention promptly.In general, anatomical sites, mechanism of injury, GCS on admission, disposition outcome, time to health facility, condition of the patient, and days spent in hospital were independent predictors for unfavorable outcome.

Keywords: *Road Traffic Accident, Clinical pattern, Management Outcomes, Jimma University Medical Center*

CHAPTER ONE

INTRODUCTION

1.1. Background

An accident is an event that happens unusually and accidentally under different circumstances(1).RTA is an accident occurring on a road or road open to public transport, resulting in the death or injury of one or more individuals and the presence of at least one moving vehicle(2). According to WHO, every day more than 3000 people die from road traffic accidentswhich constitute almost 1.3 million people losing their life each year. By 2030, if appropriate measure is not taken, it is predicted to become the fifth driving cause for death on the planet(3).They trigger general medical problems in the region, the public and worldwide, and about 20 to 50 million people experience non-lethal wounds. Although low- and middle-income countries do not have exactly 50% of vehicles in the world, they generate more than 90% of deaths identified with severe injury

(4).With the resulting significant financial burden on the medical care framework, RTAs represent a critical but avoidable reason for mortality and disability(5). In the younger population, traffic accidents are a leading cause of mortality and the WHO has declared 2011-2020 to be "The Decade of Action for Road Safety," aiming to reduce morbidity and mortality by 50% by 2020(6).

Motor vehicle accidents are preventable and treatable if appropriate measures are taken before its occurrence as well as immediately after it happens(7). It is neglected worldwide wellbeing emergency, requiring viable counteraction to advance practical security. Consistently, about 1.3 million individuals lose their lives on the streets and another 20–50 million individuals sustain non-deadly wounds because of street car accidents(8).

In one research, the proportion of deaths from road accidents to overall deaths worldwide has increased by 2.2% from 1.255 million in 2012. Despite the attempts made to enhance road and law enforcement efforts, the accident rate rose by 0.3% from 2000 to 2012(9).RTI is ranked ninth among the key causes of the loss of DALYs, and its ranking is predicted to increase to third by 2020. In addition, 96% of all children killed worldwide are due to traffic collisions(10).

With an estimated economic loss of up to 1.5% of GNP, accounts for about 85% of mortality and up to 90% of the annual DALYs lost in LMIC. Road crash deaths in the West are slowly decreasing, although developing countries are experiencing an increase(11).An estimated 12 million road traffic accidents occur annually and are a significant public health concern for all ages and sexes, accounting for almost one-quarter of all road traffic-related injuries(12).
There are significant differences between different regions in road traffic mortality rates. In comparison to the African region, the Eastern Mediterranean region has a death rate of 19.9/100,000 compared to 26.6/100,000 in the African region(13). There is a very different situation about road traffic incidents between different regions of the world. Around 90% of these RTI fatalities are concentrated in low- and middle-income countries(14).

Globally, deaths arising from road traffic accidents are a major cause of death and injury in African countries, with a disproportionate number occurring. In Ghana, studies have shown that road accidents, most of which occur in rural areas, are one of the major causes of death and injury(15).Road traffic collisions are responsible for substantial morbidity and mortality which is a major health concern worldwide. It is the current leading cause of death for children and young adults (5-29 years), and the eighth for all age groups, according to the latest Global Status Report on Road Safety (2018)(16).

The bad condition of the roads in the country and the inefficiency of the public transport system, as well as the deterioration of pollution in vehicles and rising unemployment are the key reasons why the motorcycle transport industry is thriving. Increased private and commercial use of motorcycles has also been recorded in other African nations, such as Ghana, Uganda and South Africa(17).Asia has the largest proportion of global road deaths in the world (one-third of the world's 1.4 million annually), with the highest mortality rate for road traffic accidents in Africa (28.3 per 100,000 populations when adjusted for under-reporting, compared to 11.0 in Europe)(18).Injuries kill more people worldwide every year than HIV, TB, and malaria combined in Sub-Saharan Africa(19).RTA is currently becoming a global public health issue, particularly in countries with low and medium incomes. Ethiopia is one of the 50 countries with the world's deadliest roads, according to a WHO survey in 2015(20).

Road transport is the most commonly used, complicated and unsafe of all the transport systems that people use because it is heavily correlated with the increase in collisions with road traffic (2). It is one of the key reasons for trauma-related admission in Ethiopian hospitals, and the main causes of patient admission, which raises the population and health care spending of the global disability-adjusted life year (US$518 billion per year)(21).

Various studies conducted in Ethiopia have shown that the country's trend in road traffic injury (RTI) morbidity and mortality has risen from year to year.It also leads to poverty by causing loss of productivity, harm to materials, injury, disability, sorrow, and death.It is one of the top three causes of death for people between the ages of 5 and 44, so the prevalence and potential findings that can be obtained from RTA can be clearly established in this study(22).

1.2. Statement of the Problem

RTIs are a cause of public health issues in virtually every country in the world. According to WHO, every day more than 3000 people die from road traffic accidentsof which90% live in low and middle income countries(23). Mortality and morbidity distribution, however, is highly unequal, with developing countries suffering 85% of all fatalities due to road accidents(9).The WHO reports that more than 1.2 million people die on roads around the world each year, about half of which are the least protected: motorcyclists, cyclists and pedestrians (16).

In Africa, the incidence of road traffic accidents is also likely to be much greater than anywhere else, as more vulnerable road users are involved, unsafe transport conditions such as lack of seat belts, overcrowding, and dangerous environments for vehicles are involved (24). Ethiopia, a nation with a low vehicle/population ratio, is considered one of the worst affected by RTIs in the country, primarily because of weak road safety plans and drivers' failure to comply with traffic laws (25). The Ethiopian Federal Police (2008/09-2010/11) estimated that more than two thousand people die each year and 10 thousand people are injured in road accidents (26).

The death rate from car accidents among pedestrians and passengers is growing significantly from time to time in Ethiopia due to an increase in the number of vehicles, not obeying traffic laws, lack of experienceand forgery driver license according to a study by the federal police commission(27). In addition, the report by Federal Transport Authority of Ethiopia in 2017 showed, the number of cars in Ethiopia has exceeded 831,000 which were around 708,000 in the

year 2016 (28). From the entire number of cars, 62 % of them, i.e. 515, 000 are found in Addis Ababa. According to the latest world health organization data published in 2017 on the website www.worldlifeexpectancy.com, Road Traffic Accidents deaths in Ethiopia reached 27,140 or 4.27% of total deaths ranking Ethiopia at 22 in the world (29).

A study in Ethio-Swedish children's Hospital in Ethiopia showed that road traffic accidents and trauma accounted for 25% surgical admissions in which the commonest conditions were motor vehicle accidents,burns, accidental falls, and foreign body aspirations(30). While a study in Tikur Anbessa Hospital indicated motor vehicle accident accounted for 41% of all injuries. The overall admitted rate due to injuries were 11.6% with mortality rate of 1.47% (31).RTA is a human-made problem which is modifiable to rational analysis and counter measures. In this sense, investigating its pattern and possible risk factors which contribute for unfavorable outcomes is very important for taking evidence based prevention measures (32).

In general, RTA is the major public health problem in Ethiopia that causes disabilities and death even though many studies neglected to consider these problems. Therefore, this study will search the way and come up with the burden, describe the clinical pattern and determine the possible management outcomes. Meanwhile, knowingits burden will help the traffic law enforcement body and the other stakeholder to give due focus and initiate intervention accordingly. Besides, in our country there is problem of data inconsistency and under-report due to different reasonswhich further hides the impact of RTA on human body, loss of life, material damage and also impact on the economy. Therefore, this study will fill these gapsdue to RTA in Jimma zone and South west Ethiopiaat large.

CHAPTER TWO

LITERATURE REVIEW

2.1. Clinical Pattern of Road Traffic Accident

According to the study conducted in Beijing, China, among the 968 fatal cases with clear transportation mode records, 37.5% victims were motor cyclists, 30.1% were pedestrians, 13.3% were four wheelers, 12.7%were motorized 2 to 3 wheelers and 0.12% was a bus passenger. Motor cyclists have become the largest group of fatal RTI victims in the study area. Among the motor vehicle occupants in the fatal RTIs, drivers (72.86%) were much more likely to be the deceased parties compared with passengers(33).

