

**ORIGINAL ARTICLE****MAGNITUDE AND PATTERN OF INJURY IN JIMMA UNIVERSITY SPECIALIZED HOSPITAL, SOUTH WEST ETHIOPIA****Kifle Woldemichael<sup>1</sup>, Negalign Berhanu<sup>2</sup>****ABSTRACT**

**BACKGROUND:** *Injury statistics in Ethiopia provides little knowledge about its magnitude and related information needed for prevention. This study, therefore, aims to determine the magnitude and pattern of injury in Jimma University Specialized Hospital (JUSH).*

**METHODS:** *A retrospective review of records of all injured patients seen at surgical outpatient department from April 09, 2010 to January 07, 2011; was conducted in January 2011. Data were collected using a structured checklist that was developed by adapting the World Health Organization instrument. Five degree holder nurses collected the data while investigators closely supervised. Socio demographic characteristics of the patients and injury related information were collected. Data were analyzed using SPSS for windows version 16.0.*

**RESULTS:** *Of 13500 patients who visited surgical outpatient department of JUSH during the study period, 1102(8.2%) were injury cases. The commonest mechanism of injury was blunt assault, 341(30.9%), followed by road traffic accident, 334(30.3). Fracture was the leading outcome of injury, 454(41.2%), followed by bruise or skin laceration, 404(36.7%). Significantly more males had cut, (AOR=2.0; 95% CI=1.2, 3.3) and stab, (AOR=3.0; 95% CI=1.6, 5.7), injuries compared to females. Conversely, significantly fewer males had burn, (AOR=0.4, 95% CI=0.2, 0.8) and road traffic accident, (AOR=0.7, 95% CI=0.5, 0.9), than females. Most, 715(95.8%), patients were presented to the hospital within one week. The commonest functional limitations were; difficulty to use hands, 312(28.3%) and difficulty to use legs, 217(19.7%). Eighty three, (7.5%) of the patients died and road traffic accident alone accounted for almost half, 179 (49.7%), of the severe injuries.*

**CONCLUSION:** *The magnitude of injury in the hospital was considerably high. Age and sex were predictors of injury. Appropriate prevention strategies should be designed and implemented against assault, road traffic accident and cut by sharp tool.*

**KEYWORDS:** *Injury, Magnitude, Pattern, Case records, Jimma University Specialized Hospital*

**INTRODUCTION**

The World Health Organization (WHO) global burden of injury estimate ranks injury among the top ten leading causes of death, with an estimated 5 million deaths annually of which men in Africa have the highest injury-related mortality rates in the world (1). Among African nations the rate of

injury mortality in 2004 was the highest in Nigeria and the lowest in Egypt. South Africa and Ethiopia were second and third, respectively (2). Injury is more common among men and among persons aged 15–44 years (3). Injury deaths attributable to road traffic crashes was the highest in Egypt (41%) followed by Ethiopia (30%) (2).

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Each year, over 310,000 deaths occur due to fire-related burns in the world (4). Children ages 1 to 9 years are more vulnerable to fire-related deaths than older children and adults (5). On the other hand, regardless of age, fall-related injuries account for more than half of non-fatal injuries resulting in extensive healthcare utilization and protracted period of sick days with profound economic impact (6, 7).

In a study conducted in North Gondar, 5.4% of the total patients seen in health institutions were injury cases (8). A community based study in Jimma zone similarly reported a magnitude of 8.9% (9). Various studies also revealed that males and young adults aged below 40 years were the most vulnerable groups to injury (8, 10, 11). In a preliminary study in Tikur Anbessa Hospital, out of 3822 injuries, 77% were unintentional (11) and it was 92% in the community based study in Jimma zone (9).

According to a study conducted in Eldoret, Kenya, assaults were the leading cause of injuries being responsible for 40% of the cases where road traffic accidents accounted for 18%, falls 17%, burns 3% and dog bites 3%. Eighty percent of the casualties were treated as outpatients while 20% were admitted and the mean length of stay was seven days (10). Another study conducted in Rift Valley Provincial General Hospital, Kenya, showed that 73.5% of the 5907 surgical admissions were trauma cases and the most common injuries were soft-tissue injuries, fractures, burns and head injuries. Trauma was the leading cause of death (6.6%) among all surgical admissions (12).

