ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCE
SCHOOL OF MEDICINE
DEPARTMENT OF EMERGENCY MEDICINE

ASSESSMENT OF PATTERN AND OUTCOME OF INJURY AMONG VICTIMS VISITING EMERGENCY UNIT OF NIGIST ELLENI MOHAMMED MEMORIAL HOSPITAL HOSSANA, SOUTHERN ETHIOPIA, 2020

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I, the undersigned MSc student, declared that I have submitted my original work on a title*: "ASSESSMENT OF PATTERN AND OUTCOME OF INJURY AMONG VICTIMS VISITING EMERGENCY UNIT OF NIGIST ELLENI MOHAMMED MEMORIAL HOSPITAL, HOSSANA, SOUTHERN ETHIOPIA, 2020"* for examination.

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

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This thesis by SELAMU AMANUEL is accepted in its present form by the board of examiners as a requirement for the degree of maters in EMERGENCY MEDICINE AND CRITICAL CARE NURSING.

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Statement of the author

By my signature below, I declare and affirm that this thesis is my own work. I have followed all ethical principles of scholarship in the preparation, data collection, data analysis and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited and referenced all sources used in this document. Every effort has been made to avoid plagiarism in the preparation of this thesis. I solemnly declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

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Acronyms and Abbreviations

AOR	Adjusted Odds Ratio
CI	Confidence Interval
DALYs	Disability Adjusted Life Years
ED	Emergency Department
HIV/AIDS	Human Immune Virus/ Acquired Immune Deficiency Syndrome
JUSH	Jimma University Specialized Hospital
LMICs	Low- and Middle-Income Countries
NEMMH	Nigist Elleni Mohammed Memorial Hospital
RTA	Road Traffic Accident
UI	Uncertainty Interval
USD	United States Dollar
WHO	World Health Organization
YLDs	Years Lived with Disability

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Abstract

Background: *Every day the lives of more than 14,000 people are cut short as a result of an injury globally. The burden of injury is especially high in LMICs, where over 90% of injury deaths occur. Although the hospitals should have a clear image of injury, little is known about injury statistics. This study was specifically designed to determine the patterns and outcome of commonly occurring injuries based on available health facility records in NEMMH, Hossana, Southern Ethiopia.*

Methodology*: A hospital based retrospective review of records of injury victims in NEMMH from January to December 2019 was evaluated from October to June 2020. Data were collected using a structured checklist that was developed by adapting the World Health Organization instrument. Five degree holder nurses collected the data while investigator closely supervised. Socio demographic characteristics of the patients and injury related information were collected. Data were analyzed using SPSS for windows version 25.*

Results*: Out of 6238 patients visited emergency unit of Nigist Elleni Mohammed Memorial Hospital from January 1, 2019 to December 31, 2019; 762 (12.2%) were victims of injury. Unintentional injury is the most prevalent category of injury (69.4%), of which RTA is the commonest (41% of all unintentional injury) mechanism of injury which in turn affected mostly pedestrians (41.5% of all RTA victims) followed by drivers. Interpersonal violence is the most commonly occurring intentional injury (52.3%) followed by suicidal attempt. Victims who are unintentionally injured those who sustained RTA injury, those who were injured on street, those who encountered chest injury and those who were severely injured were found to be at a higher risk of death as compared to the remaining victims.*

Conclusion*: The magnitude of injury in NEMMH is high. Injury is more prevalent among males and productive age group. Most victims faced their injuries unintentionally, of which RTA is most prevalent; whereas, interpersonal violence is the most prevalent intentional injury. The mortality rate due to injury is also high. Appropriate prevention strategies should be designed and implemented against RTA, and prompt treatment should be commenced to combat bad outcomes.*

Keywords: *Injury, Degree of injury, Pattern, Outcome, NEMMH, Ethiopia*

CHAPTER ONE: INTRODUCTION

1.1. Background

Injury is defined as "a bodily lesion at the organic level, resulting from acute exposure to either mechanical, thermal, electrical, chemical or radiant energy in amounts exceeding the threshold of physiological tolerance. In some other cases like drowning, strangulation, freezing…etc, the injury results from an insufficiency of a vital element. Unintentional injuries includes road traffic injuries, poisoning, falls, fires, drowning, and “other unintentional injuries” like exposure to animate and inanimate mechanical forces (including firearms); exposure to electric current, radiation and extreme temperature and pressure, and to forces of nature; and contact with heat and hot substances, and venomous plants and animals. Intentional injuries include self-inflicted injuries (i.e. suicide), interpersonal violence (e.g. homicide), war-related injuries, and “other intentional injuries” like injuries due to legal intervention.(1)

Injuries have been most important global public health problem killing more than 5 million people each year. This accounts for 9% of the world’s deaths, which is more than one and half times the number of fatalities that result from combined effect of HIV/AIDS, tuberculosis and malaria. Every day the lives of more than 14 000 people are cut short as a result of an injury globally. The causes of injury include acts of violence against others or oneself, road traffic crashes, burns, drowning, falls, and poisonings. (2) Injuries affect all age groups but have a particular impact on young people. For people between the ages of 5 and 44 years, injuries are one of the top three causes of death.(3)

The fraction of global deaths due to injuries was marginally higher in 2010 (9·6%) compared with two decades earlier (8·8%). This will be driven by a 46% rise in deaths worldwide due to road traffic accidents (1·3 million in 2010) and a rise in deaths from falls.(4) The burden of injury is especially high in low-income and middle-income countries, where over 90% of injury deaths occur. To lower this unacceptable burden, a spectrum of actions is needed, including better surveillance and research, increased implementation of road safety and other forms of injury prevention, and strengthening of the current scenario in trauma care (care of the injured).(5)

Road traffic crashes killed 1.25 million people worldwide in 2013 and injured up to 50 million more. The death rate due to road traffic injuries was more than 2.5 times higher in low-income countries than in high-income countries (24.1 vs 9.2 deaths per 100 000 population), despite lower rates of vehicle ownership in low-income countries.(6) Over 90% of the world's fatalities on the roads occur in low-income and middle-income countries, which have only less than half of the world's registered vehicles.(7) Ethiopia has reported 2,581 fatalities with 377,943 registered vehicles. This translates to 68.3 deaths per 10,000 vehicles. The report estimated that there are 18 estimated road traffic deaths per 100 000 population translating to more than 15,000 road traffic deaths annually. Moreover, less than 10% of the seriously injured transported by ambulance and 5.5% are permanently disabled due to road traffic (8)

Prevalence, incidence and years lived with disability (YLDs) due to injury shows that there is an increase from 1990 to 2006 and also from 2006 to 2016. Age standardized YLDs due to injury is higher in men than females except for that of sexual violence.(9) Regionally, even if findings are variable across countries in sub-Saharan Africa, the health loss attributable to road injury and interpersonal violence increased by 76% and 73%, respectively, since 1990.(10)

1.2. Statement of the problem

Injury is a leading cause of death worldwide, which kills one person every six seconds. Many more survive their injuries and face lifelong disabilities. According to the World Health Organization, the burden of injury resulting from trauma will continue to increase. Despite this expected increase, trauma systems remain poorly described and understood. Injury accounts for 11% of the global burden of death and disability. Ninety percent of this burden is disproportionately occurring in low- and middle-income countries (LMIC). The high injury burden in LMICs is due in part to unsafe conditions, but also due to worse outcomes once someone is injured. The likelihood of death after injury in a LMIC is up to six-times that observed in developed countries.(2,11)

Injury is still among the top leading causes of disease burden as well as the death of the more active and productive age group (5-44years) of the world.(12) The future of each country depends on the health and wellbeing of people in this age group.

