



HAWASSA UNIVERSITY COLLEGE OF MEDICINE AND HEALTH
SCIENCE SCHOOL OF NURSING

PATTERN OF INJURY, OUTCOME AND ASSOCIATED FACTORS
AMONG PATIENTS VISITING THE EMERGENCY DEPARTMENT IN
SIDAMA REGIONAL GENERAL HOSPITALS, ETHIOPIA; 2023.

MSc IN EMERGENCY AND CRITICAL CARE NURSING

PRINCIPAL INVESTIGATOR: DEREJE BUCHE (BSc)

HAWASSA UNIVERSITY, HAWASSA, ETHIOPIA

NOVEMBER, 2023.

PATTERN OF INJURY, OUTCOME AND ASSOCIATED FACTORS
AMONG PATIENTS VISITING EMERGENCY DEPARTMENT IN SIDAMA
REGIONAL GENERAL HOSPITALS, ETHIOPIA, 2023.

PRINCIPAL INVESTIGATOR: DREREJE BUCHE

ADVISORS 1. Mr. YONAS ALEMAYEHU (Ass.pro on PCHN)

2. Mr. ABYALEW MAMUYE (MSC AHN)

A RESEARCH THESIS SUBMITTED TO HAWASSA UNIVERSITY
COLLEGE OF MEDICINE AND HEALTH SCIENCE SCHOOL OF
NURSING FOR PARTIAL FULFILLMENT OF THE REQUIREMENT FOR
THE DEGREE OF MASTERS SCIENCE IN EMERGENCY AND CRITICAL
CARE NURSING.

NOVEMBER, 2023.

ADVISORS' APPROVAL SHEET

This is to certify that the research thesis entitled “Assessment of the pattern of injury, outcome and associated factors of injury outcome among patients visiting the emergency department Sidama regional general hospitals” submitted in partial fulfillment of the requirements for the degree of Master's with specialization in emergency and critical care nursing, the Graduate Program of the Department/School of nursing, and has been carried out by Dereje Buche ID. No GPECCNR/ 0005/14, under my/our supervision. Therefore, we recommend that the student has fulfilled the requirements and hence hereby can submit the thesis to the department.

Name of major advisor	Signature	Date
_____	_____	_____
Name of co-advisor	Signature	Date
_____	_____	_____

Declaration

I thus affirm that this MSc thesis is my original work, that it has not been submitted for a degree at any other university, and that all sources of material utilized for this thesis have been properly cited.

Name: _____

Signature: _____

SCHOOL OF GRADUATE STUDIES HAWASSA UNIVERSITY EXAMINERS' APPROVAL SHEET

We, the undersigned, members of the Board of Examiners of the final open defense by DEREJE BUCHE have read and evaluated his/her thesis entitled pattern of injury outcome and associated factors among the patients visited emergency department of Sidama regional general hospitals 2023, and examined the candidate. This is, therefore, to certify that the thesis has been accepted in partial fulfillment of the requirements for the degree.

_____	_____	_____
Name of Major Advisor	Signature	Date
_____	_____	_____
Name of Internal Examiner-I	Signature	Date
_____	_____	_____
Name of Internal Examiner-II	Signature	Date
_____	_____	_____
Name of External examiner	Signature	Date
_____	_____	_____
SGS Approval	Signature	Date

Final approval and acceptance of the thesis is contingent upon the submission of the final copy of the thesis to the School of Graduate Studies (SGS) through the Department/School Graduate Committee (DGC/SGC) of the candidate's department.

Stamp of SGS Date: _____

Acknowledgment

I would like to thank Hawassa University College of Medicine and Health Science School of Nursing for providing me with this chance. My gratitude also goes to Mr. Yonas Alemayehu (assistant professor on PCHN) and Mr. Abyalew Mamuye (MSc AHN) for their advice and encouragement to conduct this study. Finally, I thank data collectors, friends for sharing ideas, and the Sidama national regional government for sponsoring and paying the research fee.

ABBREVIATIONS/ACRONYMS

AHN	Adult Health Nursing
AOR	Adjusted Odd Ratio
CI	Confidence Interval
DALYs	Disability Adjusted Life Years
DLY	Disability Life Years
DURH	Dilla University Referral Hospital
ED	Emergency Department
GCS	Glaucoma Scale
GNP	Gross National Product
GU	Gondar University
HIV	Human Immunodeficiency Virus
ISS	Injury Severity Score
MLIC	Middle- and Low-Income Countries
MVC	Motor Vehicle Crash
OR	Odd Ratio
PCHN	Pediatrics and Child Health Nursing
RTA	Road Traffic Injury
SPSS	Statistical Package for Social Science
USD	United State Dollars
WHO	World Health Organization

TABLE OF CONTENT

Acknowledgment.....	i
Abbreviations/acronyms	ii
List of figures.....	v
List of tables.	vi
Chapter One: Introduction.	1
1.1. Background	1
1.2. Statement of problem.	3
1.3. Significance of study.....	5
Chapter Two; literature review.	6
2.1. Literature review on tthe he pattern of injury.	6
2.2. Literature review on outcomes of injury.	8
2.3. Literature review on associated factors of injury outcome.	9
2.4 Conceptual Framework.....	11
Chapter three; objectives.	12
3.1. General objectives.....	12
3.2. Specific objectives.	12
Chapter four; materials and method	13
4.1. Study design.	13
4.2. Study area and study period.....	13
4.3. Population	13
4.3.1. Source population.....	14
4.3.2. Study population.....	14
4.4. Inclusion and exclusion criteria.	14
4.4.1. Inclusion criteria.....	14
4.4.2. Exclusion criteria.....	14
4.5. Sampling.....	14
4.5.1. Sample size	14
4.5.2. Sampling technique and procedure.....	16
4.6. Variables	18
4.6.1. Dependent variable.....	18
4.7. Data collection and analysis plan.	18
4.7.1. Data collection instrument.....	18

4.7.2 data Collection Plan.....	18
4.7.3. Data quality control measures.	18
4.7.4. Data analysis.....	21
4.8. Operational definition.....	19
4.9. Ethical consideration.	20
4.10. Result dissemination plan.	20
Chapter five. Results.....	21
5.1. Sociodemographic characteristics of participants.....	23
5.2. Pattern of injury.....	25
5.3. Outcome of injury.....	33
5.4. Factors associated with injury outcome.....	35
6. Discussion.....	35
7. Conclusion.....	42
8. Recommendation	40
9. Limitation of study	41
9. Annex.....	47
9.1 Participant information sheet and consent form.	47
9.2 Questionnaire	49
10.Reference	42

LIST OF FIGURES

Figure 1. Conceptual frameworks describe (adapted from different literature reviews (Berihanu.et.al, 2017)(Bedru et al., 2020)(Tadesse et al., 2014) on the pattern of injury, outcomes and associated factors among emergency visitants in Sidama Regional General Hospitals 2023.	11
Figure 2. Schematic representation of the sampling technique of research thesis on pattern of injury outcomes and associated factors among the patient visiting emergency department in Sidama Regional General Hospitals, 2023.	16
Figure 3. Describes the selected hospitals and sample size allocation of research thesis on pattern of injury, outcome and associated factors among selected general hospitals in Sidama Regional state 2023.....	17
Figure 5. Shows place of injury on research thesis on pattern of injury, outcome and associated factors among patients visited emergency department in Sidama Regional General Hospitals 2023, (n=342).	26
Figure 6. Describes the distribution of fracture on research thesis on pattern of injury. outcome and associated factors among patients visited emergency department in Sidama regional general hospitals 2023, (n=342).	30
Figure 7. Describes outcome of injury on research thesis on pattern of injury, outcome and associated factors among patient visited emergency department in Sidama Regional Hospitals 2023, (n=342).	31

LIST OF TABLES

Table 1. sample size calculation for specific objectives, research thesis on pattern of injury, outcome and associated factors among the patients visited emergency department in Sidama Regional General Hospitals, 2023.	15
Table 3. describes that socio-demographic data research thesis on pattern of injury, outcome and associated factors among patients visited emergency department in Sidama Regional Hospitals 2023 (n=342).	21
Table 4. Describes pattern of injury of research thesis on pattern of injury, outcome and associated factors among patients visited Sidama Regional General Hospital Ethiopia, 2023, (n=342).	23
Table 5. Shows that types of RTA, Interpersonal violence and burn on research thesis on pattern of injury, outcome and associated factors among patients visited emergency department in Sidama regional general hospitals in 2023, (n=342).	24
Table 6. Describes the distribution of injury on research thesis on pattern of injury, outcome and associated factors among patients visited Sidama Regional General Hospitals 2023, (n=342).	25
Table 7. Shows mode of arrival, pre hospital care on research thesis on pattern of injury, outcome and associated factors among patients visited emergency department in Sidama Regional General Hospitals 2023 (n=342).	27
Table 8. Describes clinical information on pattern of injury, outcome and associated factors among patients visited emergency department in Sidama Regional General Hospitals 2023, (n=342).	28
Table 9. Shows distribution of outcome to different variables on research thesis on pattern of injury outcome and associated factors among patients visited emergency department in Sidama Regional General Hospitals 2023, (n=342).	32
Table 10. describes associated factors on research thesis on pattern of injury, outcome and associated factors among patients visited emergency department Sidama Regional General Hospitals 2023 (n=342).	34

ABSTRACT

Background: Injury has a significant impact on societal health and well-being, taking the lives of more than 15,000 people daily and more than 4.4 million people annually. Low- and middle-income countries have a disproportionately high injury burden, account for almost 90% of injury-related fatalities. Despite government health agencies and hospitals should have a detailed picture of injuries, little is known about injury statistics and outcomes in this region and across the country.

Objectives: To assess pattern of injury, outcome, and associated factors of injury outcome Among patients visited selected general hospitals in Sidama regional state, Ethiopia, 2023.

Methodology: An institutional-based cross-sectional study was conducted on Sidama Regional General Hospitals from March 10 to June 10, 2023, after three general hospitals were selected by the lottery method out of five general hospitals. The sample size was calculated by using the single population formula, and it became 342. Data was collected using a structured questionnaire adopted from WHO trauma surveillance, and ethical clearance was obtained from Hawassa University's ethical review board. Data was entered into EpiData version 4.1 and analyzed through SPSS version 27.

Result: A total of 342 injured patients participated in this study, and unintentional injuries accounted for 225 (65.2%) of the total injuries, and the age group 24-44 years was the most commonly affected, with 137 (40.1%). 35.6% of injury cases were due to road traffic injuries, and 27.19% of the cases were due to interpersonal violence. Out of the total participants, 96.2% were discharged alive, and 3.8% died. The glaucoma scale, severity of injury , time between injury and care, head injury, triage scale, and operated on have associations with mortality.

Conclusion and recommendation: Male patients and those aged 25–44 had a higher proportion of injury victims. The primary cause of injury was RTA, followed by interpersonal violence and fall injuries. The glaucoma scale, severity of injury, triage scale, head injury, and those patients who operated were more associated with mortality. More efforts are needed to raise awareness of RTA, improve road safety, and impose severe regulations on pedestrians and drivers.

Keywords: injury, emergency department, Sidama, Ethiopia.

CHAPTER ONE: INTRODUCTION

1.1. BACKGROUND

According to WHO, injury is defined as it is "a bodily lesion at the organic level, resulting from acute exposure to either mechanical, thermal, electrical, chemical, or radiant energy in amounts above the physiological tolerance threshold (World Health Organization, 2002).

Injuries are primarily divided into unintentional and intentional categories. Unintentional injuries include Road traffic accidents, poisoning, falls, fires, drowning, electric current, radiation, and natural forces, as well as contact with hot substances. Intentional injuries include self-inflicted (such as suicide), interpersonal (such as murder), war-related, and "other purposeful" (such as injuries caused by legal engagement) assaults (Rodney Smith, 2021).

The common causes of injury include interpersonal assaults or homicidal injuries, road traffic injuries, fall injuries, bullet injuries, chemical and electrical burns, poisoning, animal bites, sexual assault, drowning, burns, and radiational exposure (Edris *et al.*, 20015).

Injuries have been the most important global public health problem, killing more than 4.4 million people each year. This accounts for 10% of the world's deaths, which is 32% more than the fatalities resulting from malaria, tuberculosis, and HIV/AIDS combined (WHO, 2021a).

Every day, the lives of over 15,000 people are cut short due to an injury. Approximately one-fourth of the 4.4 million deaths from injuries are the result of suicide and homicide, while road traffic injuries account for another quarter. Other main causes of death from injuries are falls, drowning, burns, poisoning, and war (WHO, 2019).

Many of those who survive acts of violence, road traffic accidents, suicide attempts, or other causes of injury are left with temporary or permanent disabilities. Injuries are responsible for an estimated 8% of all years lived with disability. All causes of injury have health consequences beyond a physical injury (WHO, 2021a).