In all surgical patients admitted to the Ethio-Swedish Children's Hospital (ESCH), accidents and trauma accounted for 25% of the 564 surgical admissions. The commonest conditions were burns, car accidents, accidental falls, and foreign body aspirations (13). In a preliminary study in Tikur Anbessa Hospital, motor vehicle injuries accounted for 41% of all causes. Accidental fall and interpersonal assault accounted for 21% and 20%, respectively. Admitted cases were 11.6% with an overall mortality of 1.47% (11). In another study in North Gondar, the leading causes of injury were assault (48.5%), fall (18.6%) and road traffic (14.7%). Admission was required in 15.2% of the injured (8). A study conducted in Gondar teaching hospital on pediatric admissions reported

that 4.8% of the total admitted children were injury cases and the causes were firearms, (25%), falls (22%), burns (16%), and motor vehicle accidents (14%) (14).

According to a community based study in Jimma zone, the three most common causes of injury were cut by sharp tools, 122 (33.5%), falling, 76 (20.9%) and stab, 64 (17.6%). The results also showed that most of the injuries occurred around the house, 95(26.1%), inside the house, 81 (22.3%) and farming place, 64 (17.6%) (9). Cut or bite wound, 196 (53.8%), was the most common outcome of injury followed by sprain 29 (8.0%), bruise 26 (7.1%) and fracture, 24 (6.6%) (9).

Considering the increasing contribution of violence, injury and medical emergencies to the burden of disease, the Ethiopian Health Sector Development Program clearly gives more attention to injuries and violence among other non-communicable diseases. To materialize this, the Ministry of Health has prepared a National Multi-Sectoral Strategic Plan in coordination with various sectors. Road traffic injury, fire burn, falls and other work related injuries are priorities in the plan. The plan emphasizes the importance of well-organized emergency medical system in reducing the severity and consequences of injuries and violence (15).

However, there is paucity of comprehensive data on the magnitude and pattern of injury in Ethiopia. Without reliable information, health care planners at all levels are unable to allocate resources so as to achieve the greatest impact in preventing injuries, treating and rehabilitating injured persons (16). Since the aforementioned community based study of Jimma zone was based on self reports of individuals, it was prone to recall bias. It had acknowledged that the study might have underestimated the true prevalence of injury in the zone (9). Even though the possibility of underestimating injury is inevitable even with the present hospital based study, it is believed that findings from these two data sources would best corroborate with each other. This would give a relatively comprehensive picture of the magnitude and patterns of injury. Therefore, with the objective of determining the magnitude and patterns of injury in Jimma University Specialized Hospital, this study would also play a part in

evidence based policy dialogue to help advocate for formulating injury prevention strategies.

## METHODS AND MATERIALS

A retrospective review of records of injured patients seen at surgical out-patient department from April 09, 2010 to January 07, 2011 was carried out in Jimma University Specialized Hospital. It is the only referral hospital for over ten million people in the southwestern regions with a total capacity of about 490 beds. Currently, it has 299 technical and 258 administrative staff. It provides a range of services in outpatient, in patient and emergency basis in various areas; namely; internal medicine, surgery, obstetrics and gynecology, pediatrics, anesthesia, dentistry, ophthalmology, psychiatry, pharmacy, medical laboratory and radiology. All the patients who visited the out-patient department of Jimma University Specialized Hospital due to injury during the months covered were the study population.

Data were collected using a structured checklist that was developed by adapting from the World Health Organization's injury surveillance guideline (17). Socio-demographic characteristics of the patients and characteristics of injury, i.e., intent, mechanism, nature, place, outcome; and patient disposition were the variables included. Records of injury patients were identified among all records during the specified period from card room. After having extracted the socio-demographic data, the records were then carefully reviewed for descriptions of the treating clinician. Data on mechanism, intent, duration and place of injury were extracted primarily from the chief complaint and history of present illness sections of the description. While data on the outcome and partly on 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.

Mechanism was assessed by answering the question how the injury was inflicted, i.e., how s/he was hurt. If there were more than one mechanism, the one that precipitated the injury was recorded. Outcome/diagnosis was defined as the physical nature of the injury, real or suspected, which brought the patient to the hospital (17). One

mechanism and one diagnosis/outcome were coded for all visits. If more than one mechanism and diagnosis, the primary ones were focused on, leaving the secondary and more. An injury was categorized as; minor if it was superficial like bruises and minor cuts, moderate if it required some skilled treatment such as primary fracture managements and sutures, and severe if it required intensive medical and/or surgical management, for instance, internal hemorrhage, punctured organs, and severed blood vessels (17). Data quality was ensured by the use of data collection tool adapted from the WHO which was pre -tested.

