ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF BIOMEDICINE AND LABORATORY SCIENCES,

DEPARTMENT OF ANATOMY

Prevalence of Burn Injury, Patterns, and its Associated Factors among Burn Patients attending Yekatit 12 Hospital Medical College and AaBET Hospitals. A Two-year Retrospective study

BY: MELKAMU TEWABE

A thesis submitted to the Graduate Program of Addis Ababa University, College of Health Sciences, School of Biomedicine and Laboratory sciences, Department of Anatomy in partial Fulfillment of the degree of Master of Science in Anatomy

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Master of Science (MSc) in Anatomy

Thesis Submission Form

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ABBREVIATIONS AND ACRONYMS

ABA:	American Burn Association
AaBET:	Addis Ababa Burn, Emergency, and Trauma
AOR:	Adjusted odds ratio
CI:	Confidence interval
COR:	Crude odds ratio
DRERC:	Department Research Ethics Review Committee
DALYs:	Disability-adjusted life-years
EDHS:	Ethiopian demographic and health survey
EPHI:	Ethiopian Public Health Institute
HIT:	Health Information Technology
LMIC:	Low- and middle-income countries
LOS:	Length of stay
PI:	Principal investigator
SPSS:	Statistical package for social science
TBSA:	Total body surface area
WHO:	World Health Organization
Y12HMC:	Yekatit 12 Hospital Medical College

SUMMARY

Background: Burn is an injury to the surface layers of the body caused by agents such as fire, scald, electricity, chemicals, sunlight, or nuclear radiation. Burn injuries remain a major health concern, especially in low-resource settings with high morbidity and mortality rates. Comprehensive burn patterns and epidemiology data in developing countries like Ethiopia are limited. Thus, this study reflects the recent patterns of burn injuries at Yekatit 12 Hospital Medical College and Addis Ababa Burn, Emergency, and Trauma hospitals in Addis Ababa.

Objective: To evaluate the prevalence, patterns, and associated factors of burn injury among burn inpatients admitted at Addis Ababa Burn, Emergency, and Trauma hospital and Yekatit 12 Hospital Medical College from April 1st, 2023, to March 31st, 2025.

Method: A hospital-based retrospective cross-sectional study was conducted using a stratified sampling technique. Data was gathered using a systematic checklist that was taken from the national burn patient medical record formats. EpiData version 3.1 was used to enter the data, while SPSS version 27 was used for analysis. The factors linked to burn injuries were described using logistic regressions, chi-square tests, and descriptive statistics. The results were represented using the Crude Odds Ratio (COR) and Adjusted Odds Ratio (AOR) with a 95% confidence interval (CI)

Results: Among trauma patients, the prevalence of burn injuries was 15.92%, with 45.3% being hospitalized. Most patients were aged<15 years (55.5%) and male (54.7%). Hot fluids/Scald (56.9%) and flame (21.9%) burns were the commonest causes, frequently affecting the upper extremities (60%). Second-degree burns (60.6%) and injuries involving <10% total body surface area (48.2%) were the most common clinical findings. By Multivariate regression analysis, burn depth (AOR=0.011 for second-degree, $p<0.032$) and total burned body surface area (AOR≈0 for <30%, $p<0.0001$) were identified as significant predictors of complications. Among 137 burn patients, 73% discharged without complications, while 14.6% had scar of contracture, 8% disability, and 4.4% mortality.

Conclusion: Burn injuries unevenly affect children and are mostly caused by preventable household incidents. The extent and depth of burns significantly predict the severity of complications, indicating the need for targeted prevention programs and enhanced care capacity. These results recommend improved burn care protocols and public education to decrease the burden of burn-related morbidity.

Keywords: Burn injuries, prevalence, associated factors, Ethiopia

1. INTRODUCTION

1.1. Background

The World Health Organization (WHO) describes a burn as “an injury to the skin or other bodily tissue mainly caused by heat, but can also result from radiation, radioactivity, electricity, friction, or exposure to chemicals” (1).

Burn injury occurs when the body's outer layers are damaged by heat, radiation, chemicals, or electric current. The skin, which is the largest organ in the body, accounts for about 16% of the body's total weight. The thickness, color, and presence of hair, glands, and nails on it vary depending on the site of the body parts. The skin has two main layers: the epidermis, which is the outer surface, and the dermis, the deeper layer. Between the skin and the tissues underneath, there is a layer of fat and connective tissue called the hypodermis (2).

The degree of burn injury is determined by the depth of damage to the body's surface layers. A first-degree burn affects only the epidermis. Second-degree burns damage the papillary and reticular layers of the dermis (3). Third-degree (full-thickness) burns destroy the dermis, epidermis, and subcutaneous tissue, resulting in permanent damage. A fourth-degree burn is when a burn extends deep into the muscles or bones (2, 4).

Estimating the total body surface area (TBSA %) is crucial for the initial management of burn patients. In adults, the extent of burns is generally estimated as a percent using the technique called the rule of nine, which assumes that individual body regions represent 9% (or a multiple of it) of the total body surface area. But in children, we use the Lund and Broder chart because it provides a more accurate estimate of total body surface area (TBSA) affected by burns. Another useful rule (rule of palms), which states a patient's hand breadth represents 1% of the TBSA, is used in smaller scattered burns (3).

There are four main Causes of burn injuries: Thermal injuries account for about 90% of all burns. They can be caused by hot liquids, flame, or radiant heat, or direct contact with a hot object. Electrical injuries cause nearly 5% of all burns. The heat is generated when electricity passes through the tissues that are poor conductors, damaging the surrounding tissues (4,5).

Chemical injuries cause approximately 3% of burns. Chemicals are usually classified into acids or alkalis. Harmful radiation is caused by alpha (α), beta (β), and gamma (γ) rays, with no, less, and higher penetration, and damage to the keratin layer of the skin, respectively. Alpha particles cause damage upon ingestion or inhalation. (5).

Globally, 11 million burn injuries occur each year, with 180,000 of these leading to death. The majority of burns happen in low- and middle-income countries, with nearly 70% occurring in the WHO African and South East Asian regions. For instance, over 1 million people in India are moderately or severely burned annually. It is also reported that most burns take place at home (among females and children) and in the workplace (primarily adult males). A community survey in Ethiopia and Bangladesh indicates that 80 to 90% of burns happen at home (6).

Regionally, the African continent bears a significant burden of burn injuries each year. For instance, in South Africa, an estimated 1.6 million burn injuries occur annually (7).

In Ethiopia, the Ethiopian Health and Demographic Survey (EDHS) reports that burn injuries account for 8.7% of all significant injuries. Additionally, a study by the Ethiopian Public Health Institute (EPHI) states that burns make up 1.5% to 9% of all injuries across all age groups, with a higher incidence in the pediatric population, where burns account for 4% to 15% of all injuries. (1,8).

1.2. Statement of the problem

Even though burn injuries are reducing in developed nations, their prevalence is still high, with around 90% of them occurring in low- and middle-income countries. There is high variability in the incidence of burn injury. For instance, the number of burn-related mortalities per 100,000 population ranges from 14.53 in Côte d'Ivoire to 0.02 in Malta. (9).

Burns are a major public health problem globally, causing around 265,000 deaths annually from fires only. 96% of fire-related deaths occur in low- and middle-income countries, and burns are among the leading causes of disability-adjusted life-years (DALYs) in developing countries (10).

It has been repeatedly disclosed that even in the United States of America, Twenty percent of people live more than two hours distant from a burn center by either of air or ground transportation, making it difficult for them to receive specialized burn care (11).

According to a study conducted in eight burn hospitals in Africa, Asia, and Latin America, Burn injuries are a major problem in LMICs, as evidenced by the fact that the Dhaka center in Bangladesh handles about 5000 severe burns annually, of which about 1000 die(12).

Along with poisoning and drowning (34.1%), burns rank among the top three "unintentional fatal injuries" in the European Union. According to reports, one in 1,442 Americans lost their lives as a result of fire, flame, and smoke-related injuries.(13).

According to a study done in Dire Dawa City, burn injury was the 4th common cause of traumatic injuries, next to conflict, road traffic accidents, and falls, with the majority of the victims being females (14). With an average death rate of 17%, or one in five burn victims, the severity of burn injuries and the mortality rate vary among sub-Saharan nations. In many African countries, such as Togo (24.6%), Malawi (27%), and Ethiopia (11.6%), the mortality rate is higher than the average(15).

Many studies have shown that acute burn patients demand a high length of stay (LOS) in the hospital, resulting in a huge impact on costs of care, and a significant physical, psychological, and economic burden on the burned victims and their families, producing suffering and having an impact on one's quality of life, mental health, capacity to resume employment, and eventual death(9,16).

Over 8 million disability-adjusted life years (DALYs) are attributed to burns, making them one of the most common causes of disability globally. In South Africa, burn injuries are projected to cost US$26 million a year, not including indirect expenses from lost pay, long-term care for deformity and psychological stress, and the contribution of family resources, which also indirectly affects socioeconomic outcomes(17).