Several measures that have helped lower the rates of injuries and their consequences have been shown to be effective. WHO introduces four pillars to prevent and control injuries, namely surveillance of injury, risk factor identification, intervention development, and implementation (WHO, 2010).

In Ethiopia, a higher proportion of injuries were found in the economically active age group and were more common among males than females. Unintentional injuries were the primary

cause of the majority of injuries. MVIs were the leading cause of injury among lists of unintentional injuries, followed by falls (16%), machine/tool injuries (5.9%), burns (5.3%), poisoning (1.0%), and animal bites (1.3%). Trauma from interpersonal violence is the leading cause of intentional injury (24.4%), followed by a disproportionately low incidence of firearm (5%) and self-harm injuries (2.1%) (Seyoum and Nega, 2014).

Despite government efforts to reduce injuries, injuries are increasing at an alarming rate and constitute around half of all surgical emergencies (Osman *et al.*, 2016). On the other hand, the lack of sufficient data about it leads to an underestimation of the injury burden. Thus, to design effective prevention strategies, there is need for findings about the pattern and outcome of injury and its associated factors (Macmillan, 2012). Therefore, this study aimed to determine the pattern of injury, outcome, and associated factors among patients visiting emergency departments of general hospitals in Sidama, Ethiopia.

1.2. STATEMENT OF PROBLEM

Injury accounts for 10% of global deaths and kills one person every six seconds. It also accounts for an estimated 8% of all years lived with disability (WHO, 2021a). Every year, tens of millions more people suffer non-fatal injuries that necessitate emergency department and acute care visits, as well as hospitalization. Aside from death and injury, trauma can raise the likelihood of mental illness and suicide; smoking, alcohol, and substance misuse; chronic diseases such as heart disease, diabetes, and cancer; and social problems such as poverty, crime, and violence (WHO, 2021). Ninety percent of this burden occurs disproportionately in low- and middle-income countries (LMIC). The likelihood of death after injury in an LMIC is up to six times that of developed countries (Global Emergency and Trauma Care Initiative 2018). Injuries affect all age groups but have a particular impact on young people. For people between the ages of 15 and 29 years, injuries are one of the top three causes of death (Bennial report 2013).

Annually, Americans sustain more than 50 million medically treated injuries. This equates to about 20 injuries per 100 males and 17 injuries per 100 females. Nearly 150,000 (or 0.3%) injuries were fatal. The overall lifetime expenditure of injuries occurring is approximately 406 billion dollars. 80 billion dollars for medical treatment and 326 billion dollars for lost productivity (Corso *et al.*, 2015).

In the African continent, approximately 2,400 people die from injuries per day. Injury-related deaths in Africa among people aged 15–44 years rank second, and, for those between the ages of 5 and 29, injuries account for three of the top five causes of death (Peden M, Oyegbite K, Ozanne-Smith J, 2008). The proportion of road traffic injuries was 65.2 per 100,000 population, and the death rate was 16.6 per 100,000 population (Adeloye *et al.*, 2016).

In Sub-Saharan Africa, an estimated 231,000 people died in road accidents, accounting for roughly one-fifth of all road accident fatalities worldwide. Sub-Saharan Africa had a 40% higher road injury death rate than the rest of the world, at 27.0 per 100,000 people. In addition to deaths, there were over 8 million non-fatal injuries, with 885,000 of them severe enough to warrant hospitalization if victims had adequate access to medical care (Bhalla, 2014).

In Ethiopia, injuries are significantly increasing, partly due to urbanization and motorization and mainly due to poor safety measures such as road safety (Ali *et al.*, 2020). With 377,943 registered vehicles, Ethiopia has reported 2,581 fatalities. According to the report, there are more than 15,000 fatalities every year. Moreover, less than 10% of the seriously injured are

transported by ambulance, and 5.5% are permanently disabled due to road traffic (Federal Democratic Republic of Ethiopia Ministry of Health, 2015). Regarding the outcome of injuries in Ethiopia, one-year retrospective data from the Alert hospital revealed that out of 362 patients, 128 (35.4%) of injured patients were admitted to trauma wards, while 183 (50.6%) were treated and discharged. A critical care unit was necessary for about 27 (7.5%) of the patients. 11 (3%) were transferred to another hospital. Thirteen (3.6%) injured patients died (Abebe *et al.*, 2022).

In the last eleven (11) years, Ethiopia has lost 36.3 billion Birr as a result of traffic accidents. Ethiopia has lost 0.9% of its budget annually on average due to traffic accidents over the past eleven years (Deme, 2019).

As part of the solution, WHO recommends scientifically proven measures to prevent and control injuries like Setting appropriate speed limits based on the type of road, Setting and enforcing laws for child-resistant packaging of medicines and poisons, Reducing access to guns and knives (WHO, 2010). The ultimate goal must be to prevent injuries, also much can be done to minimize the disability. Providing quality support and care services for injuries can prevent fatalities, and reduce the amount of short-term and long-term disability (WHO, 2010).

The burden of injury is huge, and growing public health importance have not gotten enough attention, and there is still a lack of complete injury data (Bashah, Dachew and Tiruneh, 2015). Injury prevention and emergency treatment are not well understood since emergency care systems are still in their infancy, and the lack of regular reporting of injuries leads to considerable underestimation of morbidity and death. To develop prevention strategies, establish the quality of trauma care, and understand the burden of injury, it is important to understand the pattern of injuries and outcomes (Laytin *et al.*, 2020).

Although no prospective multicentered studies done in this country with variables of pattern of injury, outcomes and associated factors. This study aimed to describe the pattern of injury and the outcome of injuries among ED visitants in Sidama regional General Hospitals, Ethiopia.

1.3. SIGNIFICANCE OF STUDY

Injury, being a significant contributor to the global burden of disease, has a persistent and significant impact on people's lives as well as the community's economy, psychology, and social dimensions. Additionally, it disproportionately affects and occurs among the people of LMICs (World Health Organization, 2019). Furthermore, those who are young and productive in the community are the most affected (World Health Assembly, 2019). To respond to this huge health problem, there should be a plan for policy development and activities to update the existing ones for local government. In an attempt to improve the system for prevention and management of the problem, having a clear understanding of the problem is an irreplaceable input. This study provided input for the hospitals and the health system about the injury statistics in the Sidama region which in turn can lay a ground work for plans of prevention and care which is important to community health. The results of this study used as an alert for the Sidama regional health bureau to update the existing plan and formulate new ones accordingly.

Health professionals who work in emergency departments in the Sidama region received a clear picture from this study about injury patterns, outcomes, and factors associated with injury outcomes, which laid the groundwork for their care and raised their level of preparedness for the injury. Finally, the result of this research can serve as a base for further research on this issue.

CHAPTER TWO; LITERATURE REVIEW.

2.1. PATTERN OF INJURY

Retrospective cohort study done on 3,786 patients with injuries admitted to the emergency department of King Abdulaziz Medical City, Riyadh, Saudi Arabia, the majority of traumatic injuries were from blunt trauma in the form of MVCs (52.0%) and falls (25.8%). Males (57.1%) had a greater rate of MVC injuries than females (34.4%) did in total, while females (42.7%) had a higher rate of fall injuries than males (20.9%), which was double that of males (20.9%). Only 6.8% of injuries were burn/scald-related, evenly split between burns brought on by liquid (n = 124, 48.1%) and burns brought on by fire flames (n = 134, 51.9%). Intentional injuries accounted for 5.1% of all injuries in the form of homicide injuries, injuries purposely inflicted by others (4.8%), and suicide and self-inflicted injuries (Abolfotouh et al., 2018).

A descriptive study was done in Senegal on patients who came to the emergency room for 13 different injury reasons. The two most common reasons for patients to go to the ED are motor vehicle and fall-related injuries (38.1% and 23.8%, respectively). Assaults were also a relatively common mechanism of injury (13.3%), with pedestrian-vehicle accidents accounting for 9.5% and armed assaults accounting for 9.5%. (John, Faye, and Belue, 2019).

Another study that was done in one of the trauma centers in southwest 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. Young adults made up 450 (68.5%) of the total (age range 15–45). Males made up 500 (67.5%) of the population. 68.5% of injuries were trauma-related to road traffic accidents. The remaining injuries came from gunshots, height falls, assaults, burns, and work-related accidents (Toluse *et al.*, 2016).

According to a retrospective study conducted in Cameroon, a total of 5600 cases of injury were recorded during the study. During the study period, two-thirds of patients were male, and the mean age was 28.6 years. RTIs (55.5%) were the leading cause of injury, followed by assault (21.9%). Of the patients who sustained RTIs, 53.9% were passengers, 28.3% were drivers, and 17.8% were pedestrians. Other causes were burns (1.64%), falls (4.2%), domestic injuries (13%), assaults (21.8%), and labor accidents (1.4%). The most affected parts of the body were the lower limb (38.6%), upper limb (29.5%), head (23.6%), face, and neck (23.2%). According to the severity score, 86% of patients had mild injuries. 4.6% had a moderate injury, and 0.3% had a severe injury (Chichom-Mefire *et al.*, 2017).

In a study in Kenya, where a total of 4484 adults were included, approximately 15% had injuries from the past 12 months, 10.9% had experienced unintentional injuries other than road traffic injuries, and 3.7% had been injured in violent incidents. The leading causes of injuries other than road traffic crashes were falls (47.6%) and cuts (34.0%) (Gathecha *et al.*, 2018).

In a retrospective study at the Gondar University Hospitals in Ethiopia, 502 (81.5%) of the 616 injured patients were men, making up a male-to-female injury ratio of 5:1. Three in five (59.35%) of the injured patients were within the age range of 15–30 years. The average age was found to be 29 years (± 14.4 SD). In terms of residence, nearly an equal proportion of people were injured during the study period. In terms of occupation, 187 (32.24%) of those injured were students, while 141 (24.31%) were farmers. This discovery also revealed that the most common mechanism of injury was blunt assault, accounting for 316 (51.3%), followed by road traffic accidents, accounting for 334 (30.3%) (Berihanu *et al.*, 2017).

The cross-sectional study was carried out at Agaro General Hospital, which is located in the Jimma Zone of the Oromia Region in southwestern Ethiopia. The most common causes of child trauma were falls 151 (37.3%), road traffic accidents 98 (24.2%), and animal bites 72 (17.8%). The majority of the traumas occurred on the street or road (188/46.4%), followed by at home (149/36.8%). In terms of trauma location, the major 126 (31.1%) anatomical location where the trauma occurred was the face and head, followed by the abdomen and pelvic area 124 (30.6%). Fall trauma was the most common in the 5–12-year-old and less than 5-year-old age groups, accounting for 43.7% and 34.4% of all traumas, respectively (Dagnaw *et al.*, 2022).

According to a Dilla University referral hospital retrospective study, the majority of the victims were between the ages of 20 and 40, with 196 (52.1%) being under the age of 40 and 29 (7.7%) being over the age of 40. The majority of trauma cases, 225 (59.8%), were rural dwellers, while 151 (40.2%) were urban dwellers. The most frequent cause of injury was a traffic accident, accounting for 178 (47.3%), followed by an assault, accounting for 113 (30.1%), and a burn injury, accounting for 22 (5.9%). Lower extremity injuries were the most frequent form of injury, accounting for 135 (35.9%), followed by upper extremity injuries 74 (19.7) and polytrauma injuries (58 (15.4)), with chest trauma being the least common (Bedru *et al.*, 2020).

An institution-based prospective study carried out at Yirgalem General Hospital revealed that 346 patients who visited the ED during the study period took part in the study, with 171

(49.4%) of them being injury cases. Unintentional injuries comprised 123 (71.9%) of all injuries, and people under 24 years (48.2%) were most frequently injured. Road traffic injuries (RTIs) accounted for more than half (51.4%) of unintentional injury cases, and 48 (28%) of those cases involved interpersonal violence (assault). Depending on the degree of the injury, The majority of patients, 97 (56.7%), had minor or superficial wounds (such as bruises and scrapes), 44 (25.7%) had moderate injuries, and 16 (9.3%) had serious injuries necessitating intense medical and surgical care, with RTIs accounting for 11 (68%) of all severe injuries (Negussie *et al.*, 2018).

2.2. OUTCOMES OF INJURY

A retrospective, descriptive study done in Georgia Among this patient sample with injuries severe enough to require hospital admission, 93% (n = 23,273) recovered and were released to home; 4% (n = 1035) were referred to another hospital or facility for follow-up care; 1.6% (n = 415) discontinued treatment; and 1.5% (n = 379) of patients died. (Chkhaberidze *et al.*, 2022).

Cross-sectional studies were conducted at the Shiraz Trauma Research Center, which is associated with the Shiraz University of Medical Sciences in Iran. During the study period, there were 454 recorded injury-related deaths, resulting in a 1.0% in-hospital mortality rate. There were 8338 patients (17.6%) who stayed for more than 48 hours, with 507 (6.1%) developing a nosocomial infection during their stay (Bolandparvaz *et al.*, 2017).