As per the study conducted in Medellin, Colombia, the bodily regions most affected were the lower limbs (49.7%) of cases, the upper limbs (23.8%) and the face (13.8%). It was observed that in traffic accidents the driver's recklessness was the most frequent reason (38.8%) for its occurrence, followed by loss of control or falls from a moving vehicle (22.3%), recklessly crossing the road (5.7%), the violation of traffic rules (5.6%) and mechanical failure of the vehicle (4.6%). Regarding mechanism of injury, collision (54.9%), Run over (25.3%), Rollover (4.7%) and Fall from the vehicle (15%) (4).

A study conducted by Sinha on pattern of RTA in India indicated 32% the victims got fracture in the upper limb and 26% got fracture in lower limb, 29% of victims got multiple injuries, 23% fracture on the chest. When we see the mode of transportation maximum number of victims 48% were motorcyclist, and 16% were pedestrian's(34).In 2013, World Health Organization (WHO) indicated that more than 1.3 million people die every year as a result of RTAs, making it the eighth leading cause of death globally, and the leading cause of death for young people aged 15-29 (30).

One study conducted in Tanzania indicated, the majority of road traffic crashes were caused by Motorcycle (53.4%) followed by motor-vehicles (42.5%) and bicycles (3.7%). Drivers (38.3%) accounted for the majority of victims, followed by passengers (35.4%), Pedestrians (25.5%) and unknown were (1.1%). Majority of motor-cycle crash victims were drivers (62.8%), passengers

and pedestrians were more involved in motor-vehicles crash with 53.4% and 48.7% respectively (35).

Motorcycle accidents accounted for 18.4 % of all road traffic accidents carried out over the study period, with a male: female ratio of 6:1, according to a study done at Lagos State University of Nigeria. Head injuries accounted for 41.4% of the injuries seen, and 50.7% of the patients died from cranio-cerebral injuries (18). A study conducted in another state of Nigeria showed a recorded death rate of 8.6% due to variables such as systemic deficiencies such as the absence of a trauma system, pre-hospital care, and late presentation, the role of chemical operators, traditional healers, and delayed referral systems (7).

According to the study done in Central Ethiopia, 16.7% of the victims were died due to RTAwhile 31.5% and 39% of people were severely and slightly injured, respectively. Among those killed in RTCs, 59.9% were pedestrians, 28.2% were passengers, and 12.2% were drivers(36). On the other hand, the study conducted in TikurAnbessa Tertiary Hospital showed majority of RTA victims were pedestrians which accounts for 71.7% of people, followed by passengers (13%) and drivers which constitute 12.2% and the rest were assistants of the drivers. People living in urban areas accounted for 74% of the road traffic injury (37).

The study done in Tirunesh Beijing hospital showed the victims' peak age was 16-30 years (41.6%)(26). One survey done at Jimma referral hospital indicated that about 32.7% of RTA patients were classified as having severe, 41.3% as moderate and 26.0% as minor injury. Most importantly, road traffic accident accounted 49.7% of the severe injuries, followed by stab injury (12.5%) and cut by sharp tool (11.4%). All of the deceased cases were severely injured(38).

The study done on public health hospitals around Addis Ababa reported the magnitude of severe injury among road traffic accident victims was 36.4%. There was strong association with increased injury severity withmotor cycle rider or motorbike passenger without helmet, driving under the influence of alcohol, victim with multiple injuries, vehicle size, collision in dark lighting condition, collision in cross city/rural and vehicle occupant travelling unrestrained on the back of a truck(37).

A study underwent in Yirgalem GeneralHospital on magnitude of injury was 49.4% and unintentional injuries accounted 71.9% of the total injuries. More than half of the cases

(51.4%)were due to RTA of which 68% of all were due to severe injuries. This study found that 31% of the injured patients had a history of alcohol consumption before 6 hours of the trauma. Of them, 49%had encountered assault and 5.8% had used psychoactive substance in addition to alcohol (39).

2.2.Management Outcome of Road Traffic Accident

The study was done in Saudi Arabia on non-fatal RTI in which medical treatment outside home was sought for 62.5% RTI of which 93.3% received treatment in the out-patient departments and emergency rooms of the hospital. The overall annual incidence of non-fatal RTI for which medical treatment outside home sought was 100% of which 20% was pedestrians and the remaining 80% were motor vehicles users. The mean length of stay in the hospital was less than two weeks.In addition, 62.98% occurred in town, while 37.02% occurred out of town(10).A study done in Sri Lanka on RTA patients showed there were3% fatalities. Among the survivors, 16% patients suffered severe injuries. From the total cases85.7%, 83.1% and 68.8% were cases of fatalities, major injury survivors and less severe injury survivors respectively(14).

A cross-sectional study done in Guinea showed majority of victims were male (76.8%), presented with mild GCS during hospital admission represented 3%, and those in deep coma/Severe GCS represented 1.4% among victims of motorcycle RTA compared to 2.3% and 3.6% respectively, among victims of other types of RTA. Overall, 4.4% of RTA victims died; mortality was 1.1% amongst motorcycle RTA victims compared with 3.3% amongst other RTA victims. In terms of overall deaths, motorcycle RTA accounted for 54.0% of all deaths. However, 5.3% of victims had no information on their outcomes(40).

According to the survey done at Tirunesh Beijing Hospital on road traffic accident victims, the majority of patients sustained mild injury 63.4%. Moderate and severe injuries were 27.4% and 9.1% respectively. Nevertheless, it was categorized as severe and non-severe injury in which 63.4% of them sustained non-severe injury (Mild) while 36.6% of them sustained severe injury (Moderate and Severe). 97.6% victims survived the accident whereas 2.4% individuals died during the course of treatment(26).One survey conducted in Wolaita reported that from all victims reaching hospital, 6% died, 12.5% survived with long term disability on discharge and 81.5% survived without long term disability on discharge(1).

A study conducted in Zewditu Memorial Hospital showed, 67% of RTA victims were discharged with medical advice, 17% were hospitalized, 17% were referred to other hospitals and <1% died. Of the 78% of cases requiring hospitalization, respectively 62% and 16% were admitted to the surgical and orthopedic department. From overall victims with head injuries, 71% were male and the median age was 30 years. Of these, 66% were pedestrians, and the RTI was most often caused by automobiles (73%). At triage, 39% had a MEWS of red or orange. Fifty four percent were discharged home, 25% were admitted (most often to the surgical department) and the rest were referred out (6%) or died (1%) in the ED (27).

On the other hand, the study underwent in Gondar referral hospital showed 39% of RTA patientswere died. Of these, 19.4%, 11.7% and 7.8% of car accident injury patients have died; immediately, after surgical intervention and on arrival respectively. Outnumbered of car accident injury patients had multiple injuries that accounted for 35% followed by head injury 25.2%. About 55.3 % of the injured person GCS was not determined and 12.6% of them had GCS of 3-8(41).

2.3. Associated Factors

A study done on RTA cases in India indicated most accidents occurred from skidding of the vehicle (36.9%), followed by being hit by another vehicle (33.5%), over speeding (9.6%), reckless driving (7%), bad road condition (6.5%), sleepiness (3.4%), mobile use (2.3%), and tire burst (0.8%). In 50.4% cases, injuries occur without any collision, whereas it occurred from head-on collisions in 49.6% cases(42).

A study conducted in Bugando Medical Centre in Northwestern Tanzania showed Motorcycle (58.8%) was responsible for the majority of road traffic crashes, followed by motor-vehicles (38.7%), bicycle (2.1%) and other means of transport (e.g. donkey, trolley etc) in 4 (0.2%) of cases. Pedestrians (55.4%) accounted for the majority of victims, followed by passengers (27.2%), drivers/riders (17.2%) and others (0.2%). Regarding the time of the crash, 60.5% crashes occurred during the day, 34.8% at night(43).

One study conducted in Guinea indicated that the number of RTA victims who sustained two or more injuries was about four times higher than that of other RTA. Victims in mild coma during hospital admission represented 3.0%, and those in heavy or deep coma represented 1.4% among

victims of motorcycle RTA compared to 2.3% and 3.6%, respectively. Overall, 4.4% of RTA victims died amongst motorcycle RTA victims. Compared to those with a normal GCS, victims in mild coma (AOR: 7.4; 95% CI: 2.1–25.8) and those in heavy or deep coma (AOR: 776.1; 95% CI: 340.2–1770.7) had increased odds of dying, respectively (17).