Data were collected by five nurses with Bachelor's degree and the investigators closely supervised the data collection process. The data collectors were trained intensively for two days on the methods and approaches of the data collection. A manual was prepared to guide the data collectors on certain technical aspects of the tool to ensure reliability of the data.

The data were entered, cleaned and analyzed using SPSS for windows version 16.0 and presented using tables and figures. Counts of the registered injury cases were calculated for the study population by age, sex and other socio demographic characteristics. Rates of injury and percentages of admissions to hospital for treatment of injuries were calculated; patterns of registered injuries were also examined by mechanism, intent, place, and outcome (diagnosis). Other measures of descriptive statistics were determined. Odds ratio with its corresponding 95%CI was determined to look into associations between variables. Binary logistic regression was also employed.

In this study, a "case" was defined as an injury presented by one person for the first time, irrespective of whether that person had one or multiple injuries. Unintentional injuries were those which occurred accidentally, whereas, intentional injuries were those occurred deliberately. Intentional injuries in this document referred only to the interpersonal violence as there were no self-inflicted injuries reported during the study period. Since cut or penetrative injuries due to interpersonal violence were merged with the non intentional injuries of the same type, blunt injuries are labeled as "blunt assault injury" for analysis as an injury outcome category due to its considerable magnitude.

A clearance was obtained from the Ethical Review Committee of Jimma University before the study was conducted and the hospital management provided permission. Patients' names were not recorded on the checklist to guarantee confidentiality of the information.

## RESULTS

Thirteen thousand and five hundred patients visited surgical outpatient department of JUSH during ten months period, from April 09, 2010 to January 07, 2011, of which 1102(8.2%) were injury cases and analyzed in this study. Nine

hundred twenty of the injured patients (83.3%) were from different Woredas of Jimma zone out of which, 335(30.4%) were from Jimma town and the remaining were from the neighboring zones of SNNPR in particular. Of the cases, males outnumbered females by a sex ratio of 3.25 where the mean (SD) age of the patients was 28.6 ( $\pm$  1.4) years and 85.5% of them were 15-44 years old. Only 12.4% were aged 45-64 years. Information about the occupational status of the majority of the cases 697(63.2%) could not be established as the patients' records were incomplete. Of 405 which had the information, 126(40.0%) and 116(28.6%) were farmers and students, respectively (Table 1).

Table 1: Socio-demographic characteristics of injury cases who visited JUSH from April 09, 2010 to January 07, 2011; Jimma, South West Ethiopia.

<i>Socio-demographic characteristics (n=1102)</i>	<i>Number</i>	<i>%</i>
<b>Address</b>		
Jimma zone	920	83.8
Other zones of Oromiya region (Illubabor & Mettu)	64	5.8
Neighboring zones of SNNPR (Kafa, Bench Maji, Sheka, Gurage & Hadiya)	79	7.2
Unknown	37	3.5
<b>Sex</b>		
Male	843	76.5
Female	259	23.5
<b>Age</b>		
0-4	19	1.7
5-14	121	11
15-49	853	77.4
50-64	84	7.6
>64	25	2.3
<b>Occupation</b>		
Farmer	162	14.7
House wife	53	4.8
Student	116	10.5
Preschool children	29	2.6
Others	45	4.1
Unknown	697	63.2

Results on the intent of injury showed that 541(49.1%) were injured intentionally. Intentional injuries occurred among 430 (51.0%) of the 843 males and 111(42.9%) of the 259 females. Patients in the age group of 15-49 years sustained 454(83.9%) of the intentional injuries. The commonest mechanism of injury was blunt assault injury; 341(30.9%), followed by road traffic

accident, 334(30.3%), cut by sharp tool, 143(13%), stab, 105 (9.5%) and falling, 102(9.3%).