Another study was conducted in Cameroon based on a secondary analysis of prospective injury data collected at Limbe Regional Hospital. During the study period, a total of 2400 cases of injury were recorded, with more males (68%) than females. In terms of emergency department care outcomes, 88.73% (n = 1260) were discharged, 6.62% (n = 94) were admitted, 3.87% (n = 55) were referred to other hospitals, and 0.56% (n = 8) were either dead on arrival or died at the emergency department (Boukar *et al.*, 2022).

In Ethiopia, A retrospective study was conducted at Gondar University Hospital where 616 injury victims visited a tertiary hospital in Gondar over a period of one year. Out of all the injured patients observed, 30% were hospitalized and treated, 2% passed away, and 13% had known disabilities. When follow-up information on the type of disability was available, 42% of people walked with a limp, 13% could not walk, and 17% could not use their hands or arms (Berihanu.*et.al*, 2017).

An institution-based cross-sectional study was conducted in Amhara national regional state referral hospitals from March to April 2014. In terms of injury outcome and type of care received, 161 (70%) of the injured people were admitted to the hospital. 66 (28.7%) patients received care before being released. 95 (41.3%) patients suffered fractures as a result of the accident, while 68 (29.6%) had cuts. Before presenting to the emergency department of referral hospitals, 164 (71.3%) patients received care at lower-level health institutions (Bashah, Dachew and Tiruneh, 2015).

Jimma University Specialized Hospital conducted a retrospective review of records of injured patients seen in the surgical outpatient department from April 9, 2010, to January 7, 2011. Eight hundred seventy-two cases, or 79.1%, were managed in the outpatient department; the remaining 230 cases, or 20.9%, were managed as inpatients. The majority of these cases 1019, or 92.5%—were discharged with improvement and follow-up; 83, or 7.5%, died (Woldemichael and Berhanu, 2017).

A retrospective cross-sectional chart review of 362 patients admitted to the Alert Hospital trauma and emergency department from January 2019 to December 2019 the results showed that 183 (50.6%) injured patients were treated and discharged, while 128 (35.4%) were admitted to trauma wards. Approximately 27 (7.5%) patients required admission to an intensive care unit. The remaining 11 (3%) patients were evaluated in the emergency department and referred to other hospitals. Thirteen (3.6%) injured patients died after receiving CPR at the emergency department (Abebe *et al.*, 2022).

The cross-sectional study was carried out at Agaro General Hospital, which is located in the Jimma Zone of the Oromia Region in south-western Ethiopia. Following triage in the emergency department, 256 (63.2%) of children were discharged with improvement, while 89 (22.0%) were admitted. 48 (11.9%) of the traumatic children were referred, and 12 (3.0%) died. In terms of hospitalization, 292 (72.1%) of the children were admitted for one day (Dagnaw *et al.*, 2022).

In a retrospective study conducted by Dilla University Referral Hospital from January 2015 to June 2019, there were 23 (6%) deaths from included samples visiting the Surgical Emergency Department. The majority of deaths were among students (6 (20.1%) and males (12%). (52.2). Furthermore, the mortality rate in low socioeconomic-status cases was much higher than in middle and high socioeconomic status cases (Bedru *et al.*, 2020)./

2.3. ASSOCIATED FACTORS OF INJURY OUTCOME

According to a study conducted in Saudi Arabia, in-hospital mortality from trauma is influenced by the cause of injury, age, and damaged body parts. In the study, the following factors were found to be associated with of fatalities: age, injury mechanism, and severity (Abolfotouh *et al.*, 2018).

According to a study conducted in Kenya, 380 trauma patients died in hospitals (4.4%). Results of multivariate logistic regression found patients who were transferred from another hospital had greater odds of death in hospital than patients admitted directly (odds ratio: 1.76, 95% confidence interval, 1.34–2.31), after controlling for sex, measures of injury severity (estimated Injury Severity Score and Glasgow Coma Score level), and mechanism of injury. After controlling for injury severity, burns (odds ratio: 5.43, 95% confidence interval: (2.99–9.85) had a higher risk of in-hospital death than falls (Botchey *et al.*, 2017).

Retrospective study conducted at Dilla University Teaching Hospital revealed that, after adjustment for multiple logistic regression, mortality after an injury is three times more likely in a patient with a revised trauma score of less than ten (AOR =2.5, 95% CI = [1.8, 25.6]). One unit of decreasing GCS was associated with three times [AOR] =0.3, 95% CI = [0.13, 0.5] higher odds of predicting mortality. Being admitted for 1–7 days in the hospital was 90% [AOR] =0.1, 95% CI = [0.01, 0.8]. less likely to predict mortality compared to those admitted for >7 days (Bedru *et al.*, 2020).

An institution-based retrospective chart and electronic medical records review were conducted in the ALERT hospital trauma center emergency department from January 2019 to December 2019, and the Pearson chi-square and Fisher's exact tests were calculated to assess the relationship between patient clinical profile and ER mortality. causes of injury, injured body region, injury type, injury severity, and operated on are statistically more highly associated factors for mortality than others, with p-values of 0.002, 0.000, 0.000, 0.000, 0.000, respectively (Abebe *et al.*, 2022).

2.4. CONCEPTUAL FRAMEWORK

literature review on pattern of injury outcome and associated factors and related study used to conceptualize the research process. Generally, outcome of injury is dependent variable and factors affect it are causes of injury, sociodemographic factors occupation and behavioral factors.

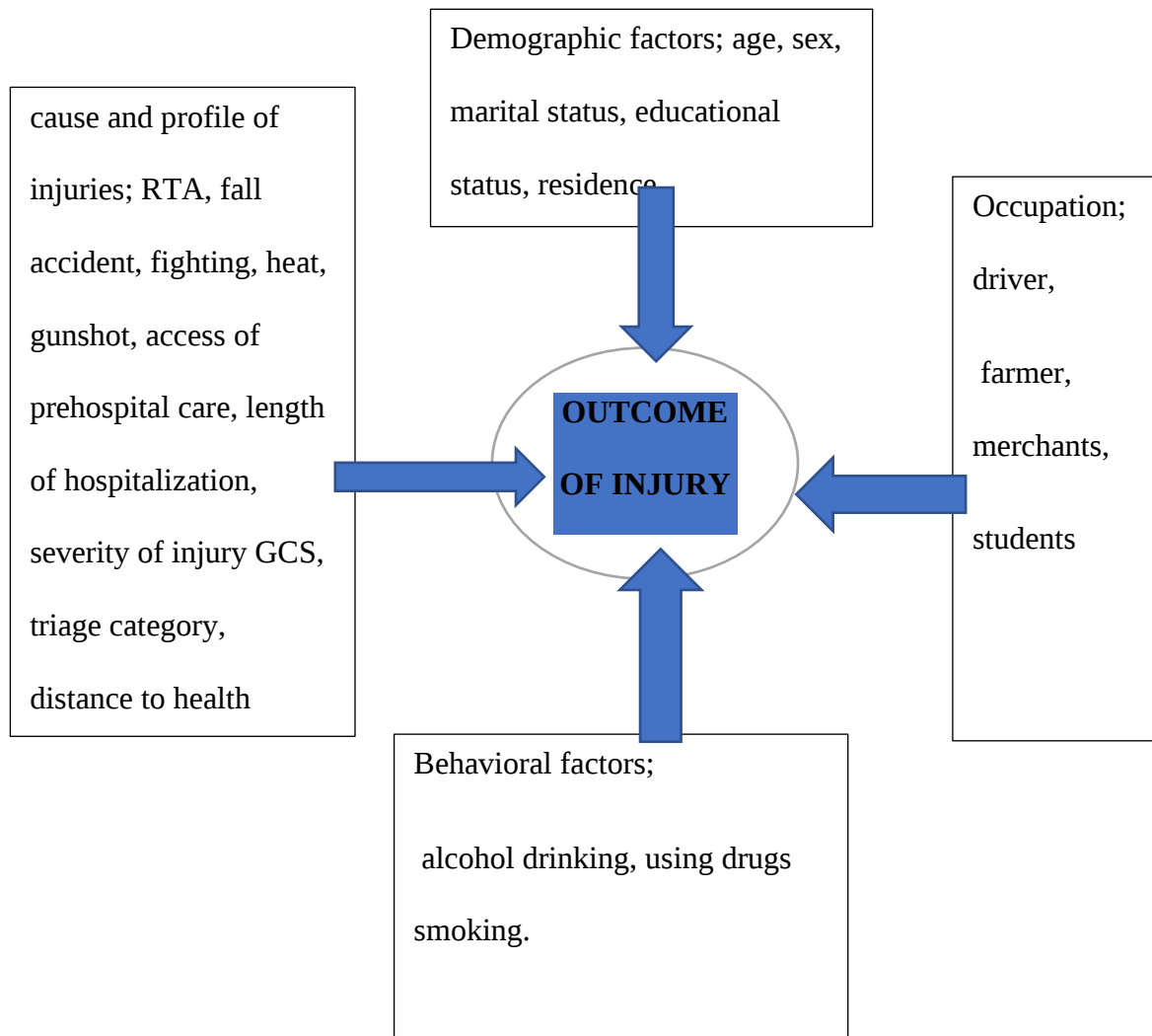


Figure 1. Conceptual frameworks describe (adapted from different literature reviews (Berihanu.et.al, 2017)(Bedru *et al.*, 2020)(Tadesse *et al.*, 2014) on the pattern of injury, outcomes and associated factors among emergency visitants in Sidama Regional General Hospitals 2023.

CHAPTER THREE; OBJECTIVES.

3.1. GENERAL OBJECTIVES

- To assess of pattern of injury, outcome and associated factors of outcome Among patients visited ED of general hospitals in Sidama regional state, Ethiopia, 2023.

3.2. SPECIFIC OBJECTIVES

- To describe the pattern of injuries among patients visited ED of general hospitals in Sidama Regional state, Ethiopia, 2023.
- To determine the outcome of injury among patients visited ED of general hospitals in Sidama Regional state, Ethiopia,2023.
- To explore associated factors of injury outcome among patients visited ED of general hospitals in Sidama Regional state, Ethiopia, 2023.

CHAPTER FOUR. MATERIALS AND METHOD

4.1. Study design

The institutional based cross-sectional study design was used.

4.2. Study area and study period

Sidama is one of the regional states in Ethiopia. The capital city of the region is Hawassa, which is 275 kilometers away from Addis Ababa. The region is bordered in the north and east by the Oromia region and in the south and west by the Oromia and SNNPR regions. According to the Sidama regional health department report, it had a total population of 4,369,214, of which 2,201,313 are females and 2,167,901 are males. The Sidama regional state has an overall population of 5,806 health professionals of diverse disciplines and 624 health posts, 127 health centers, five general hospitals, 13 primary hospitals, and one comprehensive and specialized hospital owned by the government.

Adare General Hospital is located in Hawassa, which is located 275 km south of Addis Ababa. According to the hospital's planning and information office, Adare General Hospital provides both preventive and curative health services for about three million people in the region. The hospital contains both adult and pediatric emergencies and has 30 beds. Total staff of the hospital was 32.

Yirgalem General Hospital is found in Yirgalem town, and it is one of the general hospitals in the Sidama region. The hospital is 38 km away from Hawassa and 313 km away from Addis Ababa. The hospital was established in January 1966, and it serves about 1 million people. Emergency unit organized by triage and resuscitation area, red, orange, yellow, and green zones, emergency laboratory, emergency pharmacy. Both adult and pediatric emergencies consist of 30 beds, and total manpower is 41.

Bona General Hospital was founded in 2002 E.C. The hospital is 115 km away from Hawassa and 390 km from Addis Ababa. The emergency units are organized as adult emergency and pediatric emergency, which total 22 beds, and the hospital currently serves over 500,000 people. A total emergency manpower power is 18 (Kare, Gujo and Yote, 2021) (Yoseph, Tamiso and Ejeso, 2021). This study was conducted in the Sidama region among three selected general hospitals, namely Adare Yirgalem and Bona, from March 10 to June 10, 2023.

4.3. Population

4.3.1. Source population

The source population of this study was all injured patients who visited the pediatric and adult emergency department general hospitals in the Sidama Regional State.

4.3.2. Study population

The study population of this study was the selected individuals who had injuries and visited the pediatric and adult selected hospital from March 10 to June 10.

4.4. Inclusion and Exclusion Criteria

4.4.1. Inclusion criteria

All injured patients who visited the emergency departments of selected hospitals during the study.

4.4.2. Exclusion criteria

The Patients who died before arrival with unknown cases, gynecology emergency, severely ill and unable to give information were excluded.

4.5. Sampling

4.5.1. Sample size

The sample size was determined using a single population proportion formula

$$n = \frac{z^2 \alpha/2 (pq)}{d^2}$$

were;

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 prevalence of injury from study done at Amhara regional hospitals (Berihanu.et.al, 2017).

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

n=289 10% of non-response rate was added and it became 318.