A study conducted in Adama Hospital Medical College showed pre-hospital delay greater than one hour and severity of the injuries were factors significantly associated with unfavorable management outcome. Pre-hospital duration greater than one hour were 13 times odds of unfavorable management out come as compare to visiting hospitals in less than an hour after injury(AOR= 13.3, 95% CI, 4.3, 41.7). Furthermore, severe injuries were 22 times more odds of unfavorable management outcome as compare to mild and moderate injuries(AOR= 22.372; 95% CI 6.409, 78.091)(30).

A research done in Eastern Ethiopia found that RTAs caused by driving above the speed limit and failing to give priority for other vehicles and pedestrians were significantly associated with RTC fatality. Furthermore, fatal collisions were more likely to occur in vehicles that had a defect and with unidentified causes of the collision. The nighttime RTCs were 2.5 times highest tendency(44).

A study conducted in Northern Ethiopia found out 55% of victims stayed in hospital for less than one week, 32% stayed in hospital from two to three weeks, 4.7% stayed in hospital for three weeks to one month, and the remaining 8.3% stayed for more than one month. Lower extremity represented majority of injury site 47.4% followed by upper extremity injury 32.8%. When we come to pre-hospital phase, 78.4% of trauma victims were presented to the hospitals within 24 hours to one week of the injury followed by less than 24 hours 10.7%(45).

One study in Jimma Referral Hospital indicated that 79.1% of patients were managed at outpatient department while the rest (20.9%) were managed as in-patients. For those managed as in-patient, the median length of hospital stay was 14 days and the majority (92.5%) of the cases were discharged with improvement and follow up and 7.5% died. Death was more common in those between 15-49 years of age(79.5%) followed by those 5-14 years old (12%)(38).

In general, because of the deteriorating situation of RTC deaths, accidents and property destruction, Ethiopia is currently labeled as one of the most dangerous places to drive. Well-

conducted, scientifically rigorous research on pattern, outcome and associated factorsare therefore important elements that need to be prioritized in order to minimize the mortality and complications(27).

2.4.Significance of the Study

So far, a few studies have been conducted on road traffic accident in Jimma zone. The studies only recognized the need to show baseline information that can be used by local road safety measures and stake holders.There has been inadequate study on clinical pattern as well as management outcome in Ethiopia.Therefore, this study is designed to fill the gaps in the clinical presentationof RTA and factors associated with its occurrence. In addition, it will provide basic data on the issue of patient management that may help the clinicians and policy makers to prioritize based on the severity and condition of the patient on presentation to reduce patients' deathdue to RTA in Jimma zone and Southwest Ethiopia. Finally, the study will provide information that will help in the improvement and implementation of road traffic laws enforcement by the traffic Polices and other concerned bodies. It can also be used as making a sole input to the literature.

2.5. Conceptual Framework

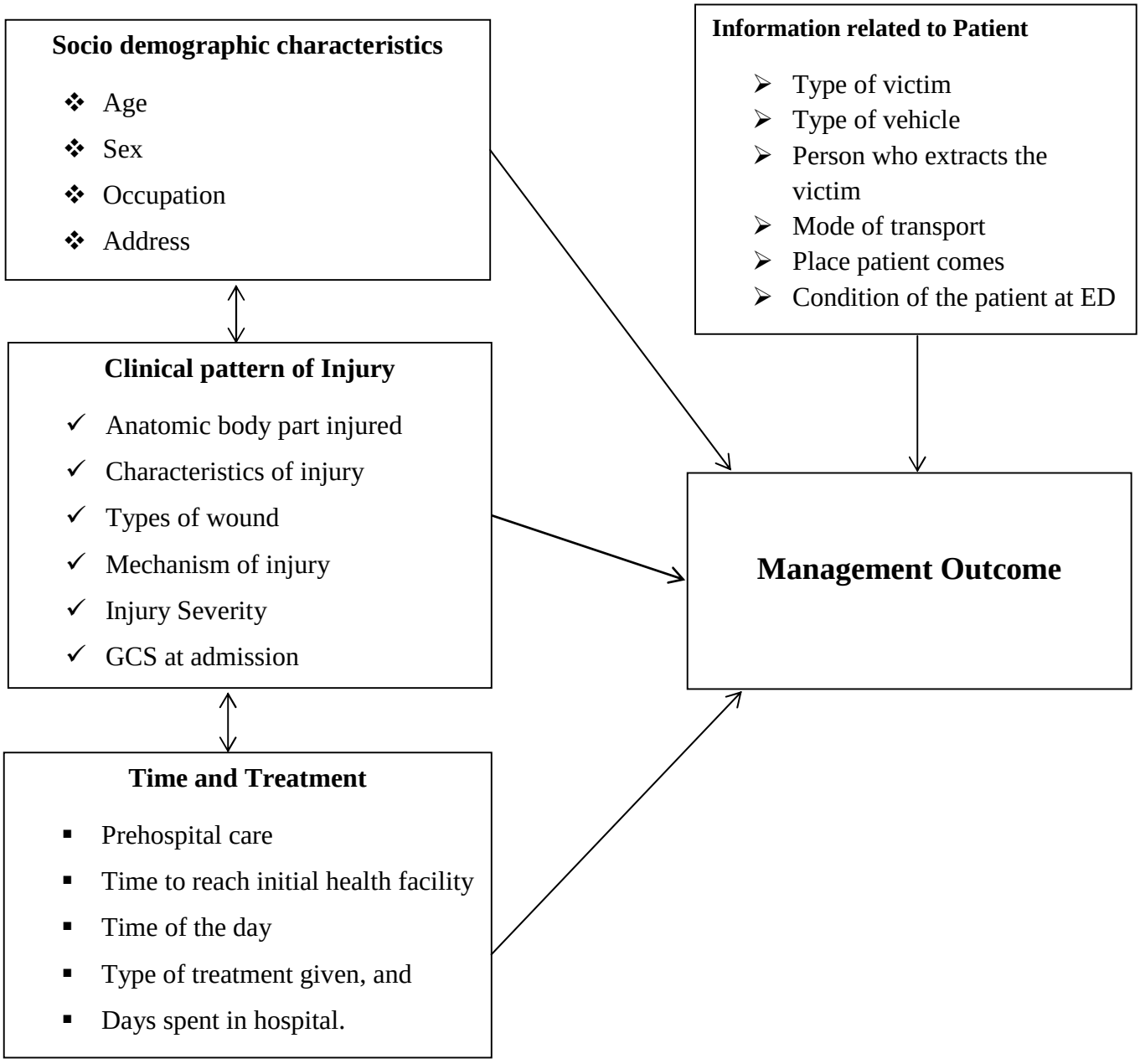

Figure 1: Conceptual framework developed after intensive literature review, June 2021(1,4,20,30,38)

CHAPTER THREE

OBJECTIVES

3.1. General Objective

- To assess clinical pattern,management outcomes and associated factors among road traffic accident victims attending emergency department of Jimma University Medical Center,Jimma Ethiopia, 2021.

3.2. Specific Objectives

1. To describe the clinical pattern of RTA in Jimma University Medical Center, Jimma Ethiopia, 2021
2. To determinemanagement outcomes of patient admitted with road traffic accident in Jimma University Medical Center, Jimma Ethiopia, 2021
3. To identify factors associated with management outcome ofRTA in Jimma University Medical Center, Jimma Ethiopia, 2021

CHAPTER FOUR

METHODS AND MATERIALS

4.1. Study Area and Period

The study was conducted in Jimma medical center which is located in Jimma town, Oromia region, Southwest of Ethiopia. Jimma town is the capital of Jimma zone which is found 352 km fromAddis Ababaand has altitude of 1800 meters above sea level. The climatic condition of Jimma town is woynadega. The mean annual range temperature of the area is 16^{o}c and 24^{o}c of minimum and maximum respectively. According to kebele Census in 2011E.C, the town has total population of 253,874of who 129,476 are men and 124,398 women. There are five hospitals in the town, two governmental and threeprivateby ownership. Jimma University Medical Center(JUMC) is the only teaching and referral hospital in the southwestern part of the country, providing services for approximately 15,000 inpatient, 160,000 outpatient attendants, 11,000 emergency cases and 4500 deliveries in a year coming to the hospital from the catchment population of about 15 million people. Under Jimma city Health Office, there are 5 Health Centers and 15 Health Posts(38).