Significantly more males had cut, 123(14.6%); (AOR=2.0; 95% CI=1.2, 3.3) and stab, 95(11.3%); (AOR=3.0; 95% CI=1.6, 5.7), injuries compared to females. Conversely, significantly fewer males had burn, 22(2.6%);

(AOR=0.4, 95%CI=0.2, 0.8) and road traffic accident, 239(28.4%); (AOR=0.7, 95%CI=0.5, 0.9), than females after controlling for age. Cases of blunt assault injury were significantly more frequent among 15-49, 284(33.3%), and 50-64, 29(34.5%); (AOR=9, 95%CI=1.2, 66.7 and AOR=9.5, 95%CI=1.2, 76.9), respectively, after controlling for sex (Table 2).

Burn cases were significantly fewer among; 5-14 years old, 14(11.6%); (AOR=0.3, 95%CI=0.09, 0.8), 15-49 years old, 16(1.9%); (AOR=0.04, 95%CI=0.01, 0.1); and 50-64 years old, two (2.4%); (AOR=0.05, 95%CI=0.01, 0.3),

as compared to 0-4 years old, six (31.6%) (Table 2).

Burns due to fire and boiled water or oil were merged for analysis throughout this document. Since 697(63.2%) and 577(52.4%) patient records were incomplete for occupation and place of injury data, respectively, they were not considered for further analyses. One third of 405 cases, for whom data on occupational status was available, sustained road traffic accident. While 45(27.8%) of farmers were injured with cut by sharp tool; 18(34%) housewives, 46(39.7%) students, and 13(44.8%) pre-school children, were injured by road traffic accident (Table 3).

Table 3: Mechanism of injury by occupation among injury cases who visited JUSH from April 09, 2010 to January 07, 2011; Jimma, South West Ethiopia.

Occupation of patient	Mechanism of injury						
	Road traffic accident	Blunt assault	Cut by sharp tool	Fall	Stab	Burn	Others
	<i>N<sub>o</sub></i> (%)						
Farmer (n=162)	39(24.1)	39(24.1)	45(27.8)	10(6.2)	21(13)	2(1.2)	6(3.7)
House wife (n=53)	18(34)	17(32.1)	6(11.3)	4(7.5)	3(5.7)	2(3.8)	3(5.7)
Student (n=116)	46(39.7)	25(21.6)	5(4.3)	23(19.8)	7(6)	7(6)	3(2.6)
Pre-school child (n=29)	13(44.8)	5(17.2)	3(10.3)	2(6.9)	0	5(17.2)	1(3.4)
Others (n=45)	19(42.2)	9(20)	4(8.9)	8(17.8)	2(4.4)	0	3(6.7)

Out of those 577 patients for whom place of injury was known, 344(59.6%) and 119(20.6%) took place on the road and around the home respectively. Around three fourth of the injuries which happened on the road, 247(71.8%), were among male patients (Fig. 1). The findings also revealed that fracture was the leading outcome of injury, 454(41.2%), followed by bruise or skin laceration, 404(36.7%), internal organ injury, 99(9%), sprain or dislocation, 56(5.1%) and cut or bite, 51(4.6%).

More females were diagnosed to have had bruise/skin laceration, 105(40.5%), and cut or bite, 13(5%), than males, 299(35.5%), and 38(4.5%), respectively. On the other hand, more males sustained fracture, 361(42.8%), than females, 93(35.9%); (AOR=1.3, 95%CI=1.002, 1.8), (Table 4). Out of the total 454 fractures proportion for

upper limbs, head and neck, lower limbs, pelvis and; both upper limbs and lower limbs were, 148(32.6%), 139(30.6%), 123(27.1%), 40(8.8%) and 4(0.9%), respectively.

In those charts where duration of injury was recorded (n=749); most of them were presented to the hospital within one week, 715(95.8%). The median duration when the patients visited the hospital was two hours and ranged from 15 minutes to 120 days. The commonest functional limitations that patients had at presentation were difficulty to use hands, 312(28.3%), difficulty to use legs, 217(19.7%), weakness of the body, 149(13.5%) and shortness of breath, 118(10.7%) and inability to move the body, 112 (10.2%).

Tble 2: Mechanisms of injury by sex and age among injury cases who visited JUSH from April 092010 to January 07, 2011; Jimma, South West Ethiopia.