Sample size calculation for objectives

Table 1. sample size calculation for specific objectives, research thesis on pattern of injury, outcome and associated factors among the patients visited emergency department in Sidama Regional General Hospitals, 2023.

Factors (pattern)	Sample size	10% non-response rate added	Reference
Intentional injury (28.1%)	311	342	(Negussie <i>et al.</i> , 2018)
Unintentional injury (71.9%)	311	342	(Negussie <i>et al.</i> , 2018)
RTI (24%)	280	308	(Dagnaw <i>et al.</i> , 2022)
Fall injury (14%)	185	204	(Negussie <i>et al.</i> , 2018)
Burn (5%)	73	81	
Violence (28%)	310	341	
Factor (outcome)			
Discharged (75%)	288	317	(Dagnaw <i>et al.</i> , 2022)
Admitted (22%)	264	290	(Dagnaw <i>et al.</i> , 2022)
Died (3%)	45	50	(Dagnaw <i>et al.</i> , 2022)

Largest sample size was taken and final sample size was 342.

4.5.2. Sampling Technique and procedure

There are five general hospitals in the Sidama region; of them, three were picked by the lottery method: Adare general hospital, Yirgalem general hospital, and Bona general hospital. The total sample size was allocated to these three hospitals by the proportional allocation method after the total data of the three hospitals' previous three months' injury case reports was taken. After the sample size was allocated, K was calculated for each hospital, and data was collected accordingly.

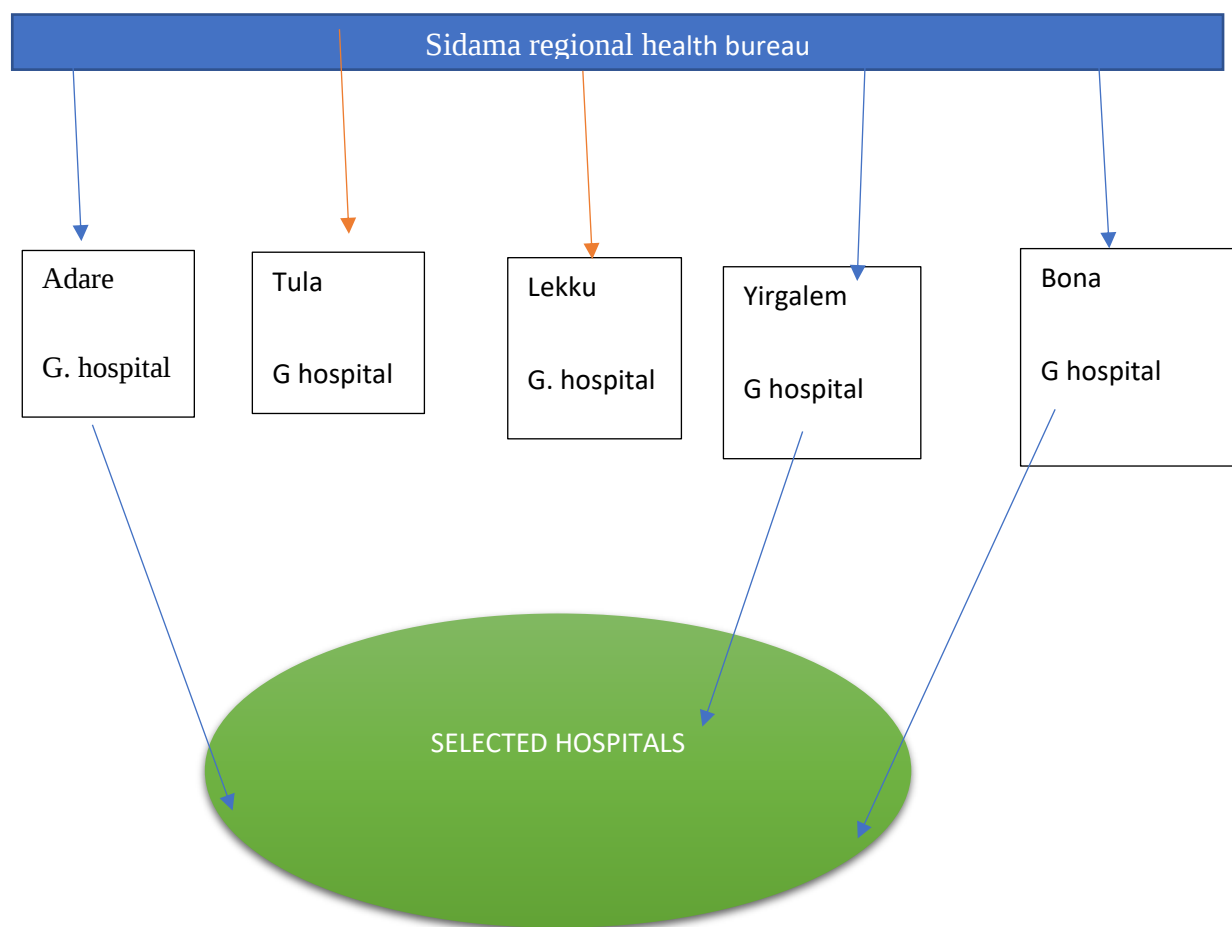


Figure 2. Schematic representation of the sampling technique of research thesis on pattern of injury outcomes and associated factors among the patient visiting emergency department in Sidama Regional General Hospitals, 2023.

A sample size was allocated to selected hospitals by using a proportional allocation formula by taking the total number of injury patients in these hospitals' previous three months' reports (data taken from the health information management system bureau of each hospital). A systematic random technique was used after K was calculated for each hospital.

1. Total population of previous three-month injury at Adare general hospital =210.
2. The total population of the previous three months of injuries at Yirgalem General Hospital is 230.
3. The total population of the previous three months' injuries at Bona General Hospital is 170.

$$n_j = n/N \times N_j$$

n_j = sample size of the j stratum

n = total sample size

N = total population

N_j = population size of the j stratum

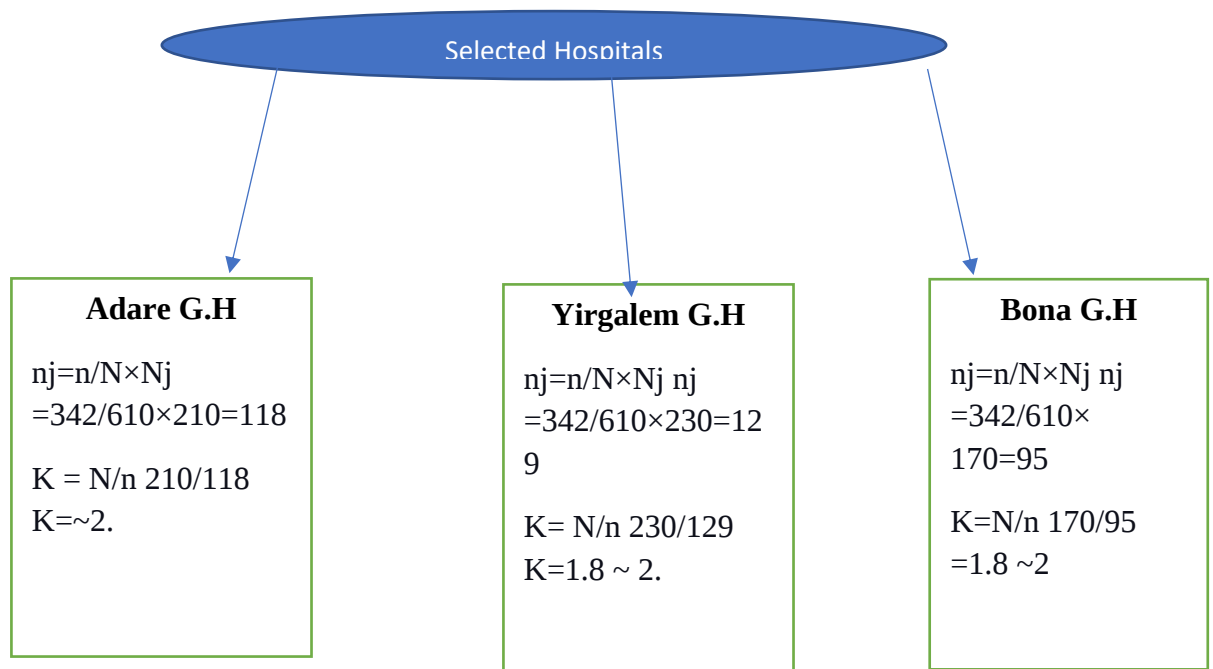


Figure 3. Describes the selected hospitals and sample size allocation of research thesis on pattern of injury, outcome and associated factors among selected general hospitals in Sidama Regional state 2023.

4.6. variables

4.6.1. Dependent variable

Outcome of Injuries

4.6.2. Independent variables

- **Demographic factors;** age, sex, marital status, educational status, residence, income
- **Occupation;** driver, farmer, merchants, students
- **Behavioral factors;** alcohol drinking, using drugs.
- **Cause and profile of injuries;** RTA, fall accident, fighting, heat, gunshot, access of prehospital care, length of hospitalization, severity of injury, GCS, triage category, distance to health facility, activity, intent of injury, place of injury, region of body injured, nature of injured, time of injury, source of referral, diagnosis by, chronic disease, mode of arrival, operated on, duration of chief complain.

4.7. Data Collection and Analysis Plan

4.7.1. Data collection instrument

A structured questionnaire that was adopted from the WHO injury surveillance guideline was used (Holder *et al.*, 2001). Data was collected using Kobotolbox. Data was collected from the injured patients about basic socio-demographics, injury profiles, and clinical information about the injury. Data on the mechanism, intent, duration, and place of injury were extracted primarily from the patient. While data on the outcome and partly on the severity of injury were extracted from the physical examination and diagnosis sections, data on patient disposition and partly on severity were extracted from the management plan or clinical decision sections.

4.7.2 Data collection process

Data was collected by six senior BSc nurses who were working at the hospitals. The trained BSc nurse collected data on both pediatric and adult emergencies from patients and followed them until the patient was discharged. The supervisor supervised the data collection process.

4.7.3. Data quality control measures

Training was given to the data collectors on the content of the questionnaire to make them familiar with the items. The questionnaire was pretested on 5% of the sample size in a population similar to the study population outside the study (Lekku general hospital). Regular check-ups for the completeness and consistency of the data were followed on a daily basis.

4.7.4. Data analysis

Data was entered into EpiData version 4.6 and analyzed using the SPSS version 27 statistical package for further analysis. Then, descriptive statistics were used to summarize the data. Graphs, charts, and statistical summary measures are used for the presentation of data. After performing a chi-square test to identify associations between independent and dependent variables, the bivariable analysis was computed to check the association between each independent variable and the dependent variable using binary logistic regression. Then, all variables with $p \leq 0.25$ in the bivariate analysis were included in the final model of multivariate analysis in order to control all possible confounders. Adjusted odds ratios with a 95% confidence interval were used to determine the strength of association and level of significance with injury outcome.

4.8. Operational definition

Injury – is a damage or harm to the body results in impairment or destruction of healthy; specifically, any unintentional or intentional damage to the body resulting from acute exposure to thermal, mechanical, electrical, or chemical energy that exceeds a threshold of tolerance in the body (World Health Organization, 2002).

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 (Ayalew, 2020).

Outcome of injury: the fate/status of the patient leaving the hospital after getting service. This is the outcome and was categorized as death and no death (Tadesse et.al, 2017).

Severity of injury (Negussie *et al.*, 2018).

No injury: a patient who had no apparent injury and required no intervention.

Minor injury: a patient who has minor or superficial injury (for example, bruises or a minor cut) that requires cleansing of the affected region.

Moderate injury: a patient who has moderate injuries that necessitate professional care such as fracture stabilization and wound suturing.

Severe injury: Patient who had severe injuries requiring intensive medical or surgical management (example, internal hemorrhage, moderate or severe head injuries).

Intentional injury - Categorized as interpersonal violence (including violence against intimate partner), and self-directed violence (Negussie *et al.*, 2018).

Unintentional injury: Comprises Road traffic injuries, fires, falls and drowning.(Negussie *et al.*, 2018).

4.9. Ethical consideration

Ethical clearance was obtained from Hawassa University College of Medicine and Health Sciences, an institutional review board. A support letter was also obtained from the school of nursing, and permission was obtained from the medical directors of the hospital for collecting data from the patients. The written consent from the patients was obtained, and the information was kept confidential by coding the data.

4.10. Result dissemination plan

The findings of this study submitted to Hawassa University College of Medicine and Health Science School of Nursing through the submission of reports and presentation of findings according to the program of the department. It will also be communicated to hospitals as well as other concerned bodies, such as the health bureau. Moreover, the publication of the study findings in local and international journals will considered.

CHAPTER FIVE. RESULTS

5.1. Sociodemographic characteristics of participants

A total of 342 patients participated, resulting in a 100% response rate. The majority of study participants were males; 224 (65.5%) and 225 (65.8%) lived in rural areas. In terms of educational attainment, 167 (48.8%) of the participants had completed primary school. Furthermore, students and farmers accounted for 130 (38%) and 64 (18.7%) of all ED cases by occupation, respectively.