The study was conducted from *March15, 2020 toApril 15, 2021*

4.2. Study Design

- ✓ A hospital based retrospective cross sectional study design wasemployed.

4.3. Source population

- ✓ All records of road traffic accident victims who visited the Emergency Department,surgical and orthopedic wards of JUMCfrom March 15, 2020 to April 15, 2021.

4.4. Study population

- ✓ Selected records of RTA patients who visited the Emergency Department,surgical and orthopedic wards of JUMCfrom March 15, 2020 to April 15, 2021.

4.5. Sample size determination

- The sample size was calculated with the critical value of 95% confidence level, 5% margin of error and taking the injury pattern amongRTA victims p=31.3%(38). Therefore, the sample size was estimated by;

$$\mathbf{n}=\left[\frac{\left(\frac{Z_{\alpha}}{2}\right)p(1-p)}{d^2}\right]$$

$$\mathbf{n}=\frac{(1.9\ )^2(0.3\ \ )(1-0.3\ \ )}{(0.0\ )^2}$$

n=330

Where: n = is the size of the sample

Zα/2 = is the standard normal value corresponding to the desired level of confidence

A confidence interval of 95% is assumed ($z_{\sim/2}=1.96$ **)**

d = margin of error

p =the injury pattern among RTA victimsin JUMC (31.3%)

By Considering 10% of incomplete records of patients which becomes 33, the final sample size was363**.**

4.6. Sampling Technique

First, lists of all RTA patients' record were obtained from the patients' registration logbook at ED ofJimma University Medical Center. There were 1,104 RTA cases from March 15, 2020 to April 15, 2021.Then, systematic random sampling technique was used with sampling fraction(k), which was calculated by dividing the total number of RTA cases in the past one year for the sample size and found to bethree i.e.k=N/n_f; 1104/363=3. Finally, the first chart of the patient was selected by lottery method.

4.7. Study variables

4.7.1. Dependent variable

- Management Outcome

4.7.2. Independent variable

- Socio-demographic data (Age, sex, Occupation and Address)
- Anatomical site injured
- Characteristics of injury
- Mechanism of injury
- Prehospital care
- place patient comes to emergency department
- Time it takes to reach initial health facility
- Condition of patient,and care given in emergency department
- Type of treatment given for the patient
- GCS on admission
- Days spent in hospital(LOS)and
- Disposition Outcome after ED
- Type of ward and
- Discharge outcome.

4.8. Eligibility Criteria

Inclusion Criteria:

- ✓ All selected records of patients who visited JUMC after sustaining road traffic accident from March 15, 2020 to April 15, 2021
- ✓ Those victims who had complete records i.e. at least major variables were included in the charts.

Exclusion Criteria:

- ✓ Incomplete records (absence of major variables) and
- ✓ Records lost from data room

4.9. Data Collection Tool and Procedure

First, we sorted out all the RTA cases from log books and medical records. Then, data collectors trace and collect data from randomly identified records of RTA cases. Data were collected by medical chart review using pretested checklist prepared in English. During data collection, two medical record officers and 4 BSc Nurses were involved. Data collectors read and assess medical charts carefully and filled the necessary information according to the check list.

4.10. Data Quality Control

Prior to data collection period, the checklist was pretested on 5% of sample size at Shenen Gibe Hospital which is found in Jimma Town at approximately 5 km from JUMC. During the pre-test, the check list was assessed for its understandability, and reliability of the subject matter. Reliability statistics was computed with Cronbach's alpha of 0.8.Identify the questions with ambiguity, and based on the obtained results necessary modifications were made on that checklist.During compilation, coding, entry, and analysis, data quality was reviewed for completeness and correctness. During data collection, data collectors were equipped with sufficient orientation and follow-up. The supervision of data collectors on how they manage problems was also considered. The completeness and consistency of the completed checklist was checked by supervisor and principal investigator on a daily basis.

4.11. Data processing and analysis

Data was manually collected and tested for completeness and accuracy, then coded and entered into Epi data version 4.6 computer programs. Subsequently, the data was exported to SPSS version 26 computer programs for study. The result was presented in narratives, graphs and tables.Bivariate analysis was employed to identify the variables having association with the outcome variable and qualified for the final model. Each variable with statistically significant in bivariate analysis entered in to multiple logistic regression model as the independent variable and management outcome of RTA as being a dependent variable. The presence and strength of association was measured by adjusted odd ratio (95% CI). Predictors with a p-value of <0.05 were considered statistically significant.

4.12. Ethical Considerations

Official letterwas obtained from Addis Ababa University, College of Health Sciences, and Research Ethical Review Committee.The advantages and purposes of the study were explained to staff members of the record office. Then, for retrieval of individual record and confidentiality of information a written consent was given to the record office of the hospital. After completion of data collection, medical records were returned back to their original place properly.

4.13. Operational Definitions

- ✓ **Disposition outcome:** is an outcome after the victim is seen by the Emergency physician at ED and planned to be discharged with improvement, admitted, referredor AMA.
- ✓ **Favorable outcome-** is a positive outcome of a patient usually after admission in which the physician decides he/she is improved or discharged with improvement.
- ✓ **Unfavorable outcome-**is the negative result of an accident which poses problem to a victim aftersustaining severe injury from RTA which ranges from physical disability up to death.
- ✓ **Minor injury:** Patient who had minor injury or superficial injury (e.g. Bruises, minor cut) requiring cleaning of the area.
- ✓ **Moderate injury:** Patient who had moderate injuries requiring some sort of skilled treatment such as fracture stabilization and suturing of wounds.

- ✓ **Severe injury:** Patient who had severe injuries requiring intensive medical/surgical management (e.g. internal hemorrhage, moderate/severe head injuries).
- ✓ **Multiple injuries-** a traumatized patient who has more than twoinjuries at his body part intentionally or unintentionally.
- ✓ **Management outcome:**is the condition of the patient at some point during their treatment which can be favorable or unfavorable.
- ✓ **Pedestrian-** A person walking rather than traveling in a vehicle
- ✓ **Passenger-** A person traveling/transport/ by vehicle
- ✓ **Pattern of RTA:**is an injury inflicted on the body due to road traffic accident such as anatomic part of the body involved, characteristics of injury, types of injuryand mechanism of injury.
- ✓ **Road traffic accident-**is an accident involving at least one vehicle on a road open to public traffic in which at least one person is injured or killed.
- ✓ **Vehicles-** A device for carrying or transporting individuals or objects such as motorcycle, Bajaj, and different types of car.

4.14. Dissemination plan

The result of the study will be submitted to Addis Ababa University, College of health science, school of Medicine, and Department of Emergency Medicine and Critical Care. It will also be disseminated to JUMC, Jimma Zone Health Office and other concerned and interested organizations. Finally, the result will be published on renowned journal for public use.

CHAPTER FIVE

RESULTS

5.1. Socio demographic characteristics

A total of 363 trauma victims' registry were reviewed and included for analysis with a completion rate of 98.4%. The mean (SD) age of the victims was 27 ± 13.7years. Of all victims visited the hospital, the most commonly affected age group were between 16-30 years old, accounting for 150 (42.0%) followed by age 31-45 years 99 (27.7%). This study also identified 270 (75.6%) of victims were male and 87 (24.4%) were female respectively with male to female ratio of 3.1 to 1. Nearly two third (64.7%) of the victims were from rural residence (Table 1).