Deaths from road traffic crashes have increased to1.35 million a year. That's nearly 3 700 people dying on the world's roads every day. Tens of millions more people are injured or disabled every year and suffer life-altering injuries with long lasting effects. These losses take a huge toll on families and communities. The cost of emergency response, health care and human grief is immense. The reason for this trend is rapid urbanization, poor safety standards, lack of enforcement, people driving distracted or fatigued, others under the influence of drugs or alcohol, speeding and a failure to wear seat-belts or helmets. (13)

In Ethiopia, injury is significantly increasing partly due to urbanization & motorization and mainly due to poor safety measures such as road safety. Despite being public burden, the attention given to the problem is very minimal. Unintended injury is the commonest injury accounting for 60% of all injury. Road traffic injury is the leading cause of unintentional injury (39% of all injury) followed by fall (16%), machine injury (5.9%), burn (5.3%), animal bite (1.3%) and poising (1%). Trauma from interpersonal violence or homicide is the leading cause of intentional injury accounting for 24.4% all injury followed by firearm 5% and self-harm injuries of 2.1%. The burden of road traffic accident is disproportionally high compared to the rest of the world having road traffic burden and case fatality rate of 946 and 80 per 10000 vehicles respectively.(14,15)

Despite this reality, in almost all regions of the country, there is very low injury statistics regarding its magnitude, pattern and outcome. The occurrence and health impact of injuries in Ethiopia have not received due attention. This can mainly be attributable to the lack of information on the nature of the problem. The available scattered data has not been adequately collected, analyzed and transformed into accessible information to support informed interventions by the health planners. It is obvious that knowing the nature of the problem is a half way towards its solution. So, in order for policies to be designed and implemented, the patterns and outcome of the problem needs to be highlighted. Hossana, being one of the economically active towns in Southern Ethiopia, the town has experienced injuries of different categories where many of the victims from the town and the neighboring rural areas seek health care at NEMMH which is currently owned by Wachemo University. In order to improve injury prevention and care of the injured, injury surveillance should be instituted in any health care setting. Although the hospital should have clear image of injury statistics, little is known about injury. This study specifically designed to assess the magnitude, pattern and outcome of commonly occurring injuries based on available health facility records in NEMMH, Hossana, Southern Ethiopia.

1.3. Significance of the study

Injury, being a leading cause of global burden of diseases, is continuously causing tremendous and terrific effect in the lives of individuals as well as the community economically, psychologically and socially. Added to this, it disproportionately occurs and affect the people in LMICs. Moreover, young productive age group of the community is mostly affected. In order to respond to this huge health problem, there should be a plan for policy development and activities to update the existing ones. In an attempt to improve the system for prevention and management of the problem, having clear image of the problem is an irreplaceable input.

This study will provide an input for the hospital and the health system as a whole a clearer image of the injury statistics in the study area which in turn can lay a good ground for plans of prevention and care. The results of this study will be used as an alert for the stake holders and policy makers to update the existing plan and to formulate new ones accordingly.

This study will also serve as a reference material for future researches on this area.

CHAPTER TWO: LITERATURE REVIEW

Globally, in 2013, about 973 million people sustained injuries that warranted some type of healthcare and about 5 million died from injuries. Road traffic injury was the major cause of injury death (29.1%) followed by self-harm (17.6%), falls (11.6%) and interpersonal violence (8.5%). Among the people who sustained injuries that warranted some type of healthcare, 5.8% (56.2 million) warranted inpatient care, of whom 38.5% (21.7 million) sustained fractures. Of the patients who warranted outpatient care 75.2% sustained minor injuries (689 million). In sub-Saharan Africa, injuries rank third behind diarrhea and malaria at 40,000 episodes and 100 deaths per 100,000 populations per year. Incidences are higher in males than in females, and the most common cause is fall, followed by road traffic injury, assault, burn and poisoning. Substantial reductions are possible through prevention programs.(11,16)

In South Eastern Iran a total of 18,155 injuries were recorded during the study period. The majority of injuries were due to road traffic crashes. Individuals living in urban areas sustained more injuries compared to individuals from rural areas. Males typically experienced more injuries than females. Males were most likely to be injured in a street/alley or village whereas females were most likely to be injured in or around the home. In urban areas, road traffic related injuries were observed to affect older age groups more than younger age groups. Poisoning was most common in the youngest age group, 0 to 4 years. For all injury types, people living in urban areas were more likely to present to the emergency department for injury compared to individuals living in rural areas. For most injury types, males were more likely than females to be affected. However, the male to female ratio was closer to 1:1 for poisoning, injuries involving animals and burns.(17)

In South Africa, Cape Town, an epidemiological analysis of trauma admissions data on Intentional injury and violence, a total of 8445 patients were included in the analysis, in which the majority were violence-related. Specifically, 35% of records included violent trauma and, of those, 75% of victims were male. There was a clear temporal pattern: a greater proportion of intentional injuries occur during the night, while unintentional injury peaks late in the afternoon. In total, two-third of all intentional traumas is inflicted on the weekends, as is 60% of

unintentional trauma. Where alcohol was recorded in the record, 72% of cases involved intentional injury. Sex was again a key factor as over 80% of all records involving alcohol or substance abuse were associated with males. The findings highlighted the association between violence, young males, substance use, and weekends.(14)

Another study which was done in one of trauma centers in south west Nigeria, where a total of 657 patients that attended the Accident and Emergency department were recruited and analyzed, shows that the mean age was 33 ± 16 years. Four hundred and fifty (68.5%) were young adults (age range 15–45). Five hundred and two (767.5%) were males. Trauma due to road traffic crash accounted for 68.5% of the injuries. Gunshot, fall from height, assault, burns, and occupational injuries accounted for the rest. The injury severity score (ISS) ranges were 1–9 (60.4%), 10–15 (15.1%), 16–24 (18.6%), and >25 (5.9). Five hundred and forty (82.2%) were discharged within 2 weeks of admission. Overall mortality was 11.0%. (15)