Table 2. describes that socio-demographic data research thesis on pattern of injury, outcome and associated factors among patients visited emergency department in Sidama Regional Hospitals 2023 (n=342).

Variables	Categories	Frequency	Percent %
Age	<5	10	2.9
	5-14	20	5.8
	15-19	50	14.6
	20-24	69	20.2
	25-44	137	40.1
	45-64	49	14.3
	>64	7	2
Sex	Male	224	65.5
	Female	118	34.5
Residence	Rural	225	65.8
	Urban	117	34.2
Marital status	Married	153	44.7
	Unmarried	179	52.3
	Widowed	6	1.8
	Divorced	4	1.2
Occupation	Farmer	64	18.7
	Civil servants	36	10.5
	Students	130	38
	Merchant	66	19.3
	Housewife	41	12
	Unemployed	5	1.5

Educational status	Unable to read and write	38	11.1
	Primary school	167	48.8
	Secondary school	87	25.4
	College and above	50	14.6
Income	>650	108	31.6
	<651	234	68.4
Chronic disease	Yes	22	6.4
	No	320	93.6

5.2. Pattern of injury

The majority of 223 (65.2%) injuries were unintentional, of which RTA, falls, and burns ranked first to third, scoring 125 (36.5%), 39 (11.4%), and 23 (6.7%), respectively. Among intentional ones, interpersonal violence was highly prevalent 93 (27.2%) followed by gunshots 12 (3.5%). The affected user groups in the case of RTA were found to be pedestrians 47(37.3%), drivers 40 (31.7%), and passengers 39 (30.9%). For violence, the reason for the assault was ranked in descending order as quarrel 58 (54.7%), alcohol use 38 (34.8%), and robbery 10 (9.4%). Victims who were traveling during the incident were 142(41.5%); followed by those who were working 102 (29.8%) and those who were playing 49 (14.3%).

Table 3. Describes pattern of injury of research thesis on pattern of injury, outcome and associated factors among patients visited Sidama Regional General Hospital Ethiopia, 2023, (n=342).

Mechanism	Frequency	Percentage %
RTA	125	36.5
Fall	39	11.4
Burn	23	6.7
Violence	93	27.2
poisoning	20	5.8
Gun shot	12	3.5
Work related	17	5
Animal bite	12	3.5
Other	1	0.3

Classifications of common types of injury.

From the total number of patients who sustain road traffic injuries, motor vehicle accidents are the most common cause, followed by motor vehicle collisions. Fighting injuries are the most common interpersonal injuries, followed by stab injuries.

Table 4. Shows that types of RTA, Interpersonal violence and burn on research thesis on pattern of injury, outcome and associated factors among patients visited emergency department in Sidama regional general hospitals in 2023, (n=342).

Variables		Frequency	Percent%
RTA(n=125)	Motor crush	96	76.8
	Motor vehicle accident	18	14.4
	Car accident	11	8.8
IPV (n=93)	Blunt injury	55	59.1
	Stab injury	31	33.3
	Sexual assault	7	7.5
Burn (n=23)	Flame burn	6	26.1
	Scald burn	12	52.2
	Electric burn	5	21.7

Distribution of mechanism of injury to different variables.

RTA is a prevalent mechanism of injury in practically all age groups, with a peak in the age range of 25–44 (53%), and burns are common in the age group <5 (50%).

Table 5. Describes the distribution of injury on research thesis on pattern of injury, outcome and associated factors among patients visited Sidama Regional General Hospitals 2023, (n=342).

Variables	RTA	Fall	Burn	Poison	Violence	gun shot	Work Related	animal bite
Age								
<5	0	3 30%	5 50%	0	0	0	0	2 20%
1-14	5 25%	6 30%	3 15%	1 5%	3 15%	0	2 10%	2 10%
15-19	21 42%	4 8%	2 4%	6 12%	14 28%	1 2%	1 2%	3 6%
20-24	27 39.1%	7 10%	2 2.8%	3 4.3%	24 34.7%	3 4.3%	2 1.4%	1 0.4%
25-44	53 38.6%	12 8.7%	9 6.5%	7 5.1%	38 27.7%	4 5.7%	8 5.8%	5 3.6%
45-64	16 32.6%	6 12.2%	5 10.2%	3 6.1	13 26.5%	2 4%	4 8.1%	0
>64	3 42.8%	1 14.2%	0	0	1 11.4%	2 28.5%	0	0
Residence								
rural	80 35.5%	27 12%	11 4.8%	12 5.3%	71 31.5%	9 4%	6 2.6%	8 3.5%
urban	45 38.4	12 10.2%	12 10.2%	8 6.8%	22 18.8%	3 2.5%	11 9.4%	4 3.4%
Occupation								
Farmer	17 26.4%	7 10.9%	2 3.1%	1 1.5%	23 35.9%	7 10.9%	5 7.8%	0
Civil s	21 58.3%	5 13.8%	0	4 11.1%	4 11.1%	1 2.7%	1 2.7%	0
Students	42 32.3%	17 13%	11 8.4%	10 7.6%	37 13%	1 0.76%	6 4.6%	7 5.3%
Merchants	30 45.4%	6 9%	5 7.5%	1 1.5%	17 25.7%	3 4.5%	3 4.5%	1 1.5%
Housewife	13 31.7%	4 9.7%	5 12.1%	3 7.3%	10 24.3%	0	2 4.8%	4 9.7%
Unemployed	2 40%	0	0	1 20%	2 20%	0	0	0
Education								
Illiterates	11 28.9%	2 5.2%	1 2.6%	2 5.2%	12 31.5%	4 10.5%	2 5.2%	4 10.5%
Primary	49 29.3%	23 13.7%	18 10.7%	12 7.1%	45 26.9%	4 2.3%	9 5.3%	7 4.1%
Secondary	35 40.2%	9 10.3%	3 3.4%	3 3.4%	29 33.3%	2 2.29%	5 5.7%	1 1.14%
College +	30 60%	5 10%	1 2%	3 6%	7 14%	2 4%	1 2%	0

Places of injury occurred.

Out of total injuries, 158 (46.2%) of the injuries happened on the street, and 81 (23.7%) occurred at home. while the occurrence of injuries at work and school was 80 (23.4%) and 4 (4.4%), respectively.

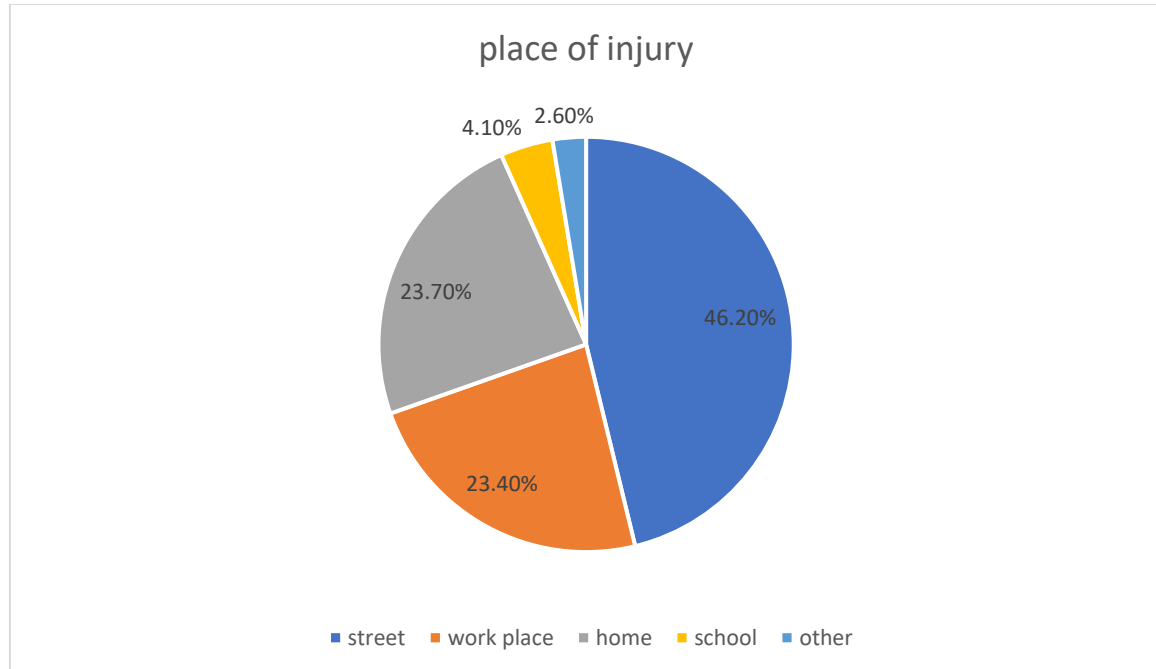


Figure 4. Shows place of injury on research thesis on pattern of injury, outcome and associated factors among patients visited emergency department in Sidama Regional General Hospitals 2023, (n=342).

Mode of transportation and prehospital care

Out of the total number of patients who visited the emergency department, 162 (47.4%) used taxis as their mode of arrival, followed by ambulances (24.6%). Ambulances were used by urban people more frequently as compared to rural people. Only 2.5% of patients got first aid at the scene; 201 (58.8%) did not get prehospital service. The most common source of referral was self-252 (73.7%), followed by health center 58 (17%). Concerning the distance between the injury to the hospital and the time between the injury and ED arrival, the majority of patients 237 (69.3%) sustained the injury between 11-100M away from the hospital, and 209 (61.1%) respectively.

Table 6. Shows mode of arrival, pre hospital care on research thesis on pattern of injury, outcome and associated factors among patients visited emergency department in Sidama Regional General Hospitals 2023 (n=342).

Mode of arrival	Frequency	Percent%
With foot	49	14.3
Ambulance	84	24.6
Private	19	5.6
Bajaj	28	8.2
Taxi	162	47.4
Distance between the injury to hospital		
<11KM	96	28.1
11-100KM	231	67.5
>100KM	15	4.4
Time between injury to ED		
<1HR	84	24.8
1-6HR	198	57.9
>6HR	60	17.5
Source of referral		
Self	252	73.7
Health center	58	17
Private	14	4.1
governmental hospital	18	5.3
Prehospital care		
Yes	141	41.2
No	201	58.8

Clinical information of injuries.

According to clinical data on injury and the type of care provided, 126 patients (36.8%) had moderate injuries that required skilled care, such as stabilizing fractures and suturing wounds. 157 (45.9%) patients experienced minor superficial injuries, while the other 75 (21.9%) patients had severe injuries requiring highly skilled medical and surgical therapy. Regarding the triage scale and GCS, 261 (88.6%) patients with mild GCS reached the ED, while 127 (37.1%) were classified as yellow by the triage category. 103 (30.1%) patients suffered fractures as a result of the accident. The most injured part of the body was the head 117 (34.2%) followed by the lower extremities 94 (29.1%).

Table 7. Describes clinical information on pattern of injury, outcome and associated factors among patients visited emergency department in Sidama Regional General Hospitals 2023, (n=342).

Variables	Frequency	Percent%
Severity of injury		
Minor injury	141	43.5
Moderate injury	126	36.8
Sever injury	75	21.9
Triage scale		
Red	59	17.2
Orange	55	16.0
Yellow	127	37.1
Green	101	29.5
GCS scale		
Mild	261	76.3
Moderate	42	12.2
Severe	39	12.0
Region of body injured		
Head	117	34.2
Neck	16	4.9
Chest	43	13.3
Abdomen	32	9.9
Upper extremities	86	25.1
Lower extremities	94	29.1
Spinal cord	3	0.8
Pelvic injury	8	2.4
Nature of injury		
Dislocation	13	4
Fracture	103	30.1
Skin laceration	112	34.6
Cut	42	13
Internal organ damage	59	17.3
Burn	25	7.7

Penetrating	15	4.6
Abrasion	10	3
Diagnosis by		
H and physical examination	342	100
x-ray	151	44.1
CT-scan	20	5.8
Ultrasound	18	5.2
Operated on		
Yes	22	6.4
No	320	93.6
Duration of ED stay		
<24	144	42.1
1-7	189	55.3
>7	9	2.6

Anatomic region of fracture occurred

Out of a total of 342 injured patients, 103 (30.1%) suffered fractures as a result of the accident, with femur fractures comprising 21%, followed by ulnar fractures 19%.