The information that is currently accessible on burn epidemiology is inconsistent and changeable, despite the fact that it is essential for resource allocation and prevention. The majority of the data originates from high-income nations and is directly tied to environmental differences, healthcare system resources, and access to healthcare resources. In lower-income countries, data collection and access to healthcare are restricted by inadequate resources, regional limitations, and high expenses(11).

Burn injury is given little attention in Ethiopia, and its epidemiological pattern is not clea. For the prevention and treatment of burn injuries, prompt and adequate knowledge is essential. Besides this, most previous research did not provide enough information about its burden relative to other traumatic injuries in their study. To the best of our knowledge, in Y12HMC and AaBET hospitals, no conjoint research has been done about the prevalence, pattern, and associated factors of burn injury. These reasons made me interested in doing my research in these hospitals.

1.3. Significance of the study

The results of this study aid in interventions intended to prevent burn injuries and manage factors associated with them in the study areas by highlighting the social determinants of health that contribute to the occurrence and severity of burn injuries. It provides information for hospital administration, staff, and similar environments. The results also give background knowledge and baseline information for future researchers.

2. LITERATURE REVIEW

2.1. Socio-demographic factors

In eight burn centers in Africa, Asia, and Latin America—Cairo, Nairobi, Ibadan, Johannesburg, Dhaka, Kathmandu, Sao Paulo, and Guadalajara—a cross-sectional study was conducted in 2014 and 2019. Across all centers, 15,344 patients were admitted; 60% of them were men and 40% were women, with children accounting for 36% of burn cases. In Dhaka (75.5%), Kathmandu (75%), and Sao Paulo (86.5%), adult burn admissions were significantly greater than those for children. In Guadalajara (76.5%), Johannesburg (66%), and Nairobi (56.5%), the proportion of burn admissions for children was significantly greater than that for adults. The majority of burns occurred in rural areas in Dhaka (73%), whereas the majority occurred in urban areas in Nairobi (81%), Guadalajara (79.5%), Cairo (86.5%), and Ibadan (78%). Household burns were the most prevalent in all centers (36% to 79%). Additionally, occupational burns were prevalent in Kathmandu (37%) and Dhaka (32%). In Dhaka, burns also occurred outside of homes and workplaces (24% in 2014 and 27% in 2019)(12).

Gender-based research done in the USA from 17 countries in South America, Africa, and Asia shows females (62%) were injured more than males (38%), and the age range 19_49 carries the highest load of burn injury, followed by <5 children, accounting for 41.4% and 26.9% respectively. Flame (47.4%) and scald (36.4%) were the commonest etiology of burn, with the upper extremity found to be the major anatomic location involved. Males stay longer in the hospital, with a median of 5.3 days, than females (4.7 days), and 0.67% of deaths were recorded in the study (18).

According to age group, the prevalence of burns in the US is bimodal, with young children (particularly toddlers) accounting for 24% of burns and those between the ages of 20 and 59 for 55%. The most frequent cause among those older than five is flame. Children under the age of five are more likely to sustain scald burns. 75% of burns happen at home, whereas 13% happen at work. Approximately 95% of burns are unintentional, 2% are caused by maltreatment, and 1% are self-inflicted(19).

A retrospective cross-sectional study conducted from 2011 to 2015 at Ayder Comprehensive Specialized Hospital indicates that among 382 pediatric burn patients, the majority, 235 (61.5%), were male. The average age of the children was 5.564 years. Of the burn patients, 236 (61.8%)

were from urban areas, while 146 (38%) were from rural areas. All discharged children with complications (30.8%) were from rural areas (20).

Fifty-two (51%) of the 102 pediatric burn patients that visited Felege Hiwot Referral Hospital between 2011 and 2016 were from urban regions, and the majority of the victims were female (64, 62.7%). 34 people (33.3%) were between the ages of 7 and 13, with a mean age of 9.56 years. Massive flame injuries with a mean extent of 70% TBSA were the cause of all deaths, with an overall mortality rate of 2.8%(21).

According to a survey done at the Hiwot Fana Hospital in Harar, the majority of burn damage patients (51.5%) were younger than 15, followed by those between the ages of 15 and 60 (46.3%), and those beyond 60 (2.2%). The majority of patients (67.2%) were single, and there is a small female predominance (51.5%) over men (48.5%). The remaining individuals were either divorced (3.0%), widowed (0.7%), or married (29.1%). Both urban and rural areas accounted for the same percentage of patients (50%) (15).

A retrospective cross-sectional study carried out at Jimma University's Burn Unit revealed that more than half (51.6%) of the victims were females. The average age of the patients was 17.0 years, and two-thirds (67.7%) came from rural areas. The majority of burn injuries (62.1%) happened at home. The most frequent risk factor for burns was epilepsy (17.7%), and four individuals had intentional burns (22).

In a prospective study done at AaBET hospital, with a male(53.3%) and age <15 years old dominance being a student(24%), housewife, and farmer(each 10.7%) were highly associated factors for the occurrence of burn injury. The majority of it occurs at home (72%), and epilepsy was the most common comorbidity and/or predisposing condition identified in the study. In the study, most patients had a TBSA of >20%, and flame burn (40%) was the commonest cause of inhalational injury diagnosed in 10.7% of the patients (23).

A retrospective analysis of 241 patients at AaBET Hospital reveals that the male-to-female ratio was 1.23:1, with 132 (55.2%) of the patients being male and 108 (44.8%) being female. With a mean age of 18.22 years, the patients ranged in age from 5 months to 77 years. Adults (132, 54.8%) were the most affected age group, followed by children (105, 43.6%) and people over 60 (4, 1.6%).

With the exception of the elderly, men outnumber women in every age category. The majority of patients are from Addis Ababa (89, 36.9%) and the Oromia area (123, 51%) (24).

A study done at 5 public hospitals in North Shewa shows that 408 participants participated in the research, and 44.9% were men. 30.1% of research participants were married, while 68.3% were single. The majority were students (20.7%) and government workers (21.5%). When the burn occurred, the majority of individuals (89.5%) were at home (17).

2.2. Clinical factors

According to the National Burn Repository 2019, the American Burn Association (ABA) reports that most injuries in the USA are caused by flame burns (41%), with scalds second at 31%. Electrical (3.6%) and chemical (3.5%) burn injuries occur less commonly. Children under the age of five are more likely to sustain scald burns, and the number of burns caused by flames rises with age (9).

Hot liquid and flame burns were the most common type of burns in all eight burn centers in Asia, Africa, and Latin America between 2014 and 2019, according to a repeated cross-sectional study. Across the centers, the percentage of patients with more than 20% TBSA varied from 19% to 81%. With the exception of Cairo, where it fell from 58% to 31%, and Ibadan, where it fell from 66% to 43%, patients with TBSA of more than 20% remained stable between 2014 and 2019. Although incidental burns accounted for 63–97% of burn admissions, assault (21%) and intentional self-harm (11%) also contributed significantly to burns in Nairobi (12).

The 17-year retrospective analysis of 17939 patients in China reports that Burns were mostly caused by scalding, which accounted for 48.0% of all cases, and flame burn followed by 44.0%. Electrical (6.8%), chemical (0.2%), and other types of burns (1.1%) share the remaining cases. The major anatomic sites of burn injury in every adult patient who was at least 18 years old were

extremities (70.3%), head and neck (47.5%), and trunk (38.9%); whereas in pediatric patients, limbs account for 66.3% followed by trunk 49.9% and head/face/neck 40.1%. 13.64 ± 16.83% was the average total body surface area (TBSA), between 0.1–100 percent. Patients with TBSA of 0–10% and 11–20% were 62.97% and 19.49% of all cases, respectively. 4.87% of patients had TBSA> 50% (13).

A cross-sectional study conducted in Saudi Arabia reported that the most frequent causes of burn were hot water (58.5%) and flame fires (32.1%), followed by sunlight (3.6%), electrical shock and chemicals (2.7%), and extremely cold temperatures (0.3%). The most common site of burns was the hand (56.9%), followed by the arm (12.4%), leg (9.6%), foot (6.6%), back and buttocks (4.8%), and chest (2.5%). The size of burns in 47.3% of cases was 5 - 10 cm, less than 5cm in 29.9%, more than 10 cm in 10.75%, and 12.1% was not known. Epidermal burns were diagnosed in 71.7%, second-degree in 25%, third-degree in 2.2%, and fourth-degree in 0.5% of all patients (25).

A study done in Nepal on 284 Hospital-admitted burn patients shows that, with 185 cases (65.2%), flame burns were the most frequent cause of burn injuries. There were 56 instances (19.8%) and 37 cases (13.4%), respectively, caused by electric burns and scalds. Burn sufferers' TBSA% varies from 1% - 95%. In the study, 40 (14.1%) patients had TBSA burns greater than 40%, while 155 (54.6%) patients had burns less than 15%. With a mean hospital stay of 26 days, the patients with electric burns had the longest hospital stays among the survivors. Over the course of the two years, 72 people (25.4%) passed away while in the hospital (26).