A study in Kenya, where a total of 4484 adults were included, approximately 15% had injuries from the past 12 months, 60.3% were males. Four percent of the respondents had been injured in a road traffic crash, 10.9% had experienced unintentional injuries other than road traffic injuries while 3.7% had been injured in violent incidents. Among drivers and passengers 12.5% reported always using a seatbelt and 8.1% of the drivers reported driving while drunk. The leading causes of injuries other than road traffic crashes were falls (47.6%) and cuts (34.0%). Males ($p = 0.001$), age 18–29 ($p < 0.05$) and smokers ($p = 0.001$) were significantly more likely to be injured in a road traffic crash. A higher social economic status ($p = 0.001$) was protective against other unintentional injuries while students had higher odds for such types of injuries. Heavy episodic drinking ($p = 0.001$) and smoking ($p < 0.05$) were associated with increased likelihood of occurrence of a violent injury.(18)

In a systematic review of literatures on trauma/injury incidents which has tried to examine the variety of socio-demographic, vehicular, environmental, and behavioral factors that are associated with injury and its outcome across different settings in Ethiopia, a higher proportion of injury was found in economically active age groups of 15-59 years (Range 56.4 %–80%) across all studies. Similarly majority of the articles reported a higher proportion (Mostly 2/3rd)

of injuries among male than female patients (range 53.9 %-91.2 %). Even though in all studies injuries were a concern for every population, some studies showed a higher incidence among farmers, students and house wife that other occupation. Unintentional injuries were the primary cause for the majority of injury-related reports made with the weighted pool average percentage of 60.7% (range from 44.6 %11 to 98%20). MVIs were the leading cause of injury among lists of unintentional injuries followed by fall (16%) machine/tools injury (5.9%), burn (5.3%), poisoning (1.0%) and Animal bite (1.3%). Trauma from interpersonal violence (Homicide) is the leading causes of intentional injury (24.4%) reported followed by disproportionately low incidence of Fire arm (5%) and Self-harm injuries (2.1%). Nine of the 36 reviewed articles reported percentage distribution of Mortality by Mechanism of injury and the rates of death from MVIs and homicide are generally higher with an average weighted pool percentage of 37.5% and 24.1% respectively.(19)

A study in Ethiopia, where 616 injury victims admitted to a tertiary hospital in Gondar over a one-year period found that injury accounts for 25% of surgical emergency cases and assault was the most common cause of injury at just over half of all injuries (51.3%), followed by road traffic crashes (30.3%). Fracture (22.9%) and head injury (17.2%) were the most common outcomes of injuries. Injury accounted for 25% of all surgical emergency cases; severe injuries accounted for around 13% of all cases. Out of all the injured patients seen, 30% were admitted and treated in the hospital, 2% died and 13% people were known to experience disability. Where there was follow up data on the type of disability experienced, 42% walked with a limp, 13% were unable to walk and 17% were unable to use a hand or arm.(20) Another cross-sectional study done in Amhara Regional State Referral Hospitals revealed that the prevalence of injury was 55.6 %. Being male, monthly income less than 34.2 USD, being age between 20 to 44 years, being a daily laborer, being a farmer and being a substance user were significantly associated with injury.(21)

In a study done in Mekelle, Tigray, 16-25 year old age group was the most commonly affected age group, accounting for 38.5% followed by the 26-35 year old group (21.4%) of the cases. Males were more frequently involved than females ((74.3%) vs (25.7%)). Eighty- three per cent of the patients were from urban areas. Interpersonal violence (31%), accidental falls

(19.2%) and Road Traffic Accidents (RTA) (14.1%) were the most common causes of injury. The Head (33.5%) was the most commonly involved part of the body.(22)
In a study done in Addis Ababa, A total of 363 individual sustained road traffic injuries were included to the study. The prevalence of severe injury among road traffic accident victims was 36.4 %.(23)

Another study done in Jimma University Specialized Hospital shows that of 13500 patients who visited surgical outpatient department of JUSH during the study period, 1102(8.2%) were injury cases. The commonest mechanism of injury was blunt assault, 341(30.9%), followed by road traffic accident, 334(30.3). Fracture was the leading outcome of injury, 454(41.2%), followed by bruise or skin laceration, 404(36.7%). Significantly more males had cut and stab injuries compared to females. Conversely, significantly fewer males had burn and road traffic accident than females. Most, 715(95.8%), patients were presented to the hospital within one week. The commonest functional limitations were; difficulty to use hands, 312(28.3%) and difficulty to use legs, 217(19.7%). Eighty three, (7.5%) of the patients died and road traffic accident alone accounted for almost half, 179 (49.7%), of the severe injuries.(24)

An institution based prospective study at Yirgalem General Hospital showed that a total of 346 patients, who visited the ED during the study period, participated in the study and of them, 171 (49.4%) were injury cases. Unintentional injuries accounted 123 (71.9%) of the total injuries and the age group ≤24 years (48.2%) was the most commonly affected age group. More than half (51.4%) of unintentional injury cases were due to Road Traffic Injuries (RTIs) and 48 (28%) of the cases were attributed to interpersonal violence (assault). The majority of patients, 97 (56.7%), had a minor or superficial injury (like bruises and minor cuts), 44 (25.7%) had a moderate injury and 16 (9.3%) had severe type of injury requiring intensive medical/surgical management; and RTIs accounted for 11 (68%) of all severe injuries. (25)

In Diredawa, Dilchora hospital, a study on 382 victims showed that he most common causes of traumatic injuries identified were conflict (42.67%), road traffic accidents (35.07%), falls (13.35%) and burn injuries (8.90%). Soft tissue injuries (57.6%), abrasion (29.3%) and fractures

(22.3%) were the three most common types of injuries experienced. Most of the victims were males, those people in the productive age bracket and those living in urban areas. Poor road structure, poor adherence to traffic rules and the use of old and poorly maintained vehicles were the main reasons for the road traffic accidents. Substance use behaviors in urban areas and farmland boundary issues in rural areas were the common causes of conflicts, and females were the most common victims of burn injuries.(26)

About 384 trauma victims were incorporated in the study in Wolayita zone, of which 240 (62.5%) were due to road traffic accidents. The majority of patients were male 298 (77.6%) and most commonly aged between 20–29 (35.42%). The principal outcome of injury was more commonly lower extremity (182 patients, 47.4%), compared to upper extremity (126 patients, 32.8%).(27)

CHAPTER THREE: OBJECTIVES

3.1. General objective

- To assess pattern and outcome of injury among victims visiting emergency unit of Nigist Elleni Mohammed Memorial Hospital, Hossana, Southern Ethiopia, from October 2019 to June 2020

3.2. Specific objectives

- To determine pattern of injury among victims visiting emergency unit in Nigist Elleni Mohammed Memorial Hospital, Hossana, Southern Ethiopia, 2020.