Table 1: Socio demographic characteristics of road traffic accident victims who visited JUMC from March 15, 2020 to April 15, 2021, Jimma, Ethiopia (n = 357)

Variables	Category	Frequency	(%)
Age	≤ 15 years	75	21.0
	16-30 years	150	42.0
	31-45 years	99	27.7
	46-59 years	24	6.7
	≥ 60 years	9	2.5
Sex	Male	270	75.6
	Female	87	24.4
Occupation	Government	57	16.0
	Student	147	41.2
	Farmer	54	15.1
	Merchant	39	10.9
	Housewife	60	16.8
Address	Rural	231	64.7
	Urban	126	35.3

5.2. Clinical Patterns of Road Traffic Accidents

Among 357 cases reviewed, 141 (39.5%) of them sustained multiple injuries involving more than two body parts including both upper and lower extremities, head, pelvic and chest injuries followed by lower limb injuries alone, 108 (30.3%) in which closed wound fracture accounted 219 (61.3%). Nearly two third (60.5%) of victims admitted with RTA developed fracture 216 (60.5%) followed by blunt abdominal injury which accounted 54 (15.1%). On the other hand, among the victims affected by the accident 177 (49.6 %) were Pedestrians followed by Passenger 93 (26.1 %). Majorityof the accident occurred on day time with day light, 228 (63.9%) whereas the remaining 129 (36.1%) occurred at night time (Table 2).

Table 2:Pattern of injury among RTA patients who attended JUMC fromMarch 15, 2020 to April 2021, Jimma Ethiopia (n = 357)

Variables	Category	Frequency	(%)
Anatomic part of the body injured	Upper Limbs	37	10.4
	Lower Limbs	108	30.3
	Pelvic Area	15	4.2
	Chest Area	5	1.4
	Head Injury	51	14.3
	Multiple injury	141	39.5
Characteristics of injury	Fracture	216	60.5
	Dislocation	6	1.7
	Laceration	22	6.2
	Abrasion	59	16.5
	Blunt abdominal injury	54	15.1
Types of wound/fracture	Open wound	87	24.4
	Closed wound	219	61.3
	Comminuted	51	14.3
Classification of the Victims	Pedestrian	177	49.6
	Driver	84	23.5
	Passenger	93	26.1
	Assistant Driver	3	0.8
Time of Accident	Night time	129	36.1
	Day time	228	63.9

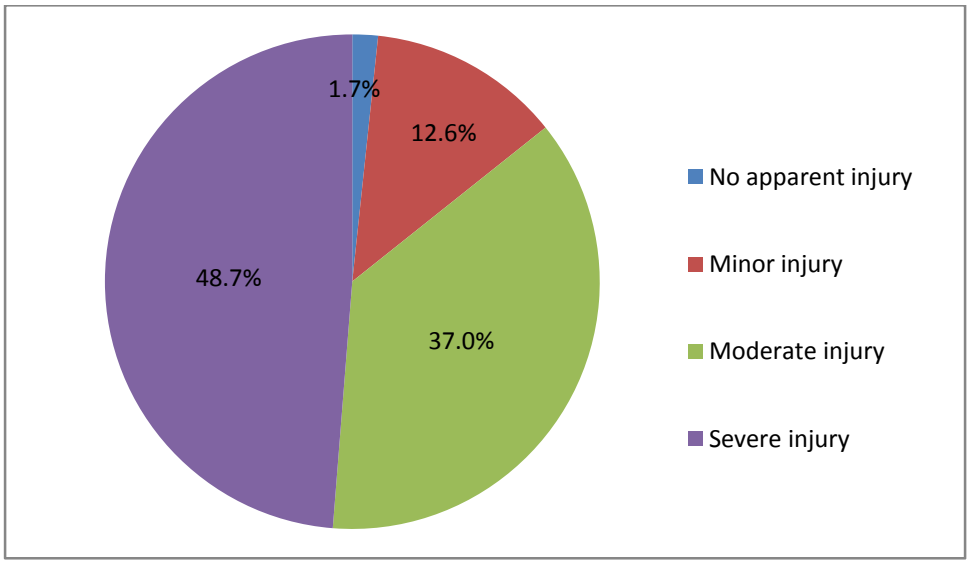

Figure 2: Injury severity among RTA victims who attended JUMC from March 15, 2020 to April 2021, Jimma Ethiopia, 2021 (n=357)

Among the study participants, nearly half (48.7%) of them sustained severe injury that requires intensive surgical management followed by moderate injury requiring some skilled treatment which accounted 132 (37%) (Figure 2).

About 153 (42.9%) of injuries due to RTA were caused by Motor Cycle followed by Minibus 69 (19.3%). Regarding mechanism of injury, more than one third (36.1%) of the victims reported that they fell down from the moving vehicle followed by the vehicle rolled over while the victim were on/in moving vehicle which were about 23.5%. In addition, more than half of the victims 207 (58%) were extracted from the vehicle by the people around them or bystanders followed by the police man which accounted 72 (20.2%).

Regarding mode of transportation, the largest proportion of victims (34.5%) was transported to their nearby health facility using private vehicle. But, only about 93 (26.1%) of patients used the Ambulance to reach to initial health institution for life saving support. The time it takes to reach initial health facility to seek the necessary support was in greater than 1 hour, 180 (50.4%). Almost half (47.9%) of the victims were come to JUMC after visiting other health institution especially district hospitals followed by those from the site of accident or scene (40.3%) (**Table 3**).

Table 3:The type of vehicle responsible in causing road traffic accident for patients who attended JUMC from March 15, 2020 to April 2021, Jimma Ethiopia, 2021 (n=357)

Variables	Category	Frequency	%
Type of vehicles	Isuzu	42	11.8
	Motor Cycle	153	42.9
	Public Bus	27	7.6
	Minibus	69	19.3
	Bajaj	66	18.5
Mechanism of injury	Fall down	129	36.1
	Roll over	84	23.5
	Hit by other vehicle	72	20.2
	Collision	72	20.2
Person who extract the extract the victim	H/professionals	18	5.0
	Bystanders	207	58.0
	Police	72	20.2
	Others	60	16.8
Mode of Transportation	Ambulance	93	26.1
	Commercial Vehicle	63	17.6
	Police vehicle	42	11.8
	Private vehicle	123	34.5
	Carried by people	36	10.1
Time it takes to initial HF	≤ 1 hour	177	49.6
	>1 hours	180	50.4
Place where patient comes	Scene	144	40.3
	Hospital	171	47.9
	H/Center	27	7.6
	Private institution	12	3.4
	Self	3	0.8

5.3. Management and its Outcomes

More than half(58%) of the victims never got any type of treatment before arriving to this referral hospital. From those victims who got treatment (42%), the largest proportion took anti-pain (22.7%) and initial resuscitation (16%). Meanwhile, the condition of the victim after reaching the emergency room of JUMC and evaluated by health professional were unstable 180 (50.4%) and six (1.7%) were reported dead on arrival. Regarding management given at ED, almost half (48.7%) of the victims resuscitated and more than one third (37%) were given anti-pain respectively.

On triage paper, more than one third(38.7%) were classified as Red needing urgent/immediate intervention, and more than two thirds (71.4%) of patients were received surgical type of treatment among which 22.8% were admitted to ICU.

Almost half of the patients'/victims (48.1%) who admitted due to road traffic accident had mild GCS followed by moderate GCS 132 (37%) on admission. The remaining patients presented to emergency department had severe GCS score or in deep coma (Table 4).