A cross-sectional descriptive study in Kenya shows that scald was the most common cause of burn (76%), followed by flame (21%), with the rest (3%) being electrical and frost burns. The most common burn sites were the lower limbs (20%), upper limbs (26%), and trunk (36%), with a notable combined incidence. 26% of patients had third-degree burns, while 152 patients (74%) suffered second-degree burns. 13.7% patients presented with comorbidity, most commonly with systemic infection (28%), substance abuse (20%), epilepsy (16%), trauma (12%), and others like mental illness, hydrocephalus, and developmental disorders (8%). A hospital stay could last anywhere from two days to 203 days, with a median duration of 16 days. 9.3% of the patients died as a result of burns (27).

According to a study conducted at AaBET hospital, flame burn was a prominent cause of burn injuries in female patients, whereas electrical and scald burns were the leading etiology of burn injuries in males. The upper extremity is the most affected body part involved in 63.1% of the patients, followed by the Lower extremity (56%), anterior trunk (45.6%), face (24.5%), posterior trunk (21.6%), neck (17.8%), Head (12.4%), and genitalia (5%). More than 2 body regions were involved in around 3/4th of the cases. Superficial partial burn was diagnosed in 39.8% of patients,

followed by Third-degree (32%), deep partial (27.8%), and superficial burn (0.4%). The mean TBSA% was 15.49% and ranged from 1% to 64% (24).

Another Study at AaBET hospital on children <14 years old burn patients shows Hot fluids burns share 50.8% of the injury causes, and 93.8% of the injuries happened at home. Second-degree burns were the most frequent clinical diagnosis examined in 83% of victims. The most commonly burned body regions were the Lower limbs (47%). Over 70% of the victims had burns covering 20% of their body surface area. Intentional burns were recorded in 1.2% of victims. 24.73 days was the mean hospital stay, which ranged from 1 day to 164 days. 3.1% of the victims died during the study period (28).

A community survey done on 651 households in three districts of Amhara, Oromia, and southern Ethiopia revealed that of the 23 individuals who experienced a burn, the majority were female (14, 60.9%) and children under five (14, 60.9%). The main causes of burn injuries were heat, flame, and hot liquid water (89.7%), and all 23 burn incidents happened at home (1).

A study at Jimma Medical Center on 124 burn patients revealed, 61.3% of the burn patients sustained second-degree burns, 31.5% of them had full-thickness burns, and 4.8% of them had first-degree burn. 93.5% of the patients face extremity burns, of which the upper limb accounted for 67.7%. More than half (55.67%) of the patients had a burned surface between 10% and 20% of TBSA. Most of the patients stayed for around one month, and 4 patients passed away (22).

Previous research in Y12HMC states hot water is the major cause of burn (35.5%), more than electricity 30.6%, firewood 16.1%, gas 11.3%, and others (stove) 6.5%. Almost all patients presented with either second-degree (56.5%) or third-degree (43.5%) burns. A total surface area of burn >25% was measured on 38.7% of the victims. 62.9% of patients stay in the hospital for <30 days, and the rest (17.7%) spend between one and two months, 12.9% stay more than three months, and 6.5% wait between two and three months (29).

In another study in Y12HMC with 184 burn hospitalizations, Flame burns accounted for most (35.8%) of burns, followed by scald (35.1%), electrical (27.8%), and others(< 0.01%). The average total body surface area (TBSA) burned was 19.8% and the mortality rate was 13.3% (30).

2.3. Post-traumatic factors

A systematic review of the epidemiology of burn injury around the world reported that the number of burn patients per year ranges from 101–205, and burn-related mortality was 18.27 %. The highest percentage of deaths was noted in Africa (23.5 %), which is higher than the global comparison (18.27 %), followed by Europe (12.40 %), South and Middle America (10.60 %), Australia (7.5 %), Asia (6.76 %), and North America (5.0 %) (31).

The average length of hospital stay decreased in all eight burn centers in Africa, Asia, and Latin America between 2014 and 2019. The median was between 6 and 26 days, and the mean values were between 11 and 33 days. Compared to other locations, Nairobi and Dhaka have longer average hospital stays. The centers' death rates ranged from 5% to 42%. In Guadalajara, Johannesburg, and Sao Paulo, fewer than 10% of patients admitted with burns died. Between 2014 and 2019, the percentage of burn-related mortality in Cairo and Ibadan decreased by 7 and 20 percentage points, respectively (12).

From the 17939 burn patients studied in China, a burn with an inhalation injury was confirmed in 543 patients (3.02%), with the lowest occurrence rates in pediatric patients (0.8%). The mean LOS was 32.11 ± 65.72 days (median: 17 days). Male patients were found to stay in the hospital for an average of nine days longer than female patients. Patients with electrical and flame burns were hospitalized for a mean of >20 days longer than those with chemical, scald, and other burns. 145 deaths were recorded, for a mortality of 0.81% (13).

A systematic review of burn injuries in sub-Saharan Africa found that the mean total body surface area (TBSA) recorded in 30 studies was 17.3%, ranging from 4 to 70% per study. The proportion of deaths was 13.1%. The average length of stay documented in 24 studies was 24.7 days for all patients (32).

Of the 241 patients studied at ABeT Hospital, twelve burn victims (5%) had associated injuries. Among them, three individuals (1.2%) suffered from blunt chest trauma, three (1.2%) had extremity fractures, and six (2.5%) experienced mild head injuries. Furthermore, comorbidities were present in 7.5% of all burn victims, with 13 patients (5.4%) having epilepsy. Pregnancy (3 patients, 1.2%) and hypertension (2 individuals, 0.8%) were additional comorbidities.

Patients admitted to the burn ward typically stay for 39.6 days (ranging from 1 to 175 days). Regarding discharge status, 78.4% were released without complication, 14.9% had some discharge complications, and 6.6% passed away (24).

In the six-year study in China, 1126 patients were included: 803 (71.3%) male and 323 (28.7%) female patients. The most common cause of burns was scalds (476, 42.27%), followed by fire (457, 40.59%). The lower limbs were the most frequently affected areas, followed by the trunk. The median length of stay in the hospital was 30 days. The mortality rate was 14.21% (33).

Among 134 burn patients studied in Harar, 4 patients had associated injuries, with 2 of them having traumatic brain injury, while the other 2 patients sustained fractures and chest trauma independently. 50% of burn patients spent fewer than 20 days in the hospital, 17.2% between 40 and 60 days, 29.1% (between 20 and 40 days), and 3.7% longer than 60 days (15).

Of the 420 study participants from five government hospitals in North Shewa, 79% experienced burns covering less than 21% of their total body surface area (TBSA). Most patients had first-degree burns (71.6%), 27.5% sustained second-degree burns, 1% of them suffered from third-degree burn injuries. Additionally, 22 of the burn incidents were related to epilepsy. Of those admitted to the hospital, 75.2% stayed for less than fifteen days. The study indicated that 40.9% of burn patients were discharged with adverse complications. The main complications included 12 (8%) deaths, 22 (15.3%) cases of disability, and 112 (76.7%) instances of contractures (17).