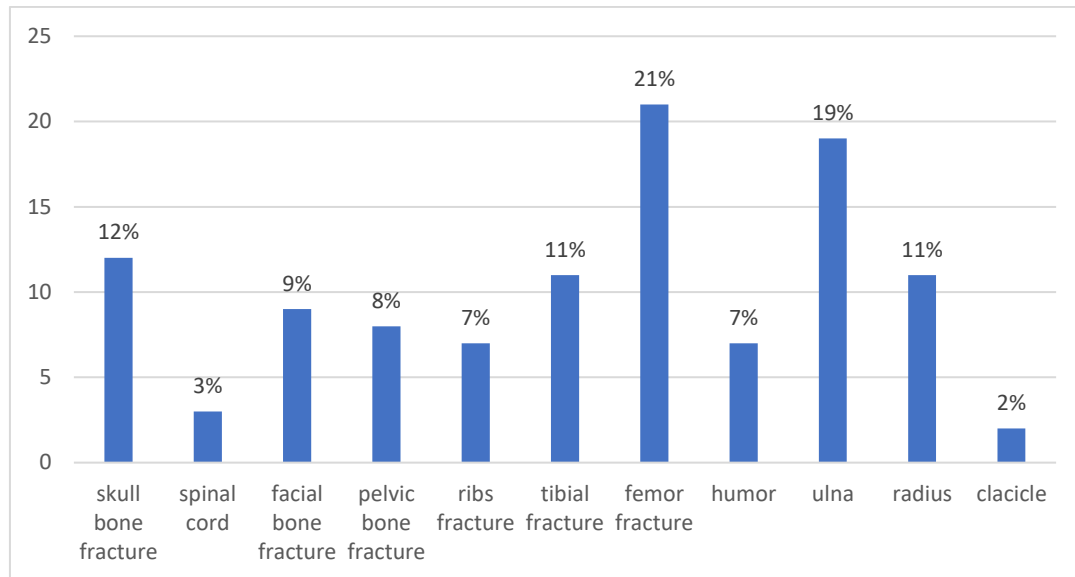


Figure 5. Describes the distribution of fracture on research thesis on pattern of injury. outcome and associated factors among patients visited emergency department in Sidama regional general hospitals 2023, (n=342).

5.3. Outcome of injury

Out of 342 patients who visited the ED, 96.2% were discharged alive and 13 (3.8%) with 95% CI [2-6] die because of injury.

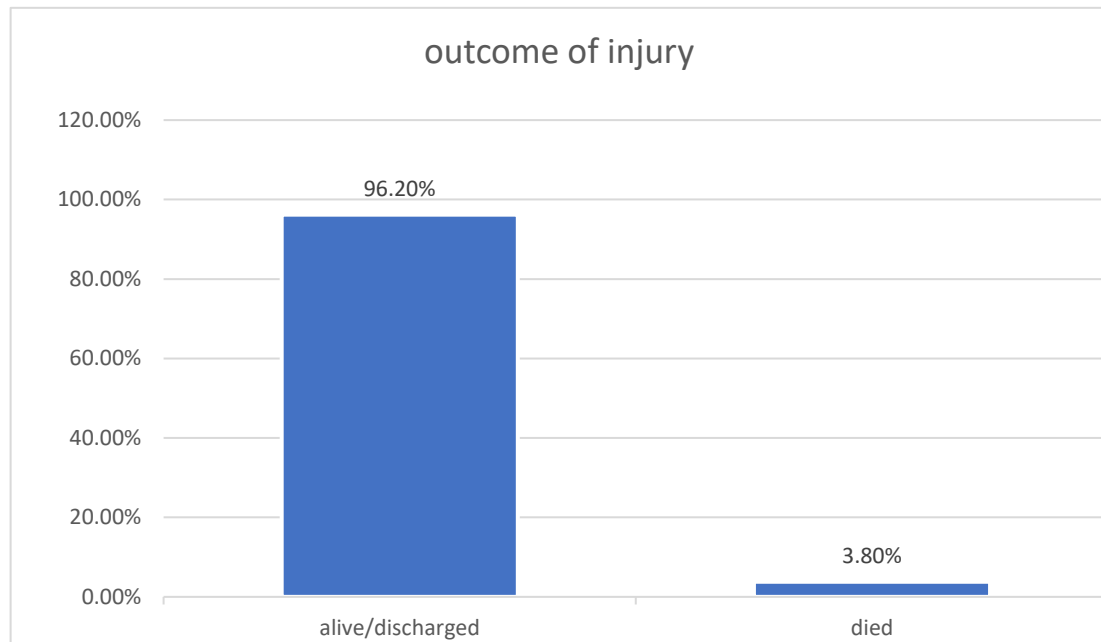


Figure 6. Describes outcome of injury on research thesis on pattern of injury, outcome and associated factors among patient visited emergency department in Sidama Regional Hospitals 2023, (n=342).

Distribution of the outcome of injury through different variables.

The frequency of death was high among males 9 (4.1%) and more common in rural areas 10 (4.6%). And death was common over age >64. By occupation, merchants were more prone to death.

Table 8. Shows distribution of outcome to different variables on research thesis on pattern of injury outcome and associated factors among patients visited emergency department in Sidama Regional General Hospitals 2023, (n=342).

Variables	Categories	Alive/discharge		Death	
		Frequency	percent%	Frequency	Precent
Sex	Male	215	65.3	9	4.1
	Female	114	34.6	4	3.5
Age	<5	10	3.03		
	5-14	19	5.77	1	5.2
	15-19	49	14.8	1	2.04
	20-24	69	20.9		
	25-44	131	39.8	6	4.5
	45-64	45	13.6	4	8.8
	>64	6	1.8	1	16.6
Educational status	Illiterates	38	11.5	0	
	Primary level	161	48.9	6	3.7
	Secondary level	82	24.9	5	6.0
	College and +	48	14.5	2	14.3
Residence	Rural	215	62.3	10	4.6
	Urban	114	37.7	3	2.6
Occupation	Farmer	64	19.4		
	Civil servant	36	10.9		
	Students	126	38.2	4	3.1
	Merchant	57	17.3	9	15.7
	Housewife	41	12.4		
	Unemployed	5	1.5		
Intent	Intentional	114	37.7	5	4.3
	Unintentional	215	62.3	8	3.7
Mechanism	RTA	118	35.8	7	5.9
	Fall	38	11.5	1	2.6
	Burn	23	6.9		
	Poison	19	5.7	1	5.2
	Violence	90	27.3	3	3.3
	Gun shot	11	3.3	1	9.09
	Work related	17	5.1		
	Animal bites	11	3.3		
	Other	1	.3		

5.4. Factors associated with injury outcome

The association between dependent and independent variables was analyzed with binary logistic regression, for each predictor with bivariate analysis. Operated on, alcohol use, mental status (Glasgow Coma Scale (GCS)), severity of the injury, triage categories, anatomic region injured, nature of the injury, the time between the injury and arrival, and comorbidities were found to have a p-value <0.25.

And further analyzed with multivariate logistic regression, and the following variables were found to have a significant association with the AOR, 95% CI, and p-value <0.05.

Triage scale: patients who were classified under the red color have about an 8.7 times higher risk of death compared to another triage category. The risk of death increases in the patients who are categorized under the red category [AOR = 8.7].

GCS: in comparison to moderate and mild GCS scores, the victims who score severe GCS have about 7.1 times higher risk of mortality. The risk of death increases for patients whose GCS is severe [AOR = 7.1].

Time between the injury and care the victims who get care after 6 hours increase the risk of death by 5.4 times compared to victims who get care within 6 hours. The patients who get care after 6 hours have a higher risk [AOR 5.4].

Body region injured: Victims who sustained Head injury are at about 1.3 times higher risk of dying than those who are injured other body parts. The risk of death is increased for those who are injured in their head [AOR=1.3].

Degree of injury: Compared to moderate and mild injuries, severe injuries have a 10.1 times greater risk of death [AOR =10.1]. The risk of death is higher for a victim who is severely injured.

Operated on: compared to no surgical intervention given, the victims who operated had a 7.2 times risk of dying. The risk of dying increases for those operated patients AOR=7.2

Table 9. describes associated factors on research thesis on pattern of injury, outcome and associated factors among patients visited emergency department Sidama Regional General Hospitals 2023 (n=342).

Variable	Category	Death		COR 95%CI	P value	AOR 95%CI
		Yes	No			
GCS	Sever Non severe	7 6	32 297	10.9(3.41-34.99) 1	0.002 1	7.1 (1.916-16.364)
IS	Severe Other	10 3	65 264	13.5(3.62-50.61) 1	0.025 1	10.1(1.028-13.427)
Time B/N	>6HR ≤ 6 HR	9 4	51 278	12.1(1.23-27.23) 1	0.004 1	5.4 (1.229-22.1972)
Triage	Red other	8 5	51 278	8.7(2.74-27.75) 1	0.001	5.2 (1.746-20.931)
Operated on	Yes No	5 8	17 312	11.4(3.39-38.82) 1	0.022	7.2 (2.451-30.691)
Alcohol use	Yes No	11 2	94 235	0.38(0.12-1.51) 1	0.045 1	0.184(0.035-0.971)
Comorbidities	Yes No	6 7	16 313	.60(0.018-0.198) 1	0.278 1	0.278(0.050-1.318)
Anatomic PI Head injury	Yes No	11 2	106 223	0.086(.019-.397) 1	0.022 1	1.22(0.245-1.228)
Upper extremity	Yes No	1 12	85 244	4.18(.536-32.63) 1	0.84 1	0.84(7.751-12.140)
Nature of injury Internal body damage	Yes No	9 4	50 279	.080(.024-0.269) 1	0.001 1	0.062(0.013-0.045)
Fracture	Yes No	9 4	94 235	.178(.053-0.591) 1	0.46 1	0.209(0.282-0.973)

Severity of injury, GCS scale, triage categories, operated on, time between injury and care given and head injury was statistically associated with mortality with P – value of 0.025, 0.002, 0.001, 0.022, 0.004 and 0.022 respectively for multivariate logistic regression.

CHAPTER SIX. DISCUSSION

This study showed that injury has occurred more among males than females and has 2.2 times increased mortality rate. 20-44 (40.1%) age group was more affected. This finding is consistent with a demographic study of injury worldwide, it commonly occurs in young productive force with more occurrence in males.

According to WHO report 61.5% of the deaths occurred in the age range of 10–44 years (WHO, 2021). The finding also similar to the research done in other low and middle-income countries (Botchey *et al.*, 2017). This is most likely related to the fact that the majority of outdoor activities are conducted by adults and children in low- and middle-income nations like Ethiopia, and males are more traumatized. Furthermore, males are more prone to fury and injuries than females of the same age.

Considering the intent of the injury, 223 (65.2%), 95% of the CI [59.9–70.1], were due to unintentional injury, and 119 (34.8%), 95% of the CI [28.9–40.1], were intentional injuries. This is in agreement with the result of a study done at Alert Hospital (64.4%) (Abebe *et al.*, 2022), and Nigeria (63%) (Dan Fulani and Mohammed, 2020). This may be due to RTA injury is more prevalent since it is unintentional injury. The result showed more prevalent than the study done in Gondar university hospital (52.6%) (Osman *et al.*, 2016). This is may be due the variation on social life style, unsafe road, topography and less prevalent than study done in Tikur Anbesa (73.2%) (Tadesse *et al.*, 2014) and (Kenya 73%) (Botchey *et al.*, 2017). The difference may be due to the demography of study done and the period of study done.

RTA was the leading cause of injury (36.5%) with 95% of CI [32.1-41.9] and was nearly the same with the result of a study done at Tikur Anbesa specialized hospital (38.3%) (Tadesse *et al.*, 2014). And more than the study done at alert trauma center (Abebe *et al.*, 2022) and Gondar teaching hospitals (Berihanu.*et.al*, 2017) 30.7%, and 30% respectively. The difference may be due to the concentration of vehicles, poor road conditions, the absence of road signs, poor traffic enforcement, and pedestrian awareness of road usage. Also, lower when compared with the study done at Dilla University Teaching Hospital. 47.3% (Abebe *et al.*, 2022) and study done in Cameroon (60%) (Boukar *et al.*, 2022). This could be attributed to geographic differences, strict driving licenses, low consumption of alcohol and drugs, road quality differences, and behavioral factors. The other cause of variation may be due to this study done in multiple centers.

This study also showed that RTA injuries were significantly higher among the age groups 20–24 (39.1%) and 25–44 (38.6%), and motor accidents (76.8%) were major causes. Fall injury was more common among males and the age between 1–15 years. Burn was more prevalent in the age 1–14 (60%) and the main causes were scald burns (52.3%). Similarly, interpersonal violence is common among male and the age group between 20–24 years (34.7%), and the main cause were blunt injury (59.1%) this is consistent with the study done at Jimma University Hospital (Woldemichael and Berhanu, 2017).

This study also showed that 46.2% of injuries occurred on the street, with a 95% CI of 40.5–51.3%. This is similar to the study done in Amhara regional referral hospitals (46.1%) (Bashah, Dachew and Tiruneh, 2015). This may still be because of poor road quality and safety, poor traffic rules and regulations, and moreover, the behaviors of the adolescents who walk on the street (which is not well-designed). Also, may be due to the predominant mechanism of injury hence RTA.