Table 4:The treatment, care given in ED and condition of the patient at ED from March 15, 2020 to April 2021, Jimma Ethiopia, 2021 (n=357)

Variables	Category	Frequency	Percentages
Treatment at initial HF	Yes	207	58.0
	No	150	42.0
Type of treatment given at initial HF (multiple response was possible)	Basic FA	36	10.1
	Resuscitation	57	16.0
	Anti-pain	81	22.7
	Antibiotics	39	10.9
Condition of the patient at ED	Stable	171	47.9
	Unstable	180	50.4
	Died on arrival	6	1.7
Care given in ED	Resuscitation	174	48.7
	Anti-pain	132	37.0
	Wound care	21	5.9
	Antibiotics	30	8.4
Place where patient kept at ED	Triage	129	36.1
	Red area	138	38.7
	Front evaluation	63	17.6
	Other*	27	7.6
	Conservative	33	9.2

Type of treatment given	Surgical	255	71.4
	Medical	69	19.3
Mental status(GCS) of the victim	13-15	174	48.7
	9-12	132	37
	3-8	51	14.3

Note: HF;Health facility, **ED;**Emergency department

***Others:** Those victims who were kept in waiting areas and yellow category

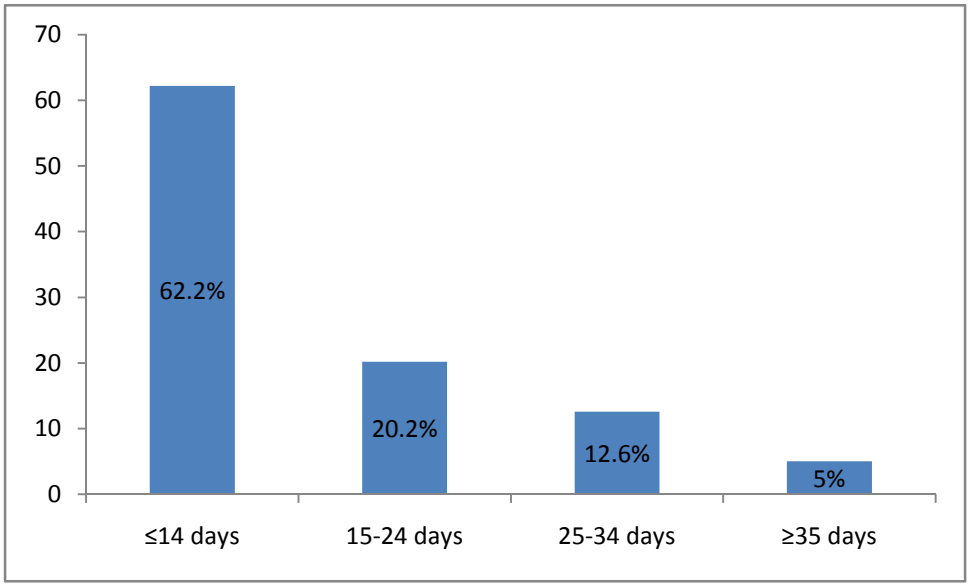

Figure 3: The average number of days patient stayed in hospital due to RTA in JUMC from March 15, 2020 to April 2021, Jimma Ethiopia, 2021(n =255)

Almost two thirds (62.2%) of patients admitted with road traffic accidents stayed in hospital for less than two weeks followed by those stayed between 15 to 24 days (20.2%) (Figure3).

About three forth (71.4%) of the victims who visited ED of JUMC were admitted of which 112 (43.9%)were admitted to surgical wardfollowed by orthopedic ward 85 (33.3%) for further treatment.Moreover, 87 (24.4%) victims with no apparent or mild injury such as simple abrasion and laceration were treated and discharged to their home from emergency outpatient department. However, about 12.6% of victims admitted with RTA had lost their lives which included those who died on arrival(**Table 5**).

Table 5: Disposition and discharge outcome of RTA patients at JUMC from March 15, 2020 to April 2021, Jimma Ethiopia, 2021

Outcome	Category	Frequency	Percentages
Disposition Outcome	Sent home	87	24.4
	Admitted	255	71.4
	Referred	6	1.7
	Died on arrival	6	1.7
	LAMA	3	0.8
Type of Ward	Orthopedics	85	33.3
	Surgery	112	43.9
	ICU	58	22.8
Discharge outcome	Died*	45	12.6
	Improved	303	84.9

*Included patients who died on arrival and after admission; AMA: those patients who left the hospital without the physicians' consent.

5.4. Factors Associated with Road Traffic Accident

The victims' age, sex, residence, type of wound, injury severity and type of vehicle causing an accident were not significantly associated with management outcome of RTA.

The odd of unfavorable outcome is 1.4 times more likely to occur among males (COR= 1.4; 95% CI: 0.34, 1.44). On the other hand, those victims above 30 years old were 1.5 times at risk of death from road traffic accident than their counterparts (COR= 1.53; 95% CI: 0.79, 3.0). By occupation, relativelybeing student increased probability of unfavorable outcome as compared to other occupations (COR= 3.80; 95% CI: 0.97, 14.86). Meanwhile, the likelihood of death among urban residents was 1.67 times when compared with residents living in rural areas (COR= 1.67; 95% CI: 0.85, 3.26).

In the bivariate analysis, the victims' age, sex, address, type of wound, injury severity and type of vehicle causing the accident had no statistically significant association with unfavorable outcome due to RTA. However, anatomical body part, mechanism of injury, time it takes to reach initial facility, place from where the patient came to hospital, condition of the patient, care given in ED and the ward to which the patient admitted had a statistically significant association with the management outcomes.Moreover, place where victims kept and treated, type of treatment given, GCS on admission, disposition outcome and length of hospital stay also hadstatistically significant association with the management outcomes of RTA.

In multivariable logistic regression,anatomical sites,mechanism of injury, time to reach initial health facility, time of the day, condition of patient at ED, type of treatment given, GCS at admission, anddays spent in hospitalwere independent factors associated with unfavorable outcome.

The likelihood of death among patients who sustained head injury were 17 times more as compared to patients with extremities' injury (AOR= 16.61; 95% CI: 3.85,71.71). The probability of occurrence of death was decreased by 23% among patients who fell down from moving vehicle as compared to patients who collided (AOR= 0.23; 95% CI: 0.08, 0.68). The odds of unfavorable outcomes among patients who stayed more than one hour before reaching the initial health facility was three times more as compared to those who came within an hour of accident (AOR= 3.30; 95% CI: 1.13, 9.60).The collisions happened in night time (dark conditions) were almost 2.79 times more likely to be unfavorable thanthose happened in daylight(AOR= 2.79; 95% CI; 1.06, 7.34). Moreover, victims who were in unstable condition during presenting to ED were 7.8times more odds of unfavorable management outcome as compared to stable patients (AOR= 7.78; 95% CI: 2.33, 26.06).

The probability of occurrence of death was decreased by 23% among patients who received surgical intervention as compared to patients who received conservative management (AOR= 0.23; 95% CI: 0.07, 0.81). The odds of unfavorable outcomes among victims admitted to surgical ward were two times more than patients who admitted to orthopedic ward(AOR= 1.96; 95% CI: 0.65,5.90). The likelihood of death among patients who had low GCS or in deep coma during admission were 20times more as compared to patients with mild GCS (AOR= 20.12; 95% CI: 7.23,55.96).Besides, the odds of unfavorable outcome among patients stayed in hospital for less than 14 days were 6.9 times more as compared to patients stayed less than 14 days (AOR= 6.85; 95% CI5.81, 8.06) (**Table 6**).

Table 6: Factors associated with management outcome of injury related to RTA at JUMC, Jimma, Southwest Ethiopia, 2021

Variables		Victims' outcome		COR (95% CI)	AOR (95% CI)	P-value
		Favorable	Unfavorable			
Age	≤30 yrs.	64.2	53.8	1	1	
	>30 yrs.	35.8	46.2	1.53(0.79, 3.0)	0.46(0.09,2.44)	0.36
Anatomical sites	Extremity	44.7	7.7	1		
	Pelvic area	5.3	7.7	8.35(1.56,44.71)	7.72(1.29,46.13)	0.03
	Head injury	13.2	23.1	10.14(2.63,39.17)	16.61(3.85,71.71)	<0.01
	Multiple sites	36.8	61.5	9.71(2.85,33.05)	18.91(5.15,69.44)	
Mechanism of Injury	Fall down	17.9	38.5	0.19(0.07,0.50)	0.23(0.08,0.68)	0.01
	Roll over	22.6	30.8	0.63(0.28,1.46)	0.31(0.10,0.95)	0.14
	Hit	20.8	15.4	0.35(0.13,0.95)	0.52(0.17,1.55)	0.24
	Collision	38.7	15.4	1	1	
Time of accident	Night	65.1	53.8	1.59(0.82,3.13)	2.79(1.06,7.34)	0.04
	Day	34.9	46.2	1		
Time it takes	≤ 1 hour	54.7	15.4	1	1	
	> 1 hours	45.3	84.6	6.65(2.71,16.30)	3.30(1.13, 9.60)	0.03
Condition of patient at ED	Stable	54.7	15.4	1	1	
	Unstable	45.3	84.6	6.65(2.71,16.30)	7.78(2.33,26.06)	<0.001
Care given in ED	Resuscitation	55.7	15.4	1	1	0.19
	Other measures*	44.3	84.6	6.90(2.81,16.94)	3.17(0.55,18.24)	
Ward the victim is admitted	Orthopedics	35.2	22.2	1	1	
	Surgery	42.0	55.6	2.09(.87,5.01)	1.96(0.65,5.90)	0.23
	ICU	22.8	22.2	1.54(0.54,4.37)	1.67(0.44,6.34)	0.45
Type of Rx given	Conservative	8.5	15.4	1	1	
	Surgical	75.5	38.5	0.28(0.10,0.79)	0.23(0.07,0.81)	0.02
	Medical	16.0	46.2	1.59(0.56,4.47)	1.15(0.31,4.19)	0.84
Mental status (GCS) on admission	Mild	51.9	23.1	1	1	
	Moderate	38.7	23.1	1.34(0.52,3.48)	1.50(0.55,4.07)	<0.001
	Severe	9.4	53.8	12.83(5.36,30.71)	20.12(7.23,55.96)	
Days spent in hospital	≤ 14 days	39.6	23.1	2.18(1.01,4.76)	6.85(5.81,8.06)	
	> 14 days	60.4	76.9	1	1	<0.001