2.4. Conceptual framework

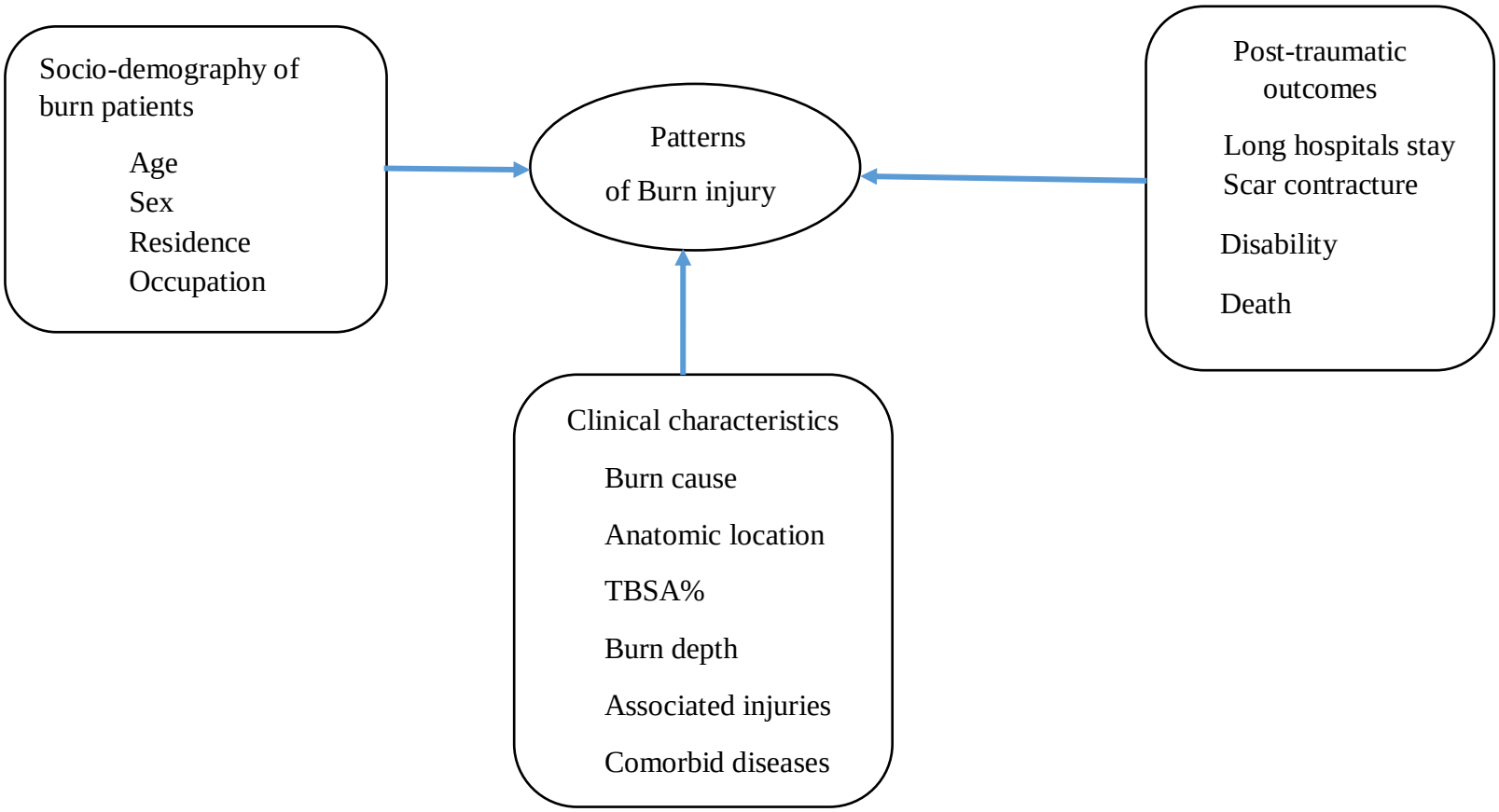

***Figure 1**: A study framework on the prevalence, patterns, and associated factors of burn injury among burn patients (based on the literature review).*

3. OBJECTIVES

3.1. General objective

- To evaluate the prevalence of burn injuries, patterns, and associated factors among burn patients attending Y12HMC and AaBET Hospitals from April 1, 2023, to March 31, 2025, in Addis Ababa, Ethiopia.

3.2. Specific objectives

- ✓ To assess the prevalence of burn injury among patients attending Y12HMC and AaBET Hospitals from April 1, 2023, to March 31, 2025, in Addis Ababa, Ethiopia.
- ✓ To determine the patterns of burn injury among patients attending Y12HMC and AaBET Hospitals from April 1, 2023, to March 31, 2025, in Addis Ababa, Ethiopia.
- ✓ To identify factors associated with burn injury among burn patients attending Y12HMC and AaBET Hospitals from April 1, 2023, to March 31, 2025, in Addis Ababa, Ethiopia.

4. METHODS AND MATERIALS

4.1. Study Area and Period

The study was conducted at Y12HMC and AaBET Hospitals in Addis Ababa, Ethiopia. Yekatit 12 Hospital Medical College (Y12HMC) was established in 1923 and is among the well-recognized hospitals in Addis Ababa. The hospital offers many preventive, curative, and rehabilitative health services for approximately 4 million people, and as well as serving as a teaching hospital. It has 9 departments, 6 units, and 265 beds. It is the first and one of two hospitals in Addis Ababa with a specialized burn unit in addition to the Addis Ababa Burn, Emergency, and Trauma (AaBET) Hospital. It has served as the main referral hospital for the treatment of burn patients since 2000. Whereas, AaBET Hospital is the burn, trauma, and emergency wing of St. Paul's Millennium Medical College. AaBET Hospital started working in July 2016 to provide tertiary-level referral and treatment for emergency, trauma, and burn cases. It has 250 beds and serves around 7000 patients annually. The burn unit of each hospital has 19 beds (12 for adults and 7 for pediatrics) and one operating room. The burn units at Y12HMC and AaBET Hospitals are led by their exclusive plastic and reconstructive surgeons with (10&8) residents, (5&6) senior plastic surgeons, (6&6) general practitioners, (14&22) nurses, and (6&9) other staff members working under them, respectively. All burn patients arriving at the hospital will first be seen at the burn outpatient or emergency department and will be admitted to the burn unit if they meet admission criteria.

The study was conducted from May 10, 2025, to June 3, 2025.

4.2. Study design

A hospital-based retrospective cross-sectional study was conducted.

4.3. Population

4.3.1 Source population

All burn patients attended Y12HMC and AaBET Hospitals from April 1, 2023, to March 31, 2025.

4.3.2 Study population

All burn patients who attended Y12HMC and AaBET Hospitals from April 1, 2023, to March 31, 2025, and fulfilled the inclusion criteria.

4.4. Inclusion and exclusion criteria

4.4.1 Inclusion criteria

- All burn patients who attended Y12HMC and AaBET Hospitals are registered in medical record folders, and whose records are available in the patient card room.

4.4.2 Exclusion criteria

- Patient cards with incomplete information on any variables under study during review.
- Patients treated on an outpatient basis.
- Patients transferred to other health facilities.
- Self-discharged patients

4.5. Sample size determination

A single population percentage formula was used to determine the sample size, taking into account the following presumptions: p = 8.9%, prevalence of burn injuries among traumatic injuries at Dilchora Hospital in Dire Dawa (14)

$$n = \left(\frac{Z\alpha}{2}\right) 2 \ p(1-p)/d2 \ ,$$

Where; n = the minimum sample size required, d = Margin of error = 5%, Zα/2 = Standard normal value at (1- α) =1.96

n= $(1.96)^2$ ×0.089(0.911)/ $(0.05)^2$

n=124

With a 10% contingency for data incompleteness, 137 patients' medical record cards were included for the final sample size to represent the 915 inpatients who attended the two hospitals from April 1, 2023, to March 31, 2025.

4.6. Sampling procedure

Stratified sampling was used to choose burn victims. First, the total number of burn inpatients treated between April 1st, 2023, and March 31st, 2025, was determined and categorized by the hospital in which they were treated. The sample size was then distributed proportionately to each hospital according to the actual number of burn inpatients that were treated there. Lastly, a systematic sampling technique was used to choose eligible patients from each hospital (Figure 2).

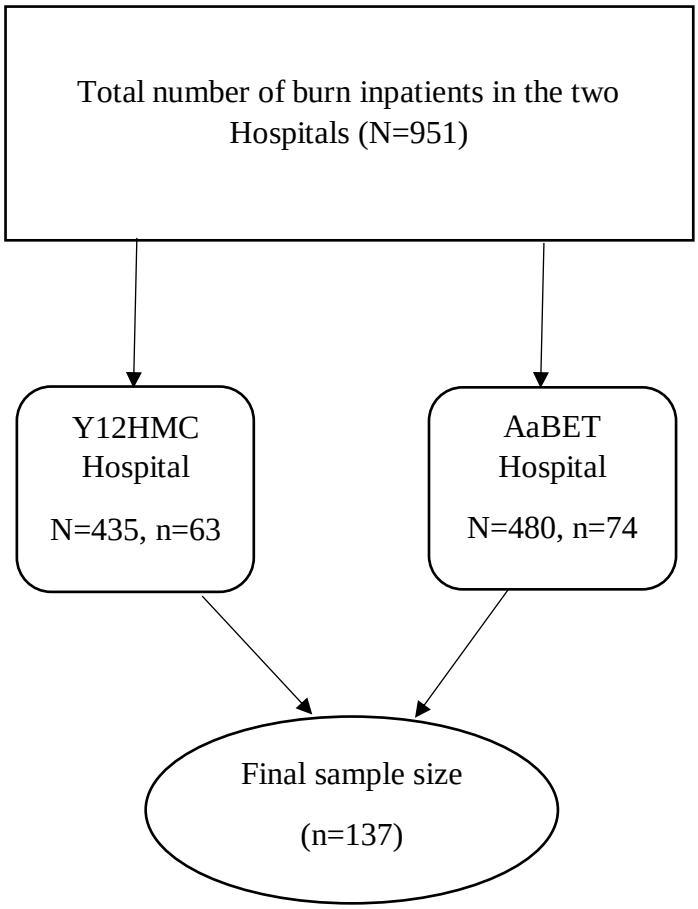

***Figure 2**: Sampling procedure for a study: prevalence, patterns, and associated factors of burn injury on burn inpatients attended Y12HMC and AaBET hospitals, Addis Ababa, Ethiopia, 2024/25*

4.7. Data Collection Methods

4.7.1 Data collection instrument

A structured questionnaire that was adopted from national burn patients' medical record formats (patient cards) that fit the study criteria was used to gather data. The medical records of the burn victims are written on the checklists, which were created in English. They include data on post-traumatic aspects, clinical issues, and Sociodemographic situations. In order to adjust the questionnaire's content, a pretest was conducted on 5% of the burn patients' medical records at Menelik-II hospital before data collection. After that, the patient's medical record was reviewed to extract the data.