- To assess the outcome of injury among victims visiting emergency unit in Nigist Elleni Mohammed Memorial Hospital, Hossana, Southern Ethiopia, 2020.

CHAPTER FOUR: METHODS and MATERIALS

4.1. Study area

This study was conducted in NEMMH which is located in South Nations Nationalities and Peoples' Region, Hadiya zone, Hossana town, 232kms south of Addis Ababa, the capital city of Ethiopia. The hospital provides health care for about 3 million people coming from Hadiya Zone and partly from neighboring zones and districts. It has more than 300 beds in different wards. It provides preventive, curative and rehabilitative clinical services organized in four case teams namely outpatient department, inpatient department, emergency & critical care and MCH & obstetrics. The emergency department provides a 24hour per day, 7days per week service.(28)

4.2. Study design and period

A hospital based cross sectional study with retrospective data of one year (from January 1, 2019 to December 31, 2019) was conducted in NEMMH from October to June 2020. Data was collected from April 1 to April 30 2020.

4.3. Population

4.3.1. Source population

The source population of this study was all individuals who visited emergency department of NEMMH during the study period.

4.3.2. Study population

The study population was selected individuals who had been injured with all kinds of injury during the past one year.

4.4. Eligibility criteria

4.4.1. Inclusion criteria

Injured patients' charts with complete clinical information were included in the study.

4.4.2. Exclusion criteria

Patient charts with incomplete information and those cases with lost charts were excluded from this study.

4.5. Sample size determination and sampling technique

The sample size determined using single population proportion formula

$$n = z^2_{\alpha/2}\,(pq)/d^2.$$

Where n: sample size z: reliability Coefficient with 95%CI

p: prevalence/ magnitude of injury q: 1-p

d: Standard error allowed 5%

- by taking p=25% which is the magnitude of injury in Gondar university hospital.(20)

$$n = 1.96^2(0.25 * 0.75)/0.05^2$$

n=288

- From the total 762 injury cases (N) seen from January 2019 to December 2019, 288(n) patients were selected as a sample size by using systematic random sampling technique.
- Sample frame obtained by manually listing out all injury cases from registry book.
- The first sample was selected randomly from 1 up to k(where k is the interval between every sample and calculated as N/n)
- Every K^{th} value taken starting from the first sample until the required sample size is reached.
- To replace lost charts and charts with incomplete information, the preceding or succeeding chart was taken

4.6. Variables of the study

4.6.1. Dependent variable

- Outcome of injury is the dependent (outcome) variable of this study

4.6.2. Independent variables

- Age, Gender, Residence, Intent of injury, Place of injury, Activity during injury, Time of injury, Month of injury, Mechanism of injury, Region of body injured, Physical nature of injury and Degree of injury were the independent variables of the study

4.7. Operational definitions

- **Pattern of injury**: is a term used to indicate grossly how injury is distributed (by age, sex, mechanism, anatomical region, residence, type/nature, its degree, time in a day, month in a year …etc)
- **Outcome of injury**: the fate/status of the patient leaving the hospital after getting service. This is the outcome (dependent) variable of the study and was originally categorized as death, being referred and being treated & discharged. Then to make it binomial response, it was recoded into death and no death, where no death category includes those who were discharged after being treated and those referred.
- **No apparent injury** : if no part of the patient's body is injured, but there is pain at the area
- **Minor injury**: if superficial injuries like bruises and lacerations
- **Moderate injury**: if injuries beyond subcutaneous tissue but not including visceral organs
- **Severe injury**: if injuries affecting visceral organs, which required intensive surgical and/or medical treatment
- **Region of injury:** shows which body part injured
- **Nature of injury**: what happened to the body e.g. bruise, fracture, internal organ injured..
- **Intentional injury**: an injury where the energy that causes it comes from a person (self or other) in an attempt to harm
- **Unintentional injury**: an injury where its cause occurs accidentally.
- **Complete clinical information**: a patient chart which can give all important information

4.8. Data collection instrument

A pretested and structured checklist which is adapted from the WHO injury surveillance guideline was used to retrieve the data from hospital records. (29) Data was collected from the injured patients' charts about basic socio-demographics, injury profile and clinical information of the injury. Data collectors were four BSc nurses who were working at the Hospital. Training was given to the data collectors on the content of the checklist to make them familiar with the items. The data extraction checklist was pretested.

4.9. Quality control

Regular check-up for completeness and consistency of the data was being followed on daily basis. Prior to data collection, the questionnaire was pretested on 5% of sample size on population similar to the study population outside the study. Both data collectors and supervisor were trained for one day.

4.10. Data process and analysis procedure

Data was entered and analyzed by using SPSS version 25 statistical package for further analysis. Then, descriptive statistics used to summarize the data and graphs and statistical summary measures were used for presentation. After performing a chi square test for association between independent and dependent variables, those predictor variables that showed association was fitted into binary logistic regression model to identify significantly associated factors with injury outcomes. A *p*-value of less than 5% considered as a cut-off value for statistical significant association.

4.11. Ethical considerations

A human subject research approval for this study was received from the institutional review board (IRB) of Addis Ababa University, college of health science, department of emergency medicine and a formal letter provided to the study institution. A support letter was written from the quality assurance office of the hospital to medical record department for retrieving retrospective data from the records. All the information will be kept confidential, and no individual identifiers will be collected.

4.12. Dissemination of result

The findings of this study will be submitted to Addis Ababa University College of health science department of emergency medicine through the submission of reports and presenting findings according to the program of the department. It will also be communicated to Nigist Elleni Mohammed Memorial Hospital as well as other concerned bodies such as policymakers and stakeholders. Moreover, publication of the study findings on local and international journals will be considered.

CHAPTER FIVE: RESULT

Six thousand two hundred thirty eight(6238) patients visited emergency unit of Nigist Elleni Mohammed Memorial Hospital from January 1, 2019 to December 31, 2019; out of which 762 (12.2%) were victims of injury. Among these 762 injury cases, the charts of 288 victims were taken as a sample by simple random sampling technique for analyzing the pattern and outcome of injury. Most of the victims 167(57.9%) were at age category of 16-30years, followed by 0-15years, and 31-45years which comprise 61(21.2%), 56(19.4%) respectively. Male victims are slightly higher in number (58% vs. 42%) than females. Victims are almost equally distributed by residence (50.7% were from rural area and the remaining 49.3% were from urban area).(Table 1)

Table 1: Socio-demographic characteristics of injury victims who visited NEMMH from January 1, 2019 to December 31, 2019; Hossana, Southern Ethiopia.