The most frequent time for occurrence of injury in this study was in the afternoon (daytime PM), this is consistent with study done in Alert trauma center (Abebe *et al.*, 2022) and which is in contrary with one study done in Gondar (Berihanu *et al.*, 2017) and South Africa, Cape Town; (Schoorman *et al.*, 2015) where injuries most frequently occur at night. This difference may be due to the fact that more prevalent injury in Gondar city is interpersonal violence, and there is less movement and activity at night in this region as compared to Cape Town.

This study revealed that 24.6% of injury patients arrived in the hospital emergency department by ambulance. On the other hand, nearly all injured patients who arrived at the hospital via ambulance did so from the health center and other regional hospital settings, where they might have gotten primary treatment and resuscitation, rather than from the injury site. This is consistent with a study done in an alert hospital (Abebe *et al.*, 2022) and significantly higher than the 20.3% found in a previous study of emergency medical care utilization in Addis Ababa hospitals (Sultan *et al.*, 2019), Dilla (9%) (Bedru *et al.*, 2020), in Lusaka, Zambia (5.8%). The difference can be due to abundant of case in this study was referred from health centers where use of ambulance is likely. And much lower than study done in the Saudi Arabia (69.1%) (Abolfotouh *et al.*, 2018). These differences might be influenced by various variables, including distance to health-care facilities or a lack of awareness of the Emergency Medical Service (EMS) contact number and availability of EMS.

In this study, head 117 (34.2%) was the commonly injured body region, followed by lower extremities 94 (29.1%) and upper extremities 86 (25.1%). Laceration 112 (34.6%) was the most abundantly occurring nature of injury, followed by fracture 103 (30.1%) and internal body damage 59 (17.3%). Hence, this finding is similar with that of a study conducted in Alert hospital the common affected body part was head 107 (29.6%), lower extremity 64 (17.7%) and upper extremity 75 (20.7%) (Abebe *et al.*, 2022) and Mekelle (Amdeslasie *et al.*, 2016) where head 202 (30.3%) lower extremity 112 (18.5%) and upper extremities 123 (20.3%) was more commonly affected; but in contrary with another study in Gondar university teaching hospital (Berihanu.*et.al*, 2017) and Kenya (Botchey *et al.*, 2017) where lower extremity injury was common. The reason for this variation between the current study and the one in GUH may be due to behavioral factors like wearing a helmet and the difference between their mechanisms of injury (RTA for the current study vs. interpersonal violence for the latter).

Minor injury 141 (43.5%) outweighed moderate injury 126 (36.8%) and severe injury 75 (21.5%). The yellow triage category was the dominant triage category 127 (37.1%), followed by green 101 (29.5%), and most patients were categorized under the mild GCS scale at 261 (76.3%), which is in line with another study done at Alert Hospital (Abebe *et al.*, 2022) and Kenya (Botchey *et al.*, 2017). The reason may be similarity in study design, setting and sampling technique.

In this study, the mortality rate was 3.8%, 95% of CI [2-6]. This implies an similar finding with Gondar University Hospital (2%) (Berihanu.*et.al*, 2017) Alert Trauma Center, 3.6%. And a higher proportion of deaths was reported at the emergency department, in which compared with the study that was reported from Tikur Anbesa Specialized Hospital (1.47%) and Menelik Hospital (1.5%). This variation can be due to the capacity of setting to give early trauma care, the absence of trauma center, lack of prehospital care, lack of ATLS, and lack of preparedness for trauma. However, the result is within the expected worldwide range (0.5%-6%), and sub-Saharan Africa (4.2%) (Tyson *et al.*, 2019), Saudi Arabia 4.8% (Abolfotouh *et al.*, 2018). And lower than the study conducted in Dilla Hospital (6.1%) (Bedru *et al.*, 2020). This inconsistency may be due to variations in the study sample, study settings, and emergency care training among health care professionals in this study setting, or the differences due this study was done multiple centers, and relatively over shorter period.

This study showed that the injury severity AOR =10.1 with a 95% CI of [1.028–13.47], the head injury AOR = 1.22 with a 95% CI of [0.245–1.228], the red triage categories AOR =5.2

with a 95% CI of [1.746–20.931], the time between injury and care given AOR = 5.4 with a 95% CI of [1.229–22.19], the Glasgow Coma scale AOR = 7.1 with a 95% CI of [1.916–16.36], and operated on AOR = 7.2 with a 95% CI of [2.451–30.69] was significantly associated with patient mortality. Patient mortality increased seven times in patients with a <8 GCS scale, whereas patient mortality was ten times more likely in patients with a severe injury level.

The mortality rate increases by 1.2 times the rate in cases of head injuries when compared with injuries to other parts of the body. This explains why a quick assessment of injury severity and the GCS scale can significantly affect the outcome of injury patients. The mortality also increases five times for patients who are in the red category compared to other triage scales. Application of this scoring system helps in categorizing high-risk patients in need of early intervention, which leads to a better outcome. This finding is consistent with a study done at Dilla University Teaching Hospital (Bedru *et al.*, 2020), and Saud Arabia (Abolfotouh *et al.*, 2018).

In a study done at Alert Hospital, the Pearson chi-square and Fisher's exact tests were calculated to assess the relationship between patient clinical profile and ER mortality. Causes of injury, body region of injury, injury type, injury severity, and operated on are more statistically highly associated factors for mortality than others, with p-values of 0.002, 0.000, 0.000, 0.000, and 0.000, respectively. This is consistent with the current study with variables like trauma severity, anatomic site of injury, and surgical intervention. Contrary to variables like the mechanism of injury and types of injury, the difference may be due to the fact that this study is prospective, and multiple centers may also be due to the fact that Alert Hospital has a trauma center and receives a more severe injury (Abebe *et al.*, 2022).

7. CONCLUSION

A higher proportion of injury victims were male patients, and the age group was 25–44 years. The rural population is more affected and common among students in their occupation. The common patterns of injury were RTA, interpersonal violence, and fall injuries. RTA was the leading cause of mortality and morbidity, followed by interpersonal violence and fall injuries. Burn injury was common among pediatric groups, while interpersonal violence was common in the adult age group. Awareness creation about RTA, improving road safety, and imposing strict regulations on pedestrians and drivers need further measures. The street was a common place while traveling was the main activity during injury. Injuries in the afternoon were more prevalent. The majority of patients did not receive pre-hospital care and were transported to hospitals by taxi. For most of the victims, the common body part affected was the head, followed by lower extremities, and laceration is a common type of injury followed by fracture. body part injured, the degree of injury, the GCS scale, the triage scale, and the time between injury and patient care were associated with the outcome of the injury.

8. RECOMMENDATION

- 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 a bad outcome from the injury, especially for patients with low GCS, head injuries, patients who operated, patients with severe injuries, and those in the triage category under red.
- The Sidama Regional Health Bureau should establish and enhance prehospital care services and emergency medical services.
- As injury is an ever-evolving problem, the regional government has to establish trauma centers to work on this preventable, neglected global problem.
- Since the head is the most common body part affected by trauma, there is a need for an enlightenment campaign from the government to ensure motorcyclists wear helmets to protect them in order to minimize the rate of head injuries among riders.
- There is a need for the government to construct and maintain the existing road and to establish a driving speed limit so as to avoid or minimize road traffic accidents.
- Community members should be aware of the causes and consequences of injuries, and every individual, family, and community as a whole should maximize their efforts towards protecting themselves and other people from injury.
- The family and caregiver should give special attention to protecting children from fire and other combustibles within households.
- Future studies can be directed to pre-hospital access and long-term follow-up outcomes of injury victims to account for the exact mortality and morbidity due to such unfortunate events.

Limitation of study

This study cannot estimate the long-term outcome of injury especially after the patient was discharged, level of disability, and prehospital use of patients. It also better to include gynecologic emergency.

Strength of study

The strength of this study is that it was done in multicenter and prospective cross-sectional study method and tried to compare both the pediatric and adult populations in terms of the pattern of injury and its outcome, which overcomes the previous study limitations.

Reference

- Abebe, T. *et al.* (2022) 'Clinical profile and outcomes of trauma patients visiting the emergency department of a trauma center Addis Ababa, Ethiopia', *African Journal of Emergency Medicine*, 12(4), pp. 478–483. Available at: <https://doi.org/10.1016/j.afjem.2022.10.013>.
- Abolfotouh, M.A. *et al.* (2018) 'Patterns of injuries and predictors of inhospital mortality in trauma patients in Saudi Arabia', *Open Access Emergency Medicine*, 10, pp. 89–99. Available at: <https://doi.org/10.2147/OAEM.S166026>.
- Adeloye, D. *et al.* (2016) 'Incidence des accidents, traumatismes et victimes de la route en Afrique: Revue systématique et méta-analyse', *Bulletin of the World Health Organization*, 94(7), pp. 510A–521A. Available at: <https://doi.org/10.2471/BLT.15.163121>.
- Ali, S. *et al.* (2020) 'The burden of injuries in Ethiopia from 1990–2017: evidence from the global burden of disease study', *Injury Epidemiology*, 7(1), pp. 1–11. Available at: <https://doi.org/10.1186/s40621-020-00292-9>.
- Amdezasie, F. *et al.* (2016) 'Patterns of Trauma in Patient Seen At the Emergency Clinics of Public Hospitals in Mekelle, Northern Ethiopia', *Ethiopian medical journal*, 54(2), pp. 63–68.
- Ayalew, M. *et al.* (2020) 'Pattern of Injuries in Patients Visiting Emergency Department of Hawassa University Comprehensive', *American Journal of Clinical and Experimental Medicine* 2020; 8(2);, 8(2), pp. 15–19. Available at: <https://doi.org/10.11648/j.ajcem.20200802.12>.
- Bashah, D.T., Dachew, B.A. and Tiruneh, B.T. (2015) 'Prevalence of injury and associated factors among patients visiting the Emergency Departments of Amhara Regional State Referral Hospitals, Ethiopia: A cross-sectional study', *BMC Emergency Medicine*, 15(1), pp. 1–7. Available at: <https://doi.org/10.1186/s12873-015-0044-3>.
- Bayissa, B.B. and Alemu, S. (2021) 'Pattern of trauma admission and outcome among patients presented to Jimma University Specialized Hospital, south-western Ethiopia', *Trauma Surgery and Acute Care Open*, 6(1), pp. 6–10. Available at: <https://doi.org/10.1136/tsaco-2020-000609>.
- Bedru, J.A. *et al.* (2020) 'Pattern and Outcomes of Injuries among Trauma Patients in Gedeo Zone, Dilla, South Ethiopia: A 5 Years Retrospective Analysis', *Ethiopian journal of health sciences* [Preprint].
- Biennial report 2013 (no date) World Health Organization. *Violence, Injuries and Disability BIENNIAL REPORT. WHO; 2011–2012) - Search, 2013.* Available at:

<https://www.bing.com/search?q=World+Health+Organization.+Violence%2C+Injuries+and+Disability+BIENNIAL+REPORT.+WHO%3B+2011-2012%29&form=ANNTTH1&refig=0e7f1be57d9841908d060c564680dd88> (Accessed: 1 January 2023).

Berihanu.et.al (2017) ‘Magnitude and patterns of injuries among patients in Gondar University Hospital , northwest Ethiopia : an institutional-based study’, *open acess journal*, pp. 25–31.

Bhalla, K. 2014 (no date) *Burden of Road Injuries in Sub-Saharan Africa | GRSF*. Available at: <https://www.roadsafetyfacility.org/publications/burden-road-injuries-sub-saharan-africa> (Accessed: 3 January 2023).

Bolandparvaz, S. *et al.* (2017) ‘Injury patterns among various age and gender groups of trauma patients in southern Iran’, *Medicine (2017)* 96:41(e7812) [Preprint].

Botchey, I.M. *et al.* (2017) ‘Understanding patterns of injury in Kenya: Analysis of a trauma registry data from a National Referral Hospital’, *Surgery (United States)*, 162(6), pp. S54–S62. Available at: <https://doi.org/10.1016/j.surg.2017.02.016>.

Boukar, M.Y.E. *et al.* (2022) ‘Injury Patterns and Treatment Outcome of Road Traffic Crash Victims at the Emergency Department of the Regional Hospital Limbe, Cameroon’, *Surgical Science*, 13(03), pp. 174–182. Available at: <https://doi.org/10.4236/ss.2022.133022>.

Chichom-Mefire, A. *et al.* (2017) ‘Key findings from a prospective trauma registry at a regional hospital in Southwest Cameroon’, *PLoS ONE*, 12(7), pp. 1–12. Available at: <https://doi.org/10.1371/journal.pone.0180784>.

Chkhaberidze, N. *et al.* (2022) ‘Epidemiological characteristics of injury in Georgia: A one-year retrospective study’, *Injury*, 53(6), pp. 1911–1919. Available at: <https://doi.org/10.1016/j.injury.2022.03.009>.

Corso, P. *et al.* (2015) ‘Incidence and lifetime costs of injuries in the United States’, *Injury Prevention*, 21(6), pp. 434–440. Available at: <https://doi.org/10.1136/ip.2005.010983rep>.