4.7.2 Data collectors

Two trained BSc nurses carefully extracted data from patients' medical records during the collection period. A half-day course on the data collection tools, ethics, and how to examine and manage medical records was given to the data collectors. The principal investigator closely supervised the data collection process and checked the filled data daily to identify and correct errors early.

4.7.3 Data collection procedure

The task of extracting the two-year recorded data from the cards of the burn patients given to each data collector. The patient's chart was traced based on their medical record number. The data collection process was carried out under the close supervision of the principal investigator.

4.8. Study Variable

4.8.1 Dependent variable

- Prevalence of burn injury
- Patterns of burn injury

4.8.2 Independent variables

- Patient sex, age, residence, occupation, marital status
- Degree of burn, Extent (TBSA) of burn
- Prior medical cases/comorbidity
- Burn cause
- Anatomical site of burn injuries
- Length of hospital stay
- Disease, disability, death

4.9. Operational definitions

TBSA: A calculation that uses the Lund and Browder estimating method to determine the proportion of the total body surface area that is affected by burn exposure and injury.

Comorbidity: the presence of preexisting systemic disease/infection, substance abuse, epilepsy, trauma, and others, like mental illness, hydrocephalus, and developmental disorders.

Discharge with complication: when a patient's documentation indicates that they were released with a contracture, disfigurement, amputation, or death.

4.10. Data quality control

Questionnaires were prepared in English and pre-tested on 5% of the study participants. Data collectors were informed on how to handle incomplete recordings and how to take and trace back patient cards in order to prevent problems during the review. The medical record unit's two Health Information Technology (HIT) employees helped data collectors locate and replace the tracer cards. Every day, there was close surveillance while the data was being collected. Epi-Data version 3.1 was used to enter the data.

4.11. Data processing and analysis

The gathered information was manually examined for errors and inconsistencies. Epi-Data version 3.1 was used to enter the data, while SPSS version 27 was used for analysis. The study population was described using descriptive statistics (frequency and percentage). The chi-square test and bivariable logistic regression were used to evaluate the statistical relationship between independent and dependent variables. A predictor in the bivariable analysis was deemed a candidate for multivariable logistic regression analysis if its P-value was less than 0.25. A multivariable logistic regression analysis was used to find variables associated to burn patients' discharge status. The association was reported using the adjusted odds ratio (AOR) (95% CI), and a P-value of less than 0.05 was considered significant.

4.13. Ethical Consideration

The study protocol was authorized by the department research ethics review committee (DRERC) of the Anatomy Department before conducting the study. The Y12HMC and AaBET hospital administrations received formal letters of authorization from the department. The heads of the hospitals provided written, signed, informed, and voluntary permission. Additionally, the head of the medical record unit and case team leaders received a circular official approval letter from the hospital. The purpose of the study and their right to facilitate or participate in it were explained to the employees of the medical record unit. To protect secrecy and privacy, records were examined in a different location.

4.14. Information dissemination

The findings of this study will be submitted and presented to Addis Ababa University College of Health Sciences, School of Biomedicine and Laboratory Sciences, Department of Anatomy. Additionally, the results will be submitted to Y12HMC and AaBET Hospitals. The findings will be presented at scientific conferences and published in a reputable national or international peer-reviewed journal.

5. Result

5.1 Prevalence of burn injury

During the two-year period, a total of 16,624 trauma patients visited Y12HMC and AaBET Hospitals. Of these, 2021(15.92%) patients sustained a burn injury (Table 1), and 915(45.3%) of them were treated as inpatients in their respective burn units.

***Table 1**: Prevalence of burn injury among trauma patients attending Y12HMC and AaBET Hospitals from April 1, 2023, to March 31, 2025*

Hospitals	Trauma patients			
	RTA	Non RTA	Burn	Total
Y12HMC	1320	5965	986	8271
AaBET	2377	4941	1035	8353
Total	3597	10906	2021	16624

RTA: Road Traffic Accident

Non RTA: Non Road Traffic Accidents

5.2 Sociodemographic characteristics

The present study included 137 burn inpatients. Of these 75(54.7%) patients were males and 62 45.3%) were females (Table 2). Pediatric (<15 years old) were the most affected, accounting for 76 (55.5%) compared to adults (15-60 years old) 56 (40.9%), and elders (>60 years old) 5(3.6%). In all age groups, males predominate over females, especially in pediatrics. Nearly all patients were from Addis Ababa (85, 62%) and Oromia (47, 34.3%), whereas the remaining 5(3.6%) patients were from Amhara, Afar, and Gurage regions. And here also, pediatric age groups are predominantly injured among patients from Addis Ababa and Oromia. Most patients were single (104, 75.9%), and 23 (16.8%) were married, while a few were divorced (6, 4.4%) or widowed (4, 2.9%).

***Table 2**: Socio-demography of burn inpatients attended Y12HMC and AaBET Hospitals from 1/4/ 2023 to 3/31/2025 (n=137)*

Variables		Frequency	Percent (%)
Address	Addis Ababa	85	62
	Oromia	47	34.3
	Others	5	3.6
Age	<15 years	76	55.5
	15-60 years	56	40.9
	>60 years	5	3.6
Sex	Male	75	54.7
	Female	62	45.3
Marital status	Single	104	75.9
	Married	23	16.8
	Divorced	6	4.4
	Widowed	4	2.9
Occupation	< 5-year-old	64	46.7
	Student	25	18.2
	House wife	6	4.4
	Government employed	4	2.9
	Private employed	12	8.8
	Merchant	13	9.5
	Farmer	7	5.1
	Unemployed	6	4.4

5.3 Clinical characteristics

Most of the burn injuries happened at home (69.3%), and the rest were recorded at the workplace (21.9%) and public areas (8.8%), such as streets, Hotels, and other playing or recreational areas. Regarding the circumstance of injury, the majority of the burns occurred unintentionally (76.6%). Others were related to assault (7.3%), self-harm (4.4%), while the remaining 11.7% had no determined intent (Table 3).

***Table 3**: Clinical profile of burn inpatients admitted Y12HMC and AaBET Hospitals from 1/4/ 2023, to 31/3/2025 (n=137)*

Variables		Frequency	Percent
Setting	Home	95	69.3
	Work place	30	21.9
	Public areas	12	8.8
Cause	Scald	78	56.9
	Flame	30	21.9
	Hot surface	7	5.1
	Electrical	14	10.2
	Chemical	8	5.8
Intent	Unintentional	105	76.6
	Assault	10	7.3
	Self-harm	6	4.4
	Undetermined	16	11.7
Depth	First degree	12	8.8
	Second degree	83	60.6
	Third degree	37	27
	Fourth degree	5	3.6
Comorbidity	Yes	38	27
	No	99	73

Scald burns were found to be the commonest cause of burn, accounting for 56.9% of the total burn injury, followed by flame (21.9%), electrical (10.2%), chemical (5.8%), and contact burns (5.1%) respectively. It is especially predominant in pediatrics, causing 80.8% of pediatric burns. On the other hand, flame (73.3%) was the major cause of burns in adults. In this study, age, burn setting, and burn depth were significantly associated with causes of burn injury, all with a p-value of <0,001 (Table 4).

***Table 4**: Burn injury causes and their associated factors on burn inpatients admitted Y12HMC and AaBET Hospitals from 1/4 2023, to 31/3/ 2025*

		Scald	Flame	Hot surface	Electrical	Chemical	p-value
		N (%)	N (%)	N (%)	N (%)	N (%)	N
Patient age	<15 years	63(80.80%)	7(23.30%)	3(42.90%)	3(21.40%)	0(0.00%)	<0.001
	15-60 years	12(15.40%)	22(73.30%)	4(57.10%)	11(78.60%)	7(87.50%)	
	>60 years	3(3.80%)	1(3.30%)	0(0.00%)	0(0.00%)	1(12.50%)	
Patient sex	Male	39(50.00%)	16(53.30%)	4(57.10%)	9(64.30%)	7(87.50%)	0.316
	Female	39(50.00%)	14(46.70%)	3(42.90%)	5(35.70%)	1(12.50%)	
Burn setting	Home	67(85.90%)	21(70.00%)	5(71.40%)	2(14.30%)	0(0.00%)	<0.001
	Work place	5(6.40%)	9(30.00%)	2(28.60%)	8(57.10%)	6(75.00%)	
	Public areas	6(7.70%)	0(0.00%)	0(0.00%)	4(28.60%)	2(25.00%)	
Burn extent	<10%	45(57.70%)	12(40.00%)	3(42.90%)	3(21.40%)	3(37.50%)	0.203
	10-20%	22(28.20%)	9(30.00%)	3(42.90%)	6(42.90%)	3(37.50%)	
	20-30%	7(9.00%)	3910.00%)	1(14.30%)	4(28.60%)	1(12.50%)	
	>30%	4(5.10%)	6(20.00%)	0(0.00%)	1(7.10%)	1(12.50%)	
Burn depth	First degree	9(11.50%)	2(6.70%)	1(14.30%)	0(0.00%)	0(0.00%)	<0.001
	Second degree	58(74.40%)	16(53.30%)	2(28.60%)	5(35.70%)	2(25.00%)	
	Third degree	11(14.10%)	11(36.70%)	3(42.90%)	6(42.90%)	6(75.00%)	
	Fourth degree	0(0.00%)	1(3.30%)	1(14.30%)	3(21.40%)	0(0.00%)	

P-value <0.005, shows a significant Association.