Sex and age of patient	Mechanisms of injury												
	Blunt assault (n=341)		Cut by sharp tool (n=143)		Burn (n=38)		Stab (n=105)		Fall (n=102)		Road traffic accident (n=334)		Others (n=39)
	<i>N<sub>a</sub></i> (%)	<i>AOR</i> (95%CI)	<i>N<sub>a</sub></i> (%)	<i>AOR</i> (95% CI)	<i>N<sub>a</sub></i> (%)	<i>AOR</i> (95% CI)	<i>N<sub>a</sub></i> (%)	<i>AOR</i> (95% CI)	<i>N<sub>a</sub></i> (%)	<i>AOR</i> (95% CI)	<i>N<sub>a</sub></i> (%)	<i>AOR</i> (95% CI)	<i>N<sub>a</sub></i> (%)
<b>Sex</b>													
Male (n=843)	256 (30.4)	0.9 (0.7, 1.2)	123 (14.6)	2.0 (1.2, 3.3)*	22 (2.6)	0.4 (0.2, 0.8)*	95 (11.3)	3.0 (1.6, 5.7)*	78 (9.3)	0.9 (0.6, 1.6)	239 (28.4)	0.7 (0.5, 0.9)*	30 (3.6)
Female (n=259)	85 (32.8)	1.0	20 (7.7)	1.0	16 (6.2)	1.0	10 (3.9)	1.0	24 (9.3)	1.0	95 (36.7)	1.0	9 (3.5)
<b>Age in years</b>													
0-4 (n=19)	1 (5.3)	1.0	2 (10.5)	1.0	6 (31.6)	1.0	2 (10.5)	1.0	3 (15.8)	1.0	5 (26.3)	1.0	0
5-14 (n=121)	21 (17.4)	3.8 (0.5, 30.3)	6 (5)	0.4 (0.08, 2.4)	14 (11.6)	0.3 (0.09, 0.8)*	3 (2.5)	0.2 (0.03, 1.4)	21 (17.4)	1.1 (0.3, 4.2)	53 (43.8)	2.2 (0.7, 6.5)	3 (2.5)
15-49 (n=853)	284 (33.3)	9 (1.2, 66.7)*	124 (14.5)	1.5 (0.3, 6.3)	16 (1.9)	0.04 (0.01, 0.1)*	86 (8)	0.9 (0.2, 4.2)	70 (8.2)	0.5 (0.1, 1.7)	241 (28.3)	1.1 (0.4, 3.1)	32 (3.8)
50-64 (n=84)	29 (34.5)	9.5 (1.2, 76.9)*	9 (10.7)	1.02 (0.2, 5.2)	2 (2.4)	0.05 (0.01, 0.3)*	10 (11.9)	1.2 (0.3, 5.7)	4 (4.8)	0.3 (0.05, 1.3)	27 (32.1)	1.3 (0.4, 4.1)	3 (3.6)
>64 (n=25)	6 (24)	5.7 (0.6, 52.6)	2 (8)	0.7 (0.09, 5.8)	0	0.1 (0.0)	4 (16)	1.6 (0.3, 9.9)	4 (16)	1.02 (0.2, 5.2)	8 (32)	1.3 (0.4, 4.9)	1 (4)

\*Significant association at  $p < 0.05$ .