Variable	Category	Frequency	Percentage
Age	0-5	6	2.1
	6-10	11	3.8
	11-15	44	15.3
	16-20	71	24.7
	21-25	76	26.4
	26-30	20	6.9
	31-35	32	11.1
	36-40	22	7.6
	41-45	2	.7
	51-55	1	.3
	56-60	3	1.0
Gender	male	167	58.0
	female	121	42.0
Residence	urban	142	49.3
	rural	146	50.7

Majority (200(69.4%)) of injuries was unintentional; of which RTA, falls, and animal bite ranked first to third scoring 82(28.5%), 74(25.7%), and 24(8.3%) respectively. Among intentional ones, interpersonal violence was highly prevalent (46(16%). The affected user groups in the case of RTA were found to be pedestrians (41.5%), drivers (40.2%) and passengers (18.3%). For interpersonal violence, the reason for the assault was ranked descending order as quarrel (60.8%), alcohol use (33.3%) and robbery (5.9%). About 37.8% of the injuries occurred on the street, while the occurrence of injury at home and work place was 22.6% each. Victims who were playing during the incident were (81(28.7%); followed by those who were working (71(24.7%) and those who were walking (45(15.6%). Afternoon (daytime PM) of the day and May month was the time and the month at which injury was frequently occurred (35.1%) and May (22.6%)). (Table 2)

Table 2: Injury profile of injury victims who visited NEMMH from January 1, 2019 to December 31, 2019; Hossana, Southern Ethiopia.

Variables	Category	Frequency	Percentage
Intent	Intentional	88	30.6
	Unintentional	200	69.4
Mechanism	RTA	82	28.5
	Falls	74	25.7
	Poisoning	16	5.6
	Animal bite	24	8.3
	Suicide	23	8.0
	Work related	16	5.6
	Violence	46	16.0
	Burn	7	2.4
Type of user (RTA)	Driver	33	11.5
	Pedestrian	34	11.8
	Passenger	15	5.2
Reason (violence)	Quarrel	31	10.8
	Robbery	3	1.0
	Alcohol	17	5.9
Place	Home	65	22.6
	Street	109	37.8
	Work place	65	22.6
	Other	49	17.0
Activity	Working	71	24.7

	Walking	45	15.6
	Playing	81	28.1
	Driving	33	11.5
	Travelling	15	5.2
	Other	43	14.9
Time	Daytime AM	78	27.1
	Daytime PM	101	35.1
	Nighttime PM	60	20.8
	Nighttime AM	49	17.0

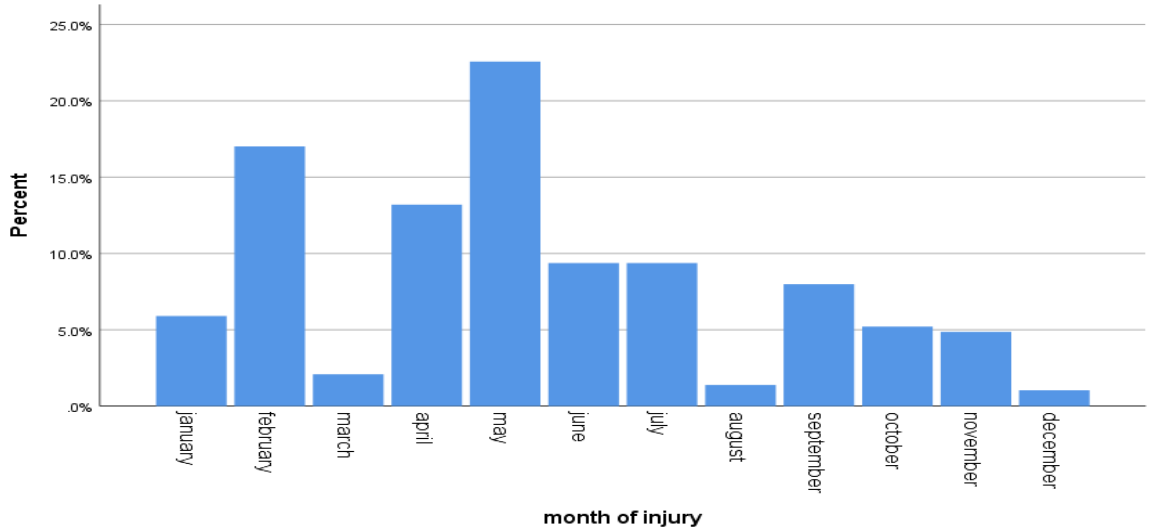

Figure 1: A bar graph showing the month of injury for victims who visited NEMMH from January 1, 2019 to December 31, 2019; Hossana, Southern Ethiopia.

Lower extremity was the mostly affected body part of the victims and seen in 35.4% of the case followed by other (unspecified) region of body (19.4%) and abdomen (15.3%). The nature of injury for most of the victims was fracture (22.9%), followed by internal organ injury (18.1%) and bruise/laceration (16.3%). Sixty eight (23.6%) of the victims encountered severe injury while the majority of the cases (117(40.6%)) was minor injury. Moderate injury was registered on 34% of the victims. The final fate of the victims while they leave the hospital was mostly being treated and discharged in 224(77.8%) 0f cases, while 33(11.5%) was referred to higher level health institutions and 31(10.8%) were died. (Table 3)

Table 3: Clinical information of injury for victims who visited NEMMH from January 1, 2019 to December 31, 2019; Hossana, Southern Ethiopia.

Variables	Category	Frequency	Percent
Region affected	Head	21	7.3
	Chest	14	4.9
	Neck	23	8.0
	Abdomen	44	15.3
	Upper extremity	31	10.8
	Lower extremity	99	34.4
	Other	56	19.4
Nature of injury	Dislocation	45	15.6
	Fracture	65	22.6
	Bruise/laceration	45	15.6
	Cut/bite	32	11.1
	Bodily burn	7	2.4
	Internal organ injury	57	19.8
	Other	37	12.8
Degree of injury	Severe injury	68	23.6
	Moderate injury	98	34.0
	Minor injury	117	40.6
	No apparent injury	5	1.7