Adults are the leading victims in all causes of burns, except in scalds, where pediatrics is mostly affected (Figure 3).

Regarding the depth of injury, most injuries were diagnosed as second degree burns (60.6%), and the others fall under third degree (27%), first degree (8.8%), and fourth degree (3.6%) burns. 75% of first-degree and 69.9% of second-degree burns are due to scald. Flame (1), hot surface (1), and electrical (3) burns were the causes for all the fourth-degree burns in the study (Table 4). When it comes to burn extent, most (48.2%) of burn injuries cause a TBSA of <10%, and 31.4% of injuries cause a burn with a TBSA of 10-20%.

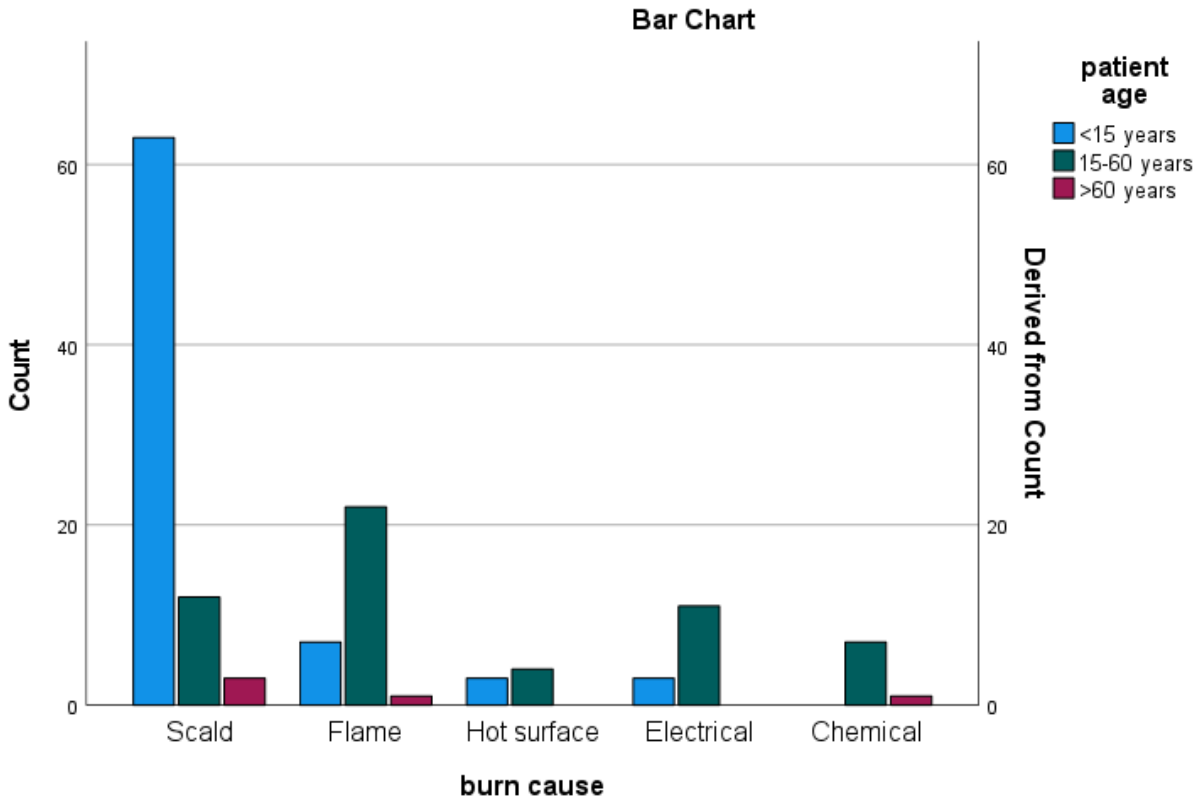

***Figure 3**: Cause-age distribution of burn injury on burn inpatients admitted at Y12HMC and AaBET hospitals from 1/4/ 2023, to 31/3/ 2025*

In this study, among the 137 burn patients, upper extremities were injured in 60% of the victims, followed by lower extremities (31.9%), anterior trunk (28.9%), head and neck (25.9%), posterior trunk (14.1%), and perineum (3%) (Figure 4). 38 burn patients had comorbidity, from these, associated injuries/trauma (18) and epilepsy (11) were the major comorbidities recorded.

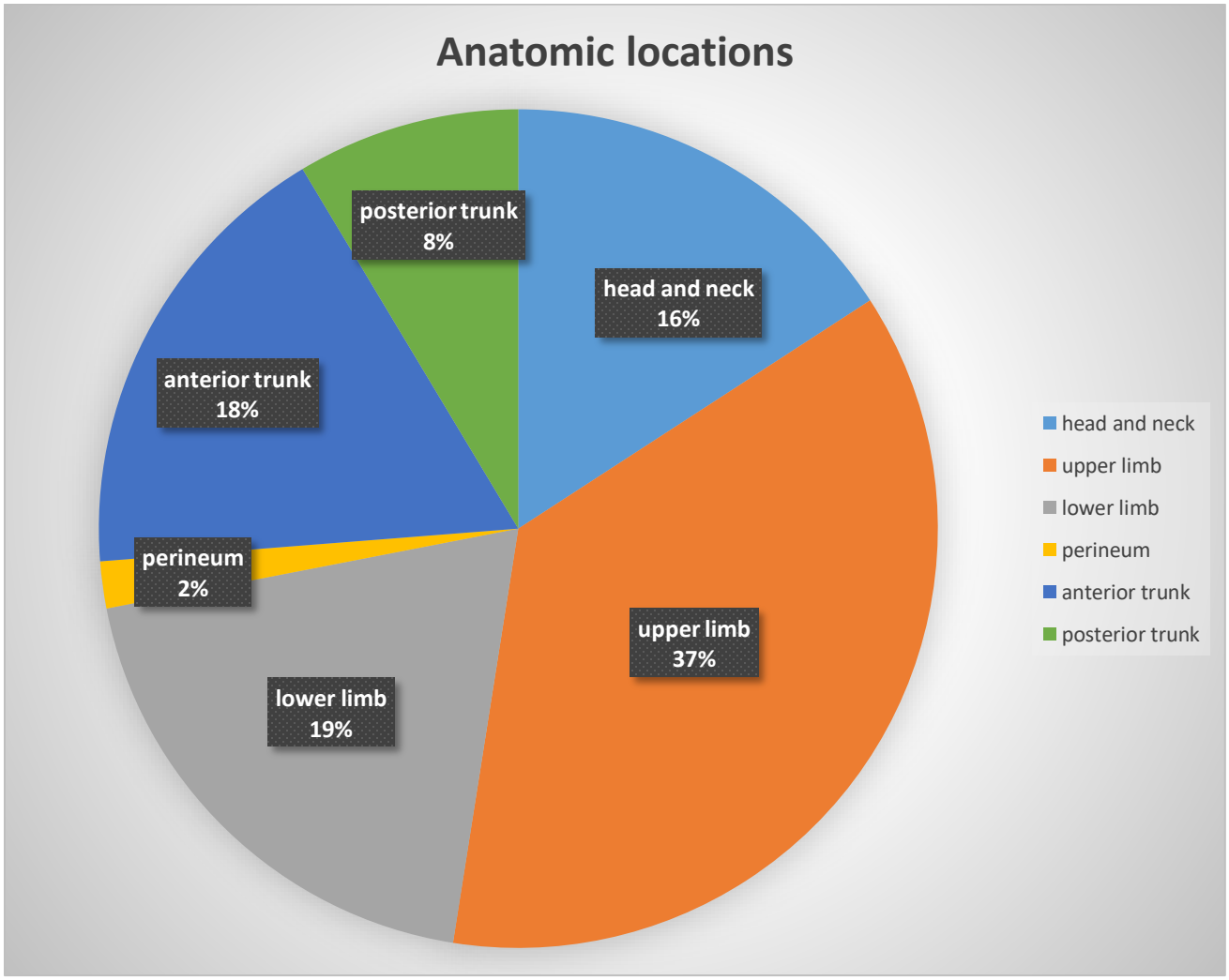

***Figure 4**: Anatomic location of burn injury on burn inpatients admitted at Y12HMC and AaBET hospitals from 1/4/ 2023, to 31/3/ 2025*

5.4 Post-traumatic characteristics

The length of hospital stay varies from One day at the very least to 107 days. The majority (46.7%) of patients stay <20 days, whereas 35.8% and 10.9% of patients stay 20 to 40 and 40 to 60 days, respectively, before discharge (Figure 5). Of the 137 patients, 100(73%) were discharged without complication, and the remaining patients were discharged with scarring /disfigurement (20, 14.6%), disability (11, 8%), and death (6, 4%).