CHAPTER SIX

DISCUSSION

Road Traffic Collisions have become a major public health and economic problem worldwide.Many studies have revealed that there has been a rapid increase in the number of road traffic accidents in many of the developing nations including our country over the last several decades(30). This study indicated that out of 357 RTA victims, the most commonly affected age group was 16-30 years, (42.0%) which is consistent with the study done in Tirunesh Beijing hospital (41.6%) (26). However, this is slightly higher than other similar studies done in Yemen (34%) which might be due to larger sample size in this study (13).They represent the most economically productive age group who likely has serious economic implications particularly at a family level and nation too; they are more engage to outdoor activities, which might increase the risk of RTA.

More than three fourth (75.6%) of patients were male, which is in line with the study done in Medellín, Colombia (75.8%) (4), Guinea (76.8%) (17), but lower than the study done in Lagos university state, Nigeria (86%) (18). These study findings agrees with other similar studies done in Cameroon (76.4%) (46),and Wolaita zone (74.8%)(1).The large proportion of male victims may be due to increased daily movement for work, andthe increased level of participation in high-risk activities.Urban resident´s accounted two thirds (64.7%) of the study population in this study.This result is higher than the study done in referral hospitals in Addis Ababa (53.7%) (37).

Regarding pattern of injury, musculoskeletal fracture was the most frequent type of injury (60.5%).This finding is slightly higher than the study done in India (50.4%)(5), Cameroon (50.76%)(46) and Tirunesh Beijing hospital (56.2%)(26), but lower than the study conducted in Eastern Ethiopia (80.2%) (44).This might be due to the fact that majority of the study participants were motor cycle drivers and passengerswho sustained falling down injury from the moving vehicle. Moreover, nearly half (48.7%) of them sustained severe injury that urged them to seek intensive surgical management followed by moderate injury requiring some skilled treatment which accounted 132 (37%). This study is much higher than the study done in Nigeria(47), in which severe cases accounted for 24.0% and 68.0% for moderate injuries (18), Jimma Referral hospital (32.7%) (38), and Central Ethiopia (31.5%) (27). However, it is in line

withthe study done inMedellin, Colombia (45.6%) (4) and Southwest Ethiopia (46.4%)(21). The discrepancy could be due to difference in the nature of the studies and epidemiologic distribution of RTA in different study setting.

The most common mechanism of injury in this study was falling down from moving vehicle (36.1%). This result is lower than the study done in Wolaita (62.5%)(1). The difference might be due to the difference in sample size, study period and the type of study design employed by the researchers. But, it agrees with the previous study done in Jimma Referral hospital (30.3%) (38), Guinea (30%) (17) and India (36.9%) (42).

Almost half of the victims injured were pedestrians (49.6%) in this study. It is higher than the study done in Shanghai, China (31%) (48), but lower than the study done in Zewditu Memorial Hospital (66%) and TASH (61%) respectively (27,49). However, it agrees with similar study done in some selected public hospitals in Ethiopia (49.7%) (37) and Saudi Arabia (55.4%) (49).The discrepancy could be due to difference in sample size and the study area, in this case Addis Ababa in which traffic flow is high as well as receiving referred cases from different parts of the country. Furthermore, insufficient attention to road safety needs (e.g. lack of pedestrian knowledge of road crossing, poor road design for users) and reckless driving behavior among drivers might increase the risk for the walker.

In the current study most of the road traffic injuries occurred during the day time with day light (63.9%) which almost agrees with the study done in India (53.2%) (42) and Northwestern Tanzania (60.5%) (43). The existence of traffic jam during the daytime, poor road network and mixed traffic flow system in urban areas might be the reasons for a higher collision during daylight. Besides, more than half (58%) of the victims were extracted from the vehicle by the people around them or bystanders. This is in contrast with the study done in Addis Ababa (37)in which 67% of the victims were extricated by the health professionals.This discrepancy could be due to the fact that the accidents occurred in urban areas are accessible for health professionals help.

Regarding prehospital care, in this study about 42% of the victims took some type of care before arriving to the hospital. This result is higher than the study done in Addis Ababa which reported only 14.3% of the victims' received prehospital care(27). It was also higher than reports from

previous studies in Central and Northern Ethiopia(30,50), which reported 0% prehospital service. This discrepancy might be due to inauguration of “Ayyoo Ambulance” service which has played paramount role in provision of better prehospital care particularly in Jimma Zone.

Even though the level of care is better in the study area, it is yet much lower to save life lost due to RTA.Moreover, more than one thirds of victims (34.5%) were transported to the nearby health facility using private vehicle followed by Ambulance (26.1%).This finding is comparablewith the result reported by selected public hospitals in Addis Ababa(24.5%) (37). The low ambulance usage in the current study is due to the fact that the study includes the participants from outside of Jimma zone.

Regarding management given at ED, almost half (48.7%) of the victims resuscitated and some were given anti-pain (37%). Nearly three fourths (71.4%) of patients admitted to surgical and orthopedic wards received surgical type of treatment. This finding is found to agree with a study done in North West Tanzania where by majority of RTA patients admitted were treated surgically(43).This consistence might be due to similar study design.However, this result is in contrast with the study done in Dilchora hospital (90.5%) (44). This might be due to larger sample size and less severe cases recordedwho sought surgical intervention in the later study. Moreover, 62.2% of patients admitted with road traffic accidents stayed in hospital for less than two weeks. It agrees with the study conducted in in Northern Ethiopia (60.5%) (51).

More than three fourth(84.9%) of the patients were discharged with improvement while 12.6% of them were died including six patients who were died on arrival.The death reported agrees with the study done in central Ethiopia (12.5%) and TASH (16.7%)(27,31), but lower than the study conducted in Cameroon (62%) (46). However, those discharged with improvement werehigher than the study done in Zewditu Memorial Hospital (67%) (50), butlower than the study done in JUSH (92.5%) (38) andand Dilchora Referral hospital (90%)(44). This discrepancy might be due to minor or moderate injuries enrolled in those studies which are in contrast to the current study.On the other hand, 14.7% of victims presented to JUMC had severe GCS which is higher than the study done in Guinea (1.4%)(17). The inconsistence might be due to admission of severe cases in the current study and larger sample size in the later study.

In multivariable logistic regression, anatomical sites, mechanism of injury,time to reach initial health facility, condition of patient at ED, type of treatment given, GCS at admission and days spent in hospitalwere factors significantly associated with unfavorable management outcome.The chances of unfavorable outcomes among patients who sustained head injury was 17 times more as compared to those who came with extremity injury (AOR= 16.6; 95% CI: 3.85,71.71). This finding agrees with the study done in Saudi Arabia (AOR= 17.4; 95% CI: 3.01,51.42)(49).

Prehospital delay more than one hour before reaching the initial health facility increased the odds of unfavorable outcome more than three times as compared to their counterparts(AOR= 3.3; 95% CI: 1.13, 9.60). This study is lower than the study done in Shanghai, China(AOR= 34.4; 95% CI: 0.158, 0.751)(33).The possible reason might be due to delay to visit nearby health institutions after injury increases the risk of complication and death due to heavy blood loss and damage of major organs.