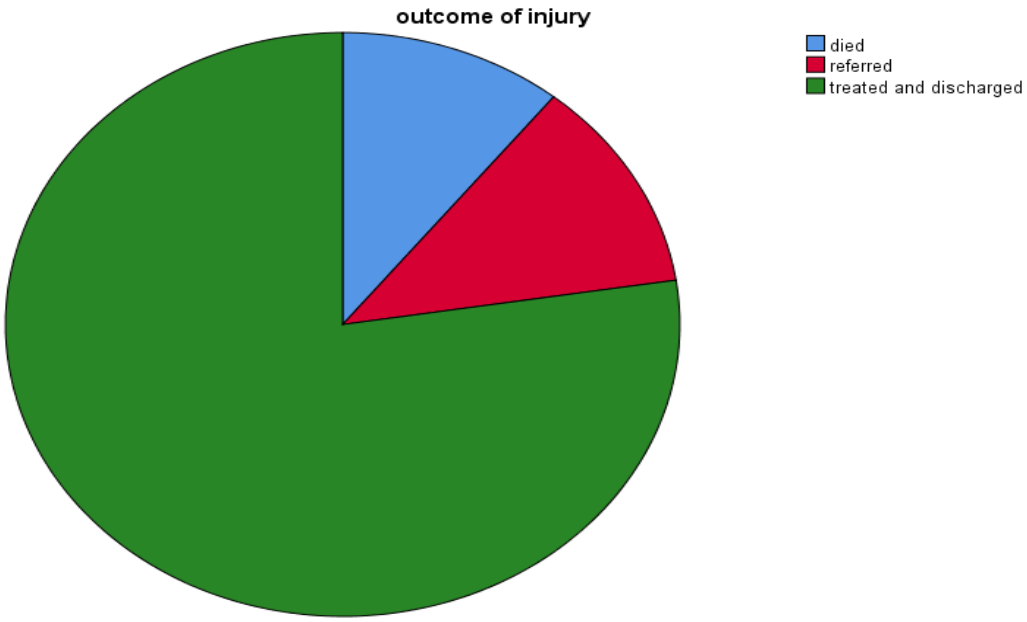

Figure 2: A pie chart showing the ***outcome of injury*** for victims who visited NEMMH from January 1, 2019 to December 31, 2019; Hossana, Southern Ethiopia.

The Chi squared test for association was done to know which of the explanatory variables appears to have a strong association with the dependent variable. According to the results, Among 12 independent variables included in this study, 9 of them showed significant association with outcome of injury in NEMMH. These are age category of the victims, intent of injury, mechanism of injury, place of injury, activity of the victim during injury, month of injury, body part injured, nature of injury, and degree of injury. So they were included in the binary logistic regression model. The remaining independent variables; gender of the victim, residence of the victim and the time at which the victim injured have no association with the outcome of injury. These variables are not included in the binary logistic regression model. (Table 4)

Table 4: The chi squared test for association between predictor variables and the outcome variable, NEMMH from January 1, 2019 to December 31, 2019; Hossana, Southern Ethiopia

Chi-Square Tests for association

Variables	Chi square	df	p-value
Gender	.141	1	.707
Age category	12.222	3	.007
Residence	1.560	1	.212
Intent	5.101	1	.024
Mechanism	59.817	7	.000
Place	32.603	3	.000
Activity	23.797	5	.000
Time	6.135	3	.105
Month	45.615	11	.000
Region	98.730	6	.000
Nature	54.105	6	.000
Degree	16.891	3	.001

Among factors that showed association with the outcome variable (through Chi-squared test), those which were found to significantly affect the occurrence of death (when they were fitted into binary logistic regression) are: intent of injury, mechanism of injury, place of injury, region (body part) injured and the degree (severity) of injury. However, other predictor variables are not significant at 5% significant level. This indicates there exists a similar pattern of death across these variables.

Intent of injury: The odds ratio 0.288 indicates that a victim who is injured intentionally is in a lower risk of death by 71.2% as compared to one who is injured unintentionally. The finding reveals that occurrence of death in the study area is higher for unintentionally injured victim.

Mechanism of injury: The odds ratio 30.166 means that the victim who sustained RTA injury has about 30times higher risk of death as compared to one who is injured with other mechanism. This means occurrence of death in the study area is higher for victims who sustained RTA injury.

Place of injury: For a victim who has been injured on street [OR=1.279], the odds of dying is increased by 27.9% as compared to those who were injured off street. The occurrence of death is higher for victims who were injured on the street.

Body region injured: Victims who sustained chest injury are at about 27 times higher risk of dying than those who are injured other body parts. The risk of death is increased for those who are injured at their chest. [OR=27.781]

Degree of injury: Compared to moderate and mild injuries, severe injuries have 45times greater risk of death [OR=45.521]. The risk of death is higher for a victim who is severely injured.

The results of the binary logistic regression revealed that, victims who are unintentionally injured those who sustained RTA injury, those who were injured on street, those who encountered chest injury and those who were severely injured were found to be at a higher risk of death as compared to the remaining victims.

Table 5: Results Logistic Regression Analysis, NEMMH from January 1, 2019 to December 31, 2019; Hossana, Southern Ethiopia

	Parameter	Category	Death		P value	AOR	95% C.I.for AOR	
			No	Yes			Lower	Upper
Death	Intent	Intentional	85(96.5%)	3(3.5%)	.046	.288	.008	.962
		Unintentional	172(86%)	28(14%)				
	Mechanism	RTA	59(71.9%)	23(28.1%)	.035	30.166	1.713	175.919
		Non RTA	198(96.1%)	8(3.9%)				
	Age	16-30yrs	155(92.8%)	12(7.2%)	.098	.210	.067	.663
		Other age category	102(91.8%)	9(8.2%)				
	Place	Street	89(81.6%)	20(18.4%)	.029	1.279	.036	45.368
		Off street	168(93.8%)	11(6.2%)				
	Activity	Walking	35(77.8%)	10(22.2%)	.408	2.605	.270	25.139
		Other activities	222(91.3%)	21(8.7%)				
	Month	January-June	184(91.1%)	18(8.9%)	.192	2.838	.592	13.601
		July-December	73(84.9%)	13(15.1%)				
	Region	Chest	1(2.4%)	13(97.6%)	.018	27.781	1.773	45.421
		Other body part	256(93.4%)	18(6.6%)				
	Nature	Fracture	59(90.8%)	6(9.2%)	.082	.105	.013	.827
		Other type	198(88.8%)	25(11.2%)				
	Degree	Severe	44(64.7%)	24(35.3%)	.000	42.521	8.654	68.926
		Non severe	213(96.8%)	7(3.2%)				

*P-value <0.05 in multiple logistic regression

CHAPTER SIX: DISCUSSION

This study was focused on reviewing injury pattern and outcome on the victims who were injured and visited the NEMMH at the specified study period. Findings from this study may therefore be regarded as a window that provides a look into current situation of injury and its outcome among the victims visiting the hospital. This study showed that the magnitude of injury among care seekers in emergency unit of the hospital was 12.2%. This is a bit larger than the magnitude of injury in JUSH (8.2%) and smaller than that of a tertiary hospital in Gondar (25%). This difference may be due to the difference of daily living and economic activities in the three cities. [19, 24]

In this study, the majority of injury victims were young in their most reproductive and productive years (16-25years were more than half of the victims (51.1%)) and showed male slightly outnumbered females. Young productive age and male dominance in this study is consistent with other studies.[17, 19, 22] Reproductive and productive age group represents the economically active age and the reason for their high incidence of road traffic crash may reflects their high economic activity levels and participation in high-risk activities such as recklessness driving/riding, over-speeding, driving/riding under the influence of alcohol and drugs and driving/riding without wearing any protective mechanisms. Male predominance in this study is due to their increased participation in high-risk activities. The distribution of injury among Rural population found to be almost similar to Urban population. This is because the hospital accommodates referrals from many nearby rural areas (sometimes even without referrals). It could also be due to high economic activities in the nearby rural areas too.