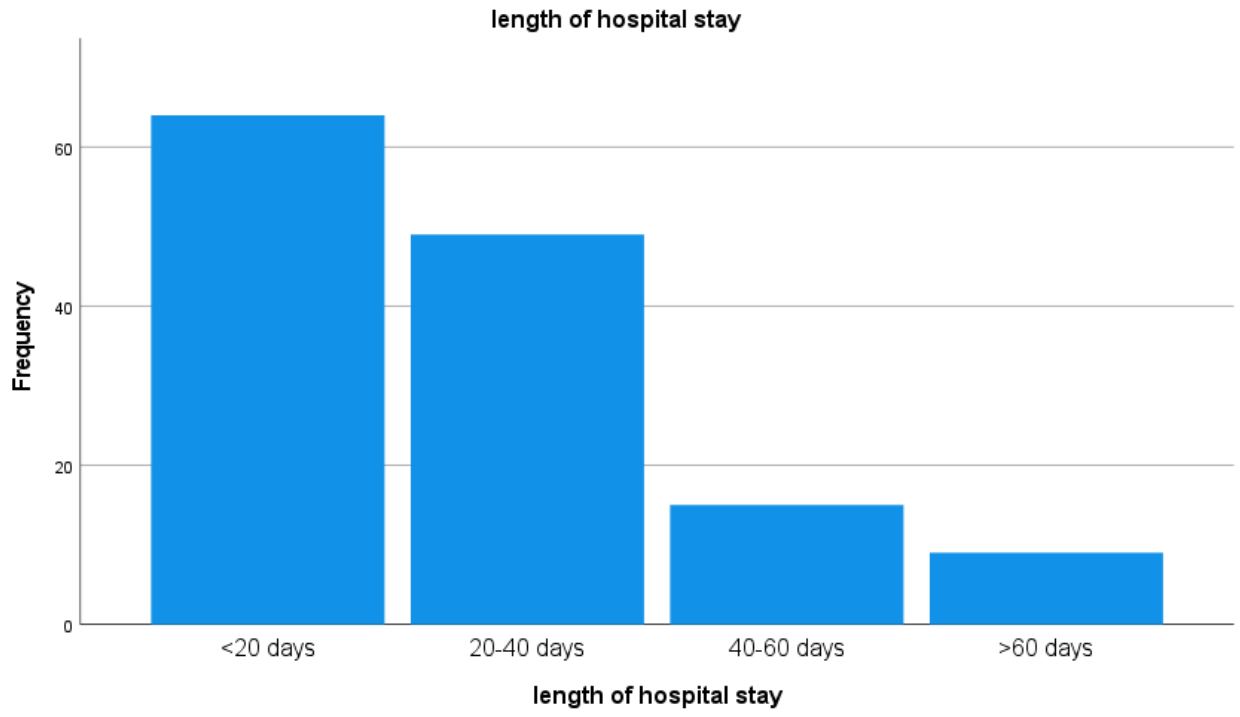

***Figure 5**: Length of hospital stay of burn inpatients admitted at Y12HMC and AaBET hospitals from 1/4/ 2023, to 31/3/ 2025*

From the bi-variate logistic regression analysis, age, burn setting, cause, depth, TBSA%, comorbidity, and length of hospital stay were found to have statistically significant association ($p< 0.25$) with the discharge status of burn patients.

After a further multivariate regression analysis, only depth of burn injury (1^{st} and 2^{nd} degree burns) and TBSA%/extent of injury were found to show a statistically significant association ($p< 0.05$) with the discharge status of the patients.

Patients with first degree (AOR~ 0, $p<0.0001$) and second degree (AOR=0.011, $P<0.032$) burns had approximately 100% and 99% decrease in the odds of discharge with complication compared to fourth degree burns. And also the first three categories of burn extent/TBSA% have extremely small odds ratios and p-value of less than 0.0001, implying patients with TBSA% of <30% have a lower odds of discharge complication compared to patients who have TBSA% of >30 %(Table 5).

In addition to burn extent and depth, scald burns ($p<0.067$) and a 20-40 days of hospital stay ($p<0.059$) show a nearly significant association ($p<0.1$) regarding discharge status compared to their counter reference.

***Table 5**: Bivariate and multivariate regression analysis of factors associated with discharge status of burn inpatients admitted to Y12HMC and AaBET Hospitals from 1/4/ 2023, to 31/3/ 2025*

Associated factors		discharge status					
		Without complication	With complication	COR (95% CI)	P-value	AOR (95% CI)	P-value
		N %	N %	N	N	N	N
Admission Hospital	AaBET	56 56%	18 48.6	1.3439(0.631- 2.861)	0.444		
	Y12HMC	44 44%	19 51.40%	1			
Patient address	Addis Ababa	68 68%	17 45.90%	2.667(0.41-17.241)	0.303		
	Oromia	29 29%	18 48.60%	1.074(0.163-7.063)	0.941		
	Others	3 3%	2 5.40%	1			
Patient age	<15 years	68 68%	8 21.60%	5.667(0 .820-39.172)	0.079		
	15-60 years	29 29%	27 73%	0.716(.111-4.620)	0.725		
	>60 years	3 3%	2 5.40%	1			
Patient sex	Male	56 56%	19 51.40%	1-206(0.566-2.568)	0.628		
	Female	44 44%	18 48.60%	1			
Burn setting	Home	76 76%	19 51.40%	4(1.160-13.798)	0.028		
	Work place	18 18%	12 32.40%	1.5(.390-5.768)	0.555		
	Public areas	6 6%	6 16.20%	1			
Burn cause	Scald	70 70%	8 21.60%	26.25(4.518-152.509)	0.00	0.028(0.001-1.291)	0.067
	Flame	18 18%	12 32.40%	4.5(0.775-26.133)	0.094		
	Hot surface	3 3%	4 10.80%	2.25(0.251020.131)	0.468		

	Electrical	7 7%	7 18.90%	3(0.443-20.315)	0.26		
	Chemical	2 2%	6 16.20%	1			
Burn depth	First degree	12 12%	0 0%	6461899371.405(0.00 ---)	0.998	7.818E-11(7.818E-11-7.818E-11)	<**0.0001**
	Second degree	75 75%	8 21.60%	37.5(3.725-377.556)	0.002	0.0110(0.000-0.672)	**0.032**
	Third degree	12 12%	25 67.60%	1.92(0.193-19.091)	0.578		
	Fourth degree	1 1%	4 10.80%	1			
Burn extent/TBSA	<10%	57 57%	9 24.30%	10231331810.990(0.0 0--	0.001	2.121E-12(9.608E-14, 4.684E-11	<**0.0001**
	10-20%	34 34%	9 24.30%	6102899676.731(0.00 --	0.279	1.737E-12(1.225E-13,2.463E-11)	<**0.0001**
	20-30%	9 9%	7 18.90%	2077037284.938(0.00 ---	0.108	1.496E-11(1.496E-11,1.496E-11	< **0.0001**
	>30%	0 0%	12 32.40%	1			
Comorbidity	Yes	22 22%	15 40.50%	0.414(0.184-0.929)	0.032		
	No	78 78%	22 59.50%	1			
Length of hospital stay	<20 days	56 56%	8 21.60%	56(6.162-508.902)	0.000		
	20-40 days	39 39%	10 27%	31.2(3.485-279.30)	0.002	0.004(1.632E-5 ,1.227)	0.059
	40-60 days	4 4%	11 29.70%	2.909(0.271-31.214)	0.378		
	>60 days	1 1%	8 21.60%	1			

AOR: Adjusted Odds ratio

CI: Confidence interval

COR: Crude Odds ratio

P-value: Level of significance

6. Discussion

This study assessed and presented information on the prevalence, pattern, and associated factors of burn injury at Y12HMC and AaBET hospitals over the two years. The present study revealed that the prevalence of burn injury accounts for 15.9% of all traumatic incidents, which is higher than the prevalence of burn injury reported at Felegehiwot Hospital (0.46%) in Bahir Dar and Dire Dawa (8.9%) (14,21). This difference might be due to the exclusion of burn patients aged >18 years and also the use of the total number of patients attended in the hospital as a denominator in the study done at Felegehiwot, and due to a smaller study period (two months) at Dire Dawa. Additionally, the present study areas are the two main referral and management centers for burn injury, with a considerably higher catchment population.

Most burn injuries occurred in pediatric patients (55.5%) . This finding is similar to studies done in Kenya, South Africa, Nepal, and a WHO report abroad (6,12,26) and with studies done in Ayder and Felege Hiwot hospitals, and a community survey done at Amhara, Oromia, and southern Ethiopia regions (1,20,21). In studies done in the USA, where strict home safety regulations are practiced (19) and in Bangladesh, where occupational exposures dominate (12), pediatric are found to be smaller than adult burn victims.