The collisions happening in dark conditions were almost three times more likely causeunfavorable outcome thanthose happening in daylight(AOR= 2.79; 95% CI; 1.06, 7.34). This might be due to the fact that an accident that happens during night time is usually associated with severe injuries because the driver may get into sleep, substance use and speed of the vehicle.

Victims who were unstable during presenting to ED were eighttimes more chances of developing unfavorable management outcome as compared to stable patients (AOR= 7.78; 95% CI: 2.33, 26.06). This is associated with severity of injury and multi organ damage in these patients as manifested by derangement in vital signs.This study is in line with the study done in Dar es Salaam, Tanzania (P = 0.000)(52).Moreover, the likelihood of death among patients who had low GCS or in deep coma (scores between 3-8) during admission were twenty times more as compared to patients with mild GCS (scores between 13-15) (AOR= 20.12; 95% CI: 7.23,55.96). This result is much lower than the study done in Guinea (AOR: 776.1; 95% CI: 340.2–1770.7)(17).The difference might be due to the fact that the study participants included in the later study were patients with traumatic brain injury secondary to motor vehicle accident. This result suggests that patients with low GCS are highly liable for bad outcome that could be due to major organ failure especially severe head injury.

The odds of unfavorable outcome among patients stayed in hospital for less than 14 days were seven times more as compared to patients stayed more than 14 days (AOR= 6.85; 95% CI 5.81, 8.06). The current study is higher thanthe study done in China (AOR= 1.98; 95% CI: 1.24 3.151.980)(48). This might be due to the fact that trimodal death distribution shows that many deaths occur in the first two weeks. In addition, this finding is came up with largest proportion of severe cases that may increases the risk of death, referral or left against medical advice during the first two weeks.

Strength of the Study

Data quality control was highly practiced during and after data collection.Training and close supervision were well established.Pre-test was done to ensure reliability of the checklist.

Limitations of the study

Findings in this study should be interpreted in the light of the inherent limitations of the study. In the current study, due to the retrospective data collection process, correlates such as marital and educational status were not included due to lack of adequate information from the medical records of study participants. The study was conducted in one medical center, so the findings may not be generalized to all hospitals.

CONCLUSIONS

RTA is a significant cause of preventable death, particularly among pedestrians and users of motorized vehicles.Meanwhile, the mortality and disability from RTA can be minimized by appropriately identifying the priority patient and giving appropriate intervention promptly. Predominantly males and people aged 16-30 years of whom rural areas and students were affected. Nearly half (48.7%) of them sustained severe injuryin which majority presented to hospitalafter an hourof sustaining injury representing a significantdelay in presentation. More than one thirdwas classified as red patients needing urgent/immediate intervention such as resuscitation and anti-pain. More than three fourth of the patients were discharged with improvement while 12.6% of them were died of which death mostly occurredafter admission of the patients into wards.In general, anatomical site, mechanism of injury, time to reach initial

health facility, time of the day, condition of patient at ED, type of treatment given, GCS at admission anddays spent in hospitalwere among independent predictors of management outcome

RECOMMENDATION

Results reported in this paper suggest the need for immediate and priority steps to be taken to minimize the unnecessary loss of lives occurring due to untimely patient management. Therefore, Ministry of Health should establish and strengthen advanced pre-hospital care and an effective ambulance system for transportation of patients to nearby health facilities as soon as possible. Furthermore, patients presenting to ED of hospital should get priority based on their clinical presentation which needs to be incorporated in triage paper. Accordingly, prompt intervention should be initiated based on anatomical site injured, mechanism of injury, time of accident, vital sign derangement on presentation and GCS on admission.

Besides, Ethiopian Road Authority should enforce the use of compulsory motorcycle helmets that would appear very important intervention to decrease the extent of damage especially head injury after road traffic accidents.

Finally, Jimma University Medical Center should improve its recording system or documentation for future researcher in order to obtain the necessary information easily.In general, these findings support an urgent call for targeted measures, particularly focused on improving trauma management systemand prompt intervention in an effort to reduce death from RTAs and its complications.

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ANNEX: English Version Checklist

Dear record officer, the purpose of obtaining the patients' record is to collect data about the clinical Pattern and management outcome among Road Traffic Accident Victims in Jimma University Medical Center. Questions included in this checklist enable the researcher to gather information relating to the topic of interest. The information collected from the records will be kept strictly confidential. The data that will be collected is very vital in achieving goal of the study. Hence, I pleasantly ask your honest cooperation!

Serial number	**PART I: SOCIODEMOGRAPHIC DATA**	Possible response (make a circle for answers)
1	Age	_____in number
2	Sex	1. Male 2. Female
3	Occupation	1. Government 2. NGO 3. Student 4. Farmer 5. Merchant 6. Housewife 6. Other _____.
4	Address	1. Urban 2. Rural
Part II: Mechanism or pattern of injury on the body		
1	Which anatomic part of the body was injured?	1. Upper limb 2. lower limb 3. Pelvic area 4. chest area 5. Head injury 6. multiple fracture (If two or more body part is involved)
2	Characteristics/Outcome of injury on the body	1. Fracture 2. Dislocation. 3. Laceration 4. Abrasion 5. Other _____.
3	Types of wound/skin break or not	1. Open wound fracture 2. Closed wound fracture 3. Comminuted fracture
4	What was mechanism of injury during an accident?	1. Fall down 2. Roll over 3. Hit by other vehicle 4. Collision
5	In which type you classify the victim?	1. Pedestrian 2. Driver 3. Assistant driver 3. Passenger 4. Other _____.
Part III: Questions to assess Injury Severity		
1. No apparent injury	2. Minor/Superficial injury	
3. Moderate injury	4. Severe injury	

Part IV: Questions to assess factors associated with RTA		
1	What was the time of accident?	1. Night time (6:00 pm-6:00 am 2. Day time (6:01am-5:59pm)
2	Which type of vehicle causes the accident?	1. Isuzu 2. Motor cycle 3. Public Bus 4. Minibus 5. Bajaj 6. Others----------
Part V: Questions related to pre-hospital care		
1	Did the patient receive a pre-hospital care?	1. Yes 2. No
2	Who extract the victim from accident place?	1. Health professionals 2. Bystanders 3. Police 4. Others
3	Which transport mode did you use to travel from the scene to an initial health facility?	1. Ambulance 2. Commercial vehicle 3. Police vehicle 4. Private vehicle 5. Carried by people 6. Walking 7. others
4	How long did it take to reach to an initial health facility?	1. 1 Hour or less 2. More than 1 Hour
5	From where does the patient come to the emergency department?	1. From the scene 2. From hospital 3. From health center 4. From private health institution 5. Self
6	Was treatment given Before arriving to ED?	1. Yes 2. No 3 Unknown
7	If yes Q6 which type of treatment was given?	1. First aid (basic) 2. Resuscitation 3. Medication (ant pain) 4. Others_____
8	How was the condition of the patient at the emergency department? (based on vital sign)	1. Stable 2. Unstable 3. Died on arrival
9	What was the care given in the emergency department?	1. Resuscitation 2. Medication 3.Wound care 4. Other_____.
10	Where was patient kept/ treated at ED?	1.Triage (resuscitation started) 2. Red area 3. Front evaluation 4. Other

Part VI: Treatment and outcome related data		
1	What type of treatment was given to the road traffic accident victim?	1. Conservative 2. Surgical 3. Medical
2	What was the GCS of the patient on admission?	1. 13-15 2. 9-12 3. 3-8
3	For how long the patient stayed in hospital?	1. ≤ 14 days 2. 15-24 days 3. 25-34 days 4. ≥ 35 days
4	The disposition outcome of the patient after the emergency room	1. Sent home 2. Admitted 3. Referred 4. Died 5. Against medical advice
5	If the patient is admitted, to which ward the patient is admitted?	1. Surgery 2. Orthopedics 3. ICU

THANK YOU FOR YOUR COOPERATION!

DECLARATION

I certify that this thesis is my own original work and has not been presented for award of a degree at any other university.

SIGNATURE: _____DATE: _____

DEREJE ENDALE