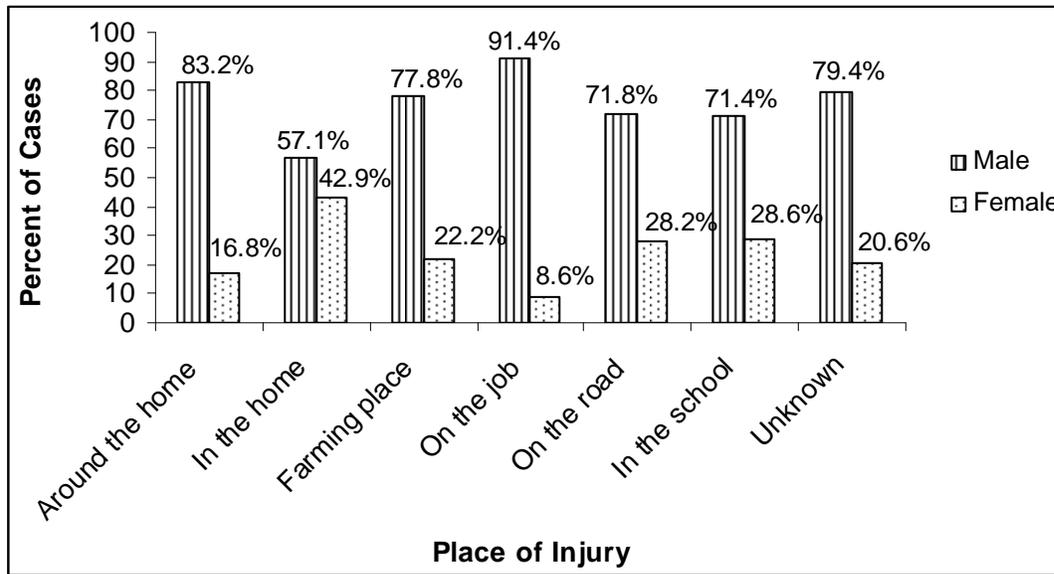


Fig. 1: Place of injury by sex among patients who visited JUSH from April 09, 2010 to January 07, 2011; Jimma, South West Ethiopia.

Eight hundred and seventy two cases, (79.1%), were managed at outpatient department while the rest, 230 (20.9%), were managed as in-patients. For those managed as in-patient, the median length of hospital stay was 14 days ranging from half a day to 150 days and the majority, 1019(92.5%), of the cases were discharged with improvement and follow up and 83(7.5%) died and 60(72.3%), of the deceased were males. Death was more common in those between 15-49 years of age, 66(79.5%), followed by those 5-14 years old, 10(12%).

With regard to injury spectrum, 360(32.7%), were classified as having had severe, 455(41.3%) as moderate and 287(26.0%) as minor injury. Most importantly, road traffic accident alone accounted for almost half of the severe injuries, 179 (49.7%), followed by stab injury, 45(12.5%), and cut by sharp tool, 41(11.4%). All of the deceased cases, 83(100%), were also severely injured.

**DISCUSSION**

The study revealed magnitude of injury in Jimma University Specialized Hospital to be 8.2%. This

is relatively higher when compared to a study conducted in North Gondar zone in 2000 using twenty health institutions which revealed a magnitude of 5.4% (8). The magnitude is lower than a study of total surgical admission (5,907) to the Rift Valley Provincial General Hospital of Kenya in 2002 where 3411(57.7%) were trauma cases (12). Similarly, another study at Viet Duc Hospital in 2006 had reported a higher magnitude with 17,643 injury cases treated in emergency department, representing 70% of all emergencies (18). The time of investigation and difference in the level and number of facilities studied could partly explain this difference. The injured cases were predominantly males which is consistent with other similar studies (8-11, 19) and most of the injuries involved people aged 15-44 years. This pattern remained the same for most injury mechanisms and outcomes. This is also in agreement with other similar studies (9, 11, 19). It is expected that people in this age group tend to live a more active life than any other age group (18). Obviously, this would signify a resultant economic impact and loss in productive years of life (7).

Table 4: Outcome of injury by sex and age among injury cases who visited JUSH from April 09, 2010 to January 07, 2011; Jimma, South West Ethiopia.