Males were more injured than females, with the prevalence of 54.7% and 45.3%, respectively, which is in line with the previous findings at AaBET hospital, Jimma medical center, North Shewa, South Africa, and Saudi Arabia (12,17,22,24,25). This could be due to higher male risk-taking behaviors and more male burn injuries in industrialized settings. The address of burn patients in Y12HMC and AaBET hospitals (62% from Addis Ababa and 38.3% from Oromia) is comparable with the previous finding from AaBET hospital, where 87.9% of patients were from Addis Ababa and Oromia (24), which reflects the catchment areas of these hospitals.

Most burn patients (75.9%) were single/unmarried, similar to studies in Jimma and north Shewa (17,22). This is due to the higher proportion of pediatrics and young adults in these studies, showing the mirror image of the young demography of Ethiopia. As stated in the previous studies, most burns in low and middle-income countries (LMIC) occur at home, which may be due to inadequate home safety infrastructures for handling burn agents (6,12). Similarly, this study found that 69.3% of the burn injuries occurred at home.

Occupational burns (21.9%) also outweigh those reported in high-income countries (13%) (19). This might be due to the weaker occupational safety in developing countries like Ethiopia.

Most burns were accidental (76.6%), consistent with findings from other studies. However, in Kenya, a contrasting proportion of assault (21%) and self-harm (11%) was recorded than in this study (assault, 7.3% and self-harm, 4.4%) (12). This might be due to differences in cultural/societal stability factors.

Studies in China, Saudi Arabia, and Kenya reported that scalding was the commonest cause for burn injury, accounting for 48%, 58.5% and 76% respectively (13,25,27). Similarly, in this study, scald was the commonest cause of burn injury, accounting for 56.9% of the total burns, followed by flame (21.9%). It is highly dominant in pediatrics, which can be explained by the long time stay of pediatrics at home, where most bun injuries happen.

In this study, most of the patients were presented with second-degree burns, which is comparable with the study findings obtained at Hiwot Fana Hospital (51.5%), AaBET Hospital (67.6%), and Jimma Medical Center (61.3%) (15,22,24). This might be due to the reason that scalds and flame were the commonest etiology of burns in most settings, which mostly cause 2nd degree burns. In contrast to the current study, a higher percentage of first-degree burns was reported in studies done in Saudi Arabia (71.7%) and North Shewa (71.6%) (17,25). This might be due to the use of a community-based study done in Saudi Arabia and the inclusion of outpatients in North Shewa, Ethiopia.

Nearly half (48.8%) of the patients had a burned TBSA of <10% which is comparable with findings in China (62.9%) and AaBET hospital (50%) (13,24). This might be due to the higher prevalence of domestic and pediatric scalds, which mostly affect smaller body parts. In contrast, in Kenya and Bangladesh, 19-80% of burn patients had >20% TBSA, which is due to the higher prevalence of occupational and intentional burns that are more damaging and invasive (12,27).

It is found consistent with most studies in Ethiopia and abroad that upper extremities (60%) and lower extremities (31.9%) were the most commonly affected body regions (13,15,24). This could be due to the exposed nature and higher involvement of both extremities in daily activities, and hence to burn agents.

Among the 137 burn patients 27% had comorbidity, of which 13% had associated injuries and 8% had epilepsy, which is similar to the epilepsy reports of North Shewa (5.1%), AaBET hospital (5.4%), and Kenya (16%) (17,24,27). This supports the fact that epilepsy is a well-documented risk factor for burns in sub-Saharan Africa (32,34,35). This could be explained by the poor epilepsy management and unsafe working areas for those at-risk patients.

This study showed that 46.7% of burn patients stayed in the hospital for <20 days, while 35.8% stayed between 20-40 days, and the remaining 10.9% required>40 days of hospitalization. This finding is similar to several studies done in Ethiopia (15,22,24), which might be due to a comparable burn severity and standardized wound care protocols. Regarding the discharge status majority (73%) of patients were discharged without complication, which is similar to the findings at Hiwot Fana, AaBET, Felegehiwot, and North Shewa hospitals (15,17,21,24). But a study in Yekatit 12 Hospital Medical College(30) reported a 13.3% mortality rate, which is higher than the findings of this study (4.4%), which can be due to the admission of severe burn patients.

According to the multivariate logistic regression analysis of this study, burn depth and TBSA% are the only statistically significant predictors of discharge with complications. First-degree (AOR~ 0, p<0.0001) and second-degree burns (AOR=0.011, P=0.032) had 99-100% lower odds of complication compared to fourth-degree burns. A similar trends were reported at AaBET hospital, where 4th degree burns had higher complication rates than first-degree burns (32% vs. 0.4%) (24). Regarding the extent of burn injury, patients with <30% TBSA had significantly lower odds of complications (AOR~ 0, p<0.0001) compared to those with >30% TBSA. This study is in line with studies done in North Shewa and a global study done at 8 burn centers in Asia, Africa, and Latin America (12,17), both studies stating burns with >20% TBSA are 3 times more likely to result in disability or death. This might be due to a higher metabolic demand in more severe burns and limited intensive care unit capacity.

7. Strengths and limitations

7.1 Strength

This study has used the two major referral and management burn centers in Addis Ababa with a complete and comprehensive data source that can show the general pattern of burn injuries for the surrounding larger catchment population. In addition, in Y12HMC, the patient information is recorded in a computer system that eases the data collection process.

7.2 Limitation

This study was done in hospitals where a higher proportion of urban settlers attend, and thus is restricted to obtaining more information on burn injuries occurring in rural areas. Because the study was retrospective, there was incomplete data for some variables. Information that could be obtained through an interview or direct observation could not able to be addressed. Laboratory and clinical measurements of burn patients were not addressed in this study.

8. Conclusion and recommendation

8.1 Conclusion

Burn injuries are still a major public health problem in Addis Ababa. Scald burns, especially among children, and flame burns in adults were the leading causes of burn injury. Second-degree burns and burns with a TBSA of <10% were the most common clinical findings. Extremities were the most commonly affected body regions. TBSA% and burn depth were the strongest predictors of complications, with >30% TBSA and full-thickness burns significantly increasing risks.

8.2 Recommendation

Based on the findings of this study, the following recommendations are provided. For health professionals, early treatment and surgical interventions with clear documentation should be implemented to enhance health care and reduce complications. For the hospital and higher public health personnel, prevention campaigns targeting electrical and household burn prevention need to be done. For researchers, prospective studies regarding the efficiency of clinicians, treatment materials, and long-term outcomes of burn complications, and a community-based studies to search for root causes of burns and related factors are advisable for the future handling of burn injuries.

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10. ANNEX

Questionnaire to extract data about the prevalence of burn injury, pattern, and its Associated Factors among Burn Patients attending Y12HMC and AaBET Hospitals from April 1, 2023 to March 31, 2025, Addis Ababa, Ethiopia.

Part I- Socio-demographic factors

1. Identification number_____

2. Medical Record Number_____

3. Date attended at the hospital for health care _____in E.C

4. Address of patient? Region/City _____District/Town_____

5. Age of patients (in complete years) _____ years

6. Sex 1. Male ☐ 2. Female ☐

7. What is the main occupation of the patient? _____

8. Marital Status

   1. Single ☐
   2. Married ☐
   3. Divorced ☐
   4. Widowed ☐

Part II. Clinical Factors

9. Setting where the burn occurred/happened?

   1. Home ☐
   2. Workplace ☐
   3. Public areas ☐

10. What was the main cause of burn injury?

    1. Thermal ☐
    2. Electrical ☐
    3. Chemical ☐
    6. Others (Specify) _____

11. If thermal burn, what type of thermal burn is it?

    1. Flame ☐
    2. Hot surface ☐
    3. Scald (hot fluid or gas) ☐

12. Burn caused intentionally?

    1. Unintentional ☐
    2. Assault ☐
    3. Self-harm ☐
    4. Undetermined intent ☐

13. How was the depth of the burn injury?

    1. Superficial/first-degree burn ☐
    2. Partial thickness/second-degree burn ☐
    3. Full-thickness/third-degree burn ☐
    4. Fourth-degree burn ☐

14. Extent of burn injury (% of total burn surface area burned): _____

15. Body parts affected by burn injury (multiple responses are possible)

    1. Head and neck ☐
    2. Upper extremities ☐
    3. Lower extremities ☐
    4. Perineum ☐
    5. Anterior trunk ☐
    6. Posterior trunk ☐

16. Was the burn injury an inhalation burn? 1. Yes ☐ 2. No ☐

17. Presence of comorbidity? 1. Yes ☐ 2. No ☐

18. If yes for comorbidity, what is/are the comorbidities (multiple responses are possible)?

1. Trauma/associated injuries ☐
2. CVS disease ☐
3. HIV/AIDS ☐
4. Diabetes ☐
5. Epilepsy ☐
6. Alcoholic ☐
7. Pregnancy ☐
8. Others (specify) _____

Part III. Post-traumatic factors

19. Length of hospital stays in days from admission to discharge? _____

20. Outcome of a patient who had sustained a burn injury?

1. Discharged with complications ☐
2. Discharged without complication ☐

21. If the outcome was discharge with a complication, what was the complication?

1. Scarring or disfigurement ☐
2. Disability ☐
3. Death ☐