Most (69.4%) of the injuries in this study were unintentional (with RTA followed by accidental falls leading the race) and among the intentional ones interpersonal violence is the most frequent event(making it the 3rd among all injuries) followed by suicidal attempt. RTA being the commonest and leading mechanism of all injury in this study, in contrary with the studies done in Gondar [20], Mekelle [22], and Jimma [24]; is may be due to the poor quality and safety of roads which have no adequate space for pedestrians (making them most vulnerable for RTA) and the behavior of the drivers (2nd vulnerable group for RTA after Pedestrians).

This study also showed that most of the injuries occurred on the street followed by work place and home. This may still be because of the poor road quality and safety, poor traffic rules

and regulations and moreover, the behaviors of the adolescents who were playing games and walking on the street (which is not well designed). Majority of the victims were injured while playing (not only in the play grounds but also in the street), working (at work place or home), and walking in the street respectively.

The most frequent time for occurrence of injury in this study was in the afternoon (daytime PM), followed by morning (daytime AM), which is in contrary with one study done in South Africa, Cape Town; where injury most frequently occurred at night time. [14] This difference may be due to the reason that less movement and activities in night in Hossana as compared to Cape Town. May was the month at which highest number of injuries was registered.

In this study, lower extremity was the most commonly injured part of the body with fracture being the most abundantly occurring nature of injury followed by internal organ injury. Hence, this finding is consistent with that of a study conducted in Wolayita where lower extremity is more commonly affected; but in contrary with another study in Mekelle where head injury is common. [22, 27] The reason for this difference between the current study and the one in Mekelle may be due to the difference between their mechanisms of injury (RTA for current study vs. Interpersonal violence for the latter). Fracture was also the most frequently occurred nature of injury in other study done in Gondar as it is in this current study.[20]

Minor injury outweighed moderate and severe injury respectively in current study which is in line with another study done in Yirgalem General Hospital. And majority of the victims were treated and discharged and the overall mortality rate was 10.8%. Even if the majority of victims sustained minor injury in this study, the prevalence of severe injury was still higher (23.6%) as compared to other studies.[20, 25] Likewise, even if majority of victims were treated and discharged, the mortality rate of the current study was still higher (10.8%) as compared to the study done in JUSH (7.5%). [24].

As revealed by the chi squared test for the relationship between the predictor variables (independent variables) and the outcome variable (dependent variable), age of the victim, gender, residence and time of the injury had no association with the outcome of injury. The intent, mechanism, place of injury, activity during the injury, month of injury, body part injured, nature of injury and the degree of injury showed association with outcome of injury. Further fitting of the variables into logistic regression showed that intent, mechanism, place, degree of injury and body part injured have significant effect on the outcome of injury at 5% significance level.

Victims, who were ***unintentionally***, injured, those who sustained ***RTA***, who were injured ***on street***, those with ***chest injury***, and those who suffered ***severe injury*** were more likely to ***die*** as compared to other categories of victims.

CHAPTER SEVEN: CONCLUSION

This study showed diverse injury pattern and high morbidity and mortality among the victims attending Emergency unit of Nigist Elleni Mohammed Memorial Hospital, Hossana, Southern Ethiopia. The findings reflect that there is high prevalence of injury especially among males and most young and productive & reproductive group of the society. Unintentional injury is the most prevalent category of injury, of which RTA is the commonest mechanism of injury which in turn affected mostly pedestrians followed by drivers. Interpersonal violence is the most commonly occurring intentional injury followed by suicidal attempt. Street was common place while playing was the main activity during injury. Injuries in the afternoon were more prevalent, while May is considered as the month of most injury in contrary with October (least).

For most of the victims, common body part affected was lower extremity and fracture is most prevalent. Minor injury was the prevalent degree of injury and the last fate of the victims as they left the hospital was ranked in a descending order as those treated and discharged, those referred and those who died. The intent, mechanism, place of injury, body part injured and the degree of injury were the predictors of outcome of injury

CHAPTER EIGHT: RECOMMENDATIONS

- Based on the findings of this study, some points of improvement were recommended by the researcher.
  - Urgent road traffic accident prevention measures like enforcing strong rules and regulations for the drivers as well as the pedestrians and prompt assessment and reconstruction of safe roads are warranted in order to reduce morbidity and mortality with injury especially RTA.
  - Prompt treatment of the victims may guarantee the avoidance of bad outcome from the injury. Eventually, it is expected that the hospital should serve as data provider and research center. Data from hospital sources can corroborate with community based data and can help practitioners, researchers, program managers and policy makers at different levels identify populations at risk, implement and evaluate prevention programs. However, some patients' records were incomplete for certain important information for which NEMMH's management and clinical staff should consider for corrective measures.
  - Community members should be aware of the causes & consequences of injuries and every individual, families and the community as a whole should maximize their effort towards protecting themselves and other people from injury.
  - Further researches are highly recommended in this area as the current one is cross sectional, hospital based, uni-centered, and uses secondary data (patient charts). So prospective, community based, multi-centered studies are very recommended.

REFERENCES

1. World Health Organization, editor. The injury chart book: a graphical overview of the global burden of injuries. Geneva: Dept. of Injuries and Violence Prevention, Noncommunicable Diseases and Mental Health Cluster, World Health Organization; 2002. 75 p.

2. World Health Organization. INJURIES and VIOLENCE The facts. WHO; 2014.

3. World Health Organization. Violence, Injuries and Disability BIENNIAL REPORT. WHO; 2008 2009.

4. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. The Lancet. 2012 Dec;380(9859):2095–128.

5. World Health Organization, International Society of Surgery, International Association of Trauma Surgery and Intensive Care, editors. Guidelines for trauma quality improvement programmes. Geneva, Switzerland: World Health Organization; 2009. 104 p.