Dagnaw, Y. *et al.* (2022) ‘Mechanisms , Pattern and Outcome of Pediatrics Trauma At Agaro General Hospital ’, *health service research and managerialepidemiology*, 9, pp. 1–8. Available at: <https://doi.org/10.1177/23333928221101975>.

Danfulani, Mohammed and Mohammed, D. (2020) ‘Socio-Demographic Pattern in Patients Presenting with Injuries in Trauma Unit in a Tertiary Institution in North-Western Nigeria’, *East African Scholars Journal of Medical Sciences*, 3(11), pp. 402–405. Available at: <https://doi.org/10.36349/easms.2020.v03i11.003>.

Deme, D. (2019) ‘Road Traffic Accident in Ethiopia from 2007/08-2017/18’, *American International Journal of Sciences and Engineering Research*, 2(2), pp. 49–59. Available at:

<https://doi.org/10.46545/aijser.v2i2.90>.

Edris, M. *et al.* (20015) ‘Injury Prevention and Management For the Ethiopian Health Center Team’, *researchGates* [Preprint], (December 2022).

Federal Democratic Republic of Ethiopia Ministry of Health (2015) ‘Health Sector Transformation Plan: 2015/16-2019/20.The Federal Democratic Republic of Ethiopia’, *Federal Democratic Republic of Ethiopia Ministry of Health*, 20(May), p. 50. Available at: https://www.globalfinancingfacility.org/sites/gff_new/files/Ethiopia-health-system-transformation-plan.

Gathecha, G.K. *et al.* (2018) ‘Prevalence and predictors of injuries in Kenya: findings from the national STEPs survey’, *BMC Public Health*, 18(S3). Available at: <https://doi.org/10.1186/s12889-018-6061-x>.

Global Emergency and Trauma Care Initiative 2018 (no date). Available at: <https://www.who.int/news/item/08-12-2018-global-emergency-and-trauma-care-initiative> (Accessed: 2 January 2023).

Holder, Y. *et al.* (2001) ‘Injury Surveillance Guidelines’, *Who*, (1), pp. 1–91.

John, K., Faye, F. and Belue, R. (2019) ‘A descriptive study of trauma cases encountered in the Grand M’Bour Hospital Emergency Department in Senegal’, *Pan African Medical Journal*, 32, pp. 1–10. Available at: <https://doi.org/10.11604/pamj.2019.32.9.14550>.

Kare, A.P., Gujo, A.B. and Yote, N.Y. (2021) ‘Job Satisfaction Level and Associated Factors Among Rural Health Extension Workers of Sidama Region, Southern Ethiopia’, *Health Services Research and Managerial Epidemiology*, 8, pp. 1–7. Available at: <https://doi.org/10.1177/23333928211051832>.

Laytin, A.D. *et al.* (2020) ‘Patterns of injury at an Ethiopian referral hospital: Using an institutional trauma registry to inform injury prevention and systems strengthening’, *African Journal of Emergency Medicine*, 10(2), pp. 58–63. Available at: <https://doi.org/10.1016/j.afjem.2020.01.001>.

Macmillan, M. (2012) *Safety and health at work, Rehabilitation*. Available at: <https://doi.org/10.1177/146642407209200502>.

Negussie, A. *et al.* (2018) ‘Prevalence and outcome of injury in patients visiting the emergency Department of Yirgalem General Hospital , Southern Ethiopia’, *BMC emergency medicine*, pp. 1–5.

Osman, M. *et al.* (2016) ‘Magnitude and pattern of injuries in north Gondar administrative zone, northwest Ethiopia.’, *europemc.org* [Preprint]. Available at: <https://europemc.org/article/med/15227886> (Accessed: 3 January 2023).

- Peden M, Oyegbite K, Ozanne-Smith J, et al (2008) 'World Report on Child Injury Prevention - PubMed - NCBI', *Geneva: World Health Organization*. Edited by M. Peden et al., pp. 31–56. Available at: http://www.who.int/violence_injury_prevention/child/injury/world_report/World_report.pdf (Accessed: 2 January 2023).
- Polinder, S. *et al.* (2016) 'The economic burden of injury : Health care and productivity costs of injuries in the Netherlands', *Accident Analysis and Prevention*, 93, pp. 92–100. Available at: <https://doi.org/10.1016/j.aap.2016.04.003>.
- Rodney Smith (2021) *Unintentional vs. Intentional Injuries*. Available at: <https://study.com/academy/lesson/unintentional-injuries-vs-intentional-injuries-definitions-differences.html> (Accessed: 10 March 2023).
- Schuurman, N. *et al.* (2015) 'Intentional injury and violence in Cape Town, South Africa: An epidemiological analysis of trauma admissions data', *Global Health Action*, 8(1). Available at: <https://doi.org/10.3402/gha.v8.27016>.
- Seidenberg, P. *et al.* (2014) 'Epidemiology of injuries, outcomes, and hospital resource utilisation at a tertiary teaching hospital in Lusaka, Zambia', *African Journal of Emergency Medicine*, 4(3), pp. 115–122. Available at: <https://doi.org/10.1016/j.afjem.2014.01.006>.
- Seyoum, N. and Nega, B. (2014) 'Trauma in Ethiopia Revisited: A systematic Review', *East and Central African Journal of Surgery*, 18(2), pp. 108–118.
- Sultan, M. *et al.* (2019) 'Trends and barriers of emergency medical service use in Addis Ababa; Ethiopia', *BMC Emergency Medicine*, 19(1), pp. 1–8. Available at: <https://doi.org/10.1186/s12873-019-0242-5>.
- Tadesse, B. *et al.* (2014) 'Pattern of Injury and Associated Variables as Seen in the Emergency Department at Tikur Anbessa Specialized Referral Hospital, Addis Ababa, Ethiopia', *East and Central African Journal of Surgery*, 19(1), pp. 73–82. Available at: <https://www.ajol.info/index.php/ecaajs/article/view/102446>.
- Toluse, A. *et al.* (2016) 'Injury epidemiology at a trauma center in Southwest Nigeria', *African Journal of Trauma*, 5(1), p. 1. Available at: <https://doi.org/10.4103/1597-1112.195446>.
- Tyson, A.F. *et al.* (2019) *Hospital Mortality*.
- WHO (2010) *INJURIES FACTS*.
- WHO (2021a) *Injuries and violence*. Available at: <https://www.who.int/news-room/fact-sheets/detail/injuries-and-violence> (Accessed: 27 February 2023).
- WHO (2021b) 'THE INJURY CHART BOOK A graphical overview of the global burden of injuries Department of Injuries and Violence Prevention Noncommunicable Diseases and

Mental Health Cluster World Health Organization’, *International Classification* [Preprint].

Woldemichael, K. and Berhanu, N. (2017) ‘Magnitude and pattern of injury in jimma university specialized hospital, Southwest ethiopia.’, *Ethiopian journal of health sciences*, 21(3), pp. 155–65. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/22434995><http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC3275868>.

World Health Assembly, 72 (2019) ‘Emergency care systems for universal health coverage: ensuring timely care for the acutely ill and injured: draft resolution proposed by Argentina, Ecuador, Eswatini, Ethiopia, Israel, the European Union and its Member States and the United States of Amer’, (May), pp. 1–5. Available at: <https://apps.who.int/iris/handle/10665/329158>.

World Health Organization (2002) ‘The Injury Chart Book’, *International Classification*, p. 81.

World Health Organization (WHO) (2019) ‘Preventing injuries and violence: an overview’, *World Health Organization*, p. 14.

Yoseph, A., Tamiso, A. and Ejeso, A. (2021) ‘Knowledge, attitudes, and practices related to COVID-19 pandemic among adult population in Sidama Regional State, Southern Ethiopia: A community based cross-sectional study’, *PLoS ONE*, 16(1 January), pp. 1–19. Available at: <https://doi.org/10.1371/journal.pone.0246283>.

Annex

Participant Information Sheet& Consent Form.

My name is _____ am working as a data collector for the study being conducted in this hospital by Dereje Buche who is studying for his Master's degree at Hawassa university, the College of Health and Medical Sciences. I kindly request you to lend me permission to give information to this study.

Title of study: to assess pattern, outcome of injury and associated factors among emergency visitants in sidama regional general hospitals.

Purpose/aim of the study: The findings of this study can be of a paramount importance for the regional health bureau, for hospitals, health office to plan intervention programs and reduce injuries. Moreover, the aim of this study is to write a thesis as a partial requirement for the fulfillment of a Master's Program in emergency and critical care nursing for the principal investigator.

Risks and benefits: The risk of being participating in this study is time wasting, but the findings from this research may reveal important information for the local health planners which helps prevention and care of injury.

Procedures and duration: Participants are interviewed once and the interview may take about 20 minutes. So, I kindly request you to spare me this time for the interview.

Confidentiality: The information which we provide will be confidential. There will be no information that will identify patient in particular. The findings of the study will be general for the study community and will not reflect anything particular of individual persons or housing. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the research.

Contact address: If there are any questions or enquires any time about the study or the procedures, please contact: us through the address below.

Name	Address	Phone number	E mail
------	---------	--------------	--------

Dereje Buche	Hawassa	+251916158438	derejebuche@gmail.com
--------------	---------	---------------	--

Declaration of informed voluntary consent: I have read/ was read to me/ the participant information sheet. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality, the rights of participating and the contact address for any queries. I have been given the opportunity to ask questions for things that may have been unclear. I was informed that I have the right to withdraw from the study at any time or not to answer any question that I do not want. Therefore, I declare my voluntary consent to participate in this study with my initials (signature).

Name and signature of participant: _____ Date _____

Name and signature of Data Collector: _____ Date _____

Questionnaire

1.sociodemographic characteristics of patients

1.1. age

1.2. Sex: male----- female-----

1.3. residence: urban----- rural-----

1.4. marital status: 1. married 2. unmarried 3. widowed 4. divorced

1.5. occupation: 1. farmer 2. Civil servant 3. Student 4. Merchant 5. Housewife 6. Unemployed

1.6. religious: 1. orthodox 2. Protestant 3. Muslim 4. Others

1.7. time of injury: AM ----- PM-----

1.8. ethnic group 1. Sidama 2. Amhara 3. Oromo 4. Wolaita 5. Other (specify)

1.9. Educational status 1. Illiterate 2. Read and write 3. Primary school 4. Secondary school 4. College and above.

1.11 duration of chief complain _____

1.12 drug uses _____

1.13 uses of alcohol_____

114. chronic disease yes____ no_____

2. injury profile

2.1. Intent of injury 1. Intentional..... 2. Unintentional.....

2.2. mechanism of injury

1. RTA 2. Homicide 3. Fall 4. Burn 5. Poison 6. Suicide 7. drowning 8. Work related 9. Violence 10. Gunshot 11. Other

2.3. place of injury 1. Street 2. Workplace 3. home 4. School 5. Other

2.4. activities 1. Working 2. Travelling 3. Playing

2.5. type of users 1. Pedestrian 2. Driver 3. passenger 4. others

2.6. cause of assault 1. Quarrel 2. Robbery 3. Alcohol 4. others

2.7Triage Categories

1. Red 2. Orange 3. Yellow 4. Green

2.8 Referral source 1. Self. 2. Health center 3. Private clinic 4. Governmental hospitals

2.9 GCS scale

- a) Mild
- b) Moderate
- c) severe

2.9 Duration of hospitalization

- a) Less than one day
- b) 1-7days
- c) >7days

2.10 Means of EC arrival

- a) Taxi
- b) Ambulance
- c) Private car
- d) On foot

2.11 Time from injury to hospital arrival.

- a) ≤ 1 h
- b) 1–6 h
- c) >6 h

2.12 distance from site of injury to hospital

- a) ≤ 10 km
- b) 11–100 km
- c) >100 km

1.13. pre hospital care

- a) yes _____
- b) no _____

1.14 first aid

- a) yes _____
- b no _____

3. clinical information of injury

3.1. region of body injured 1. head 2. chest 3. Abdomen 4. neck 5. Upper extremities 6. Lower extremities 7 other

3.2. nature of injuries 1. dislocation 2. fracture 3. Bruise 4. Skin laceration 5. Cut 6. Internal organ damage 7 bodily burn 8. Others

3.3. Diagnosed by 1= X-ray 2= history and physical examination 3= CT – scan 4=others (specify)

3.4. If fracture which bone 1= ulna 2=radius 3= humerus 4= femur 5=tibia 6=hip bone 7= rib 8=others(specify)

3.5. degree of injured 1. No apparent injury 2. Minor 3. Moderate 4. Severe

3.6. Disability Yes ----- No-----

3.7. Disability status 1. Unable to walk at all 2. Walk with a limp 3. Unable to use hand or arm 4. Other

3.8. outcome 1. Treated and 2. admitted to surgical ward 3. Admitted to ICU 4. Referred 5. Died