6. World Health Organization. World health statistics 2018: monitoring health for the SDGs [Internet]. 2018 [cited 2019 Nov 26]. Available from: http://apps.who.int/iris/bitstream/handle/10665/272596/9789241565585-eng.pdf?ua=1

7. World Health Organization, Violence and Injury Prevention. Global status report on road safety: time for action. [Internet]. Geneva: World Health Organization; 2009 [cited 2020 Feb 4]. Available from: http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf

8. The Federal Democratic Republic of Ethiopia Ministry of Health. Health Sector Transformation Plan. 2015.

9. Vos T, Abajobir AA, Abate KH, Abbafati C, Abbas KM, Abd-Allah F, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. The Lancet. 2017 Sep;390(10100):1211–59.

10. The Global burden of disease: Generating evidence, Guiding Policy. HUMAN DEVELOPMENT NETWORK THE WORLD BANK; (SUB-SAHARAN AFRICA REGIONAL EDITION).

11. Director-General W, Adhanom DT. NO ONE SHOULD DIE FOR THE LACK OF ACCESS TO EMERGENCY CARE, AN ESSENTIAL PART OF UNIVERSAL HEALTH COVERAGE. :24.

12. Peden M, McGee K, Krug EG. Injury:a leading cause of global disease burden. Geneva, Switzerland: World Health Organization; 2002.

13. World Health Organization. Global status report on road safety 2018 [Internet]. Geneva: World Health Organization; 2018 [cited 2020 Feb 4]. Available from: http://www.freefullpdf.com/#gsc.tab=0&gsc.q=traffic%20safety%20ISBN%202019&gsc.sort=

14. Schuurman N, Cinnamon J, Walker BB, Fawcett V, Nicol A, Hameed SM, et al. Intentional injury and violence in Cape Town, South Africa: an epidemiological analysis of trauma admissions data. Glob Health Action. 2015 Dec;8(1):27016.

15. Toluse A, Idowu O, Ogundele O, Egbewole A. Injury epidemiology at a trauma center in Southwest Nigeria. Afr J Trauma. 2016;5(1):1.

16. Haagsma JA, Graetz N, Bolliger I, Naghavi M, Higashi H, Mullany EC, et al. The global burden of injury: incidence, mortality, disability-adjusted life years and time trends from the Global Burden of Disease study 2013. Inj Prev. 2016 Feb;22(1):3–18.

17. Ansari-Moghaddam A, Martiniuk AL, Mohammadi M, Rad M, Sargazi F, Sheykhzadeh K, et al. The pattern of injury and poisoning in South East Iran. BMC Int Health Hum Rights. 2012 Dec;12(1):17.

18. Gathecha GK, Ngaruiya C, Mwai W, Kendagor A, Owondo S, Nyanjau L, et al. Prevalence and predictors of injuries in Kenya: findings from the national STEPs survey. BMC Public Health. 2018 Nov;18(S3):1222.

19. Azaj A, Seyoum N, Nega B. Trauma in Ethiopia Revisited: A systematic Review. East Cent Afr J Surg. 2013;18(2).

20. Awoke Ayele T, Zeleke BM, Tessema GA, Fentie Melak M. Magnitude and patterns of injuries among patients in Gondar University Hospital, northwest Ethiopia: an institutional-based study. Open Access Surg. 2017 Apr;Volume 10:25–31.

21. Bashah DT, Dachew BA, Tiruneh BT. Prevalence of injury and associated factors among patients visiting the Emergency Departments of Amhara Regional State Referral Hospitals, Ethiopia: a cross-sectional study. BMC Emerg Med. 2015 Dec;15(1):20.

22. Amdeslasie F, Kidanu M, Lerebo W, Ali D. PATTERNS OF TRAUMA IN PATIENT SEEN AT THE EMERGENCY CLINICS OF PUBLIC HOSPITALS IN MEKELLE, NORTHERN ETHIOPIA. Ethiop Med J. 2016;54(2).

23. Baru A, Azazh A, Beza L. Injury severity levels and associated factors among road traffic collision victims referred to emergency departments of selected public hospitals in Addis Ababa, Ethiopia: the study based on the Haddon matrix. BMC Emerg Med. 2019 Dec;19(1):2.

24. Woldemichael K, Berhanu N. MAGNITUDE AND PATTERN OF INJURY IN JIMMA UNIVERSITY SPECIALIZED HOSPITAL, SOUTH WEST ETHIOPIA. 2011;21(3):11.

25. Negussie A, Getie A, Manaye E, Tekle T. Prevalence and outcome of injury in patients visiting the emergency Department of Yirgalem General Hospital, Southern Ethiopia. BMC Emerg Med. 2018 Dec;18(1):14.

26. Bulto LN, Dessie Y, Geda B. Magnitude, causes and characteristics of trauma victims visiting Emergency and Surgical Units of Dilchora Hospital, Eastern Ethiopia. Pan Afr Med J [Internet]. 2018 [cited 2020 Jan 9];30. Available from: http://www.panafrican-med-journal.com/content/article/30/177/full/

27. Hailemichael F, Suleiman M, Pauolos W. Magnitude and outcomes of road traffic accidents at Hospitals in Wolaita Zone, SNNPR, Ethiopia. BMC Res Notes. 2015 Dec;8(1):135.

28. Ayele Y. THE HISTORY AND ACTIVITIES OF WACHEMO UNIVERSITY NIGIST ELENI HOSPITAL. 2019.

29. Y Holder, M Peden, E Krug, J Lund, G Gururaj, O Kobusingye, editors. Injury surveillance guidelines [Internet]. World Health Organization; 2001. Available from: http://www.who.int/violence_injury_prevention/index.html

ANNEXES

Questionnaire (English)

1. Sociodemographic characteristics of injured patients

1.1.Sex:_____
1.2.Age:_____
1.3.Residence: Urban Rural

2. Injury profile

2.1.Intent of injury:	Unintentional	Intentional		
2.2.Mechanism:	Homicide	Violence	Suicide	Falls
	RTA	Burn	Drowning	Work related
	Poison	Others		
2.3.Type of user:	Pedestrian	Driver	Passenger	Other
2.4.Cause for assault:	Quarrel	Robbery	Alcohol	Other
2.5.Place of injury:	Home	Street	Work	Other
2.6.Activity:	Working	Travel	Playing	Other
2.7.Time of injury:	Daytime	AM	PM	
	Night time	AM	PM	

2.8.Date of injury(Month): _____

3. Clinical information of injury

3.1.Region of the body injured

Head	Chest	Neck	Abdomen
Upper extremity	Lower extremity	Others (specify)	

3.2.Nature of injury

Dislocation	Bruise/skin laceration	Cut or bite	Bodily burn
Fracture	Internal organ injury	Others (specify)	

3.3.Degree of injury

No apparent injury	Minor	Moderate	Severe

3.4.Outcome:	Treated & discharged	Died	Referred