Sex and age of patient	Outcomes of injury												
	Sprain/ dislocation (n=56)		Bruise/skin laceration (n=404)		Cut or bite (n=51)		Bodily burn (n=34)		Fracture (n=454)		Internal organ injury (n=99)		Others (n=4)
	<i>N<sub>o</sub></i> (%)	<i>AOR</i> (95% CI)	<i>N<sub>o</sub></i> (%)	<i>AOR</i> (95% CI)	<i>N<sub>o</sub></i> (%)	<i>AOR</i> (95% CI)	<i>N<sub>o</sub></i> (%)	<i>AOR</i> (95% CI)	<i>N<sub>o</sub></i> (%)	<i>AOR</i> (95% CI)	<i>N<sub>o</sub></i> (%)	<i>AOR</i> (95% CI)	<i>N<sub>o</sub></i> (%)
<b>Sex</b>													
Male (n=843)	39 (4.6)	0.7 (0.4, 1.2)	299 (35.5)	0.8 (0.6,1.07)	38 (4.5)	0.9 (0.5, 1.7)	21 (2.5)	0.5 (0.2,0.9)*	361 (42.8)	1.3 (1.002,1.8)*	82 (9.7)	1.5 (0.9, 2.6)	3 (0.3)
Female (n=259)	17 (6.6)	1.0	105 (40.5)	1.0	13 (5)	1.0	13 (5)	1.0	93 (35.9)	1.0	17 (6.6)	1.0	1 (0.1)
<b>Age in years</b>													
0-4 (n=19)	0	1.0	5 (26.3)	1.0	2 (10.9)	1.0	4 (21.1)	1.0	7 (36.8)	1.0	1 (5.3)	1.0	0
5-14 (n=121)	7 (5.8)	1.2 (0.5,2.8)	43 (35.6)	1.5 (0.5,5.3)	0	0	12 (9.9)	0.1 (0.1,1.8)	50 (41.3)	1.2 (0.4,3.7)	9 (7.7)	1.5 (0.2,32.3)	0
15-49 (n=853)	47 (5.5)	1.6 (0.7,3.5)	315 (36.9)	1.6 (0.6,5.3)	46 (5.4)	0.5 (0.1,3.1)	16 (1.9)	0.07 (0.02,0.3)*	344 (40.3)	1.2 (0.4,3.3)	81 (9.5)	1.9 (0.3,38.5)	4 (0.4)
50-64 (n=84)	2 (2.4)	0.4 (0.07,1.9)	36 (42.9)	2.1 (0.6,7.4)	3 (3.6)	0.1 (0.02,0.6)*	2 (2.4)	0.09 (0.01,0.7)*	36 (42.9)	1.3 (0.4,4.1)	5 (5.9)	1.1 (0.1,27.4)	0
>64 (n=25)	2 (8)	1.6 (0.4,6.2)	5 (20)	0.7 (0.1,3.5)	3 (12)	1.2 (0.1,11.4)	2 (8)	0.3 (0.04,2.5)	11 (44)	1.4 (0.3,5.5)	2 (8)	1.6 (0.1,47.6)	0

\*Significant association at  $p < 0.05$ .

Almost half of the injuries were intentional and is higher than 23% reported from Tikur Anbessa Hospital, Addis Ababa (11) and 8% from Vietnamese hospital (18). However, another study conducted in Canadian hospitals reported more intentional injuries (20). The possible explanation for the variation may be the difference in study time and setting. The commonest mechanisms of injury were blunt assault, road traffic accident and cut by sharp tool. In a preliminary data from registry of St Paul's Hospital, Addis Ababa, more assault related injuries were identified in favor of this result (7). Similarly, in another study in Eldoret, Kenya, assaults were the leading causes followed by road traffic accidents and falls (10). Studies conducted in Tikur Anbessa Hospital, Addis Ababa (11), in North Gondar zone (8) and in the Rift Valley Provincial General Hospital of Kenya (12) had, however, reported a different trend with road traffic accident at the top followed by interpersonal assault and accidental fall.

Males, as compared to females, were twice and three times more likely to have had cut and stab injuries, respectively. Studies from western Kenya (18) and Ghana (21) reported the same observation. Conversely, males were less likely to have had burn which is consistent with other studies (7, 19). This may be attributed to the high exposure women have due to their role in domestic activities such as cooking, baking and ironing (7). Moreover, males were less likely to have had road traffic accident. This is partly supported by the study conducted in Ghana where males predominated in all mechanisms except pedestrian injuries (21).

This study also showed that blunt assault injury was significantly higher among age group 15-49 and 50-64 years compared to 0-4 years. Similarly, the study from Ghana reported that assault was more common in 15-34 and 35-59 years than 0-4 years old (21).

Burn injury was more frequent among children aged 0-4 yrs. As age increased, burn got significantly less common. This is in line with reports from other studies (5, 21). This calls for the need for special attention that should be given to protect children from fire and other combustibles within households.

While majority of farmers were injured with cut by sharp tools, majority of housewives, students and pre-school children were injured by

road traffic accident. More farmers had cut injury, probably, due to their work related exposure to sharp agricultural instruments as reported by other studies (19, 21). Housewives, students and pre-school children might have had more frequent access to roads resulting in a relatively higher exposure to road traffic accidents.

The two most common places of injury were road and home. Another study in the same zone however reported that more than two-third of the injuries occurred in and around home environment and funning places (9). On the other hand higher prevalence of injuries from road accidents were observed in the hospital for it serves as a referral center not only for Jimma zone but also for other adjacent zones and as well the injures might be more serious in nature. This is further supported by the finding on injury spectrum in the same study where injuries due to road traffic accident were three times more likely to result in death than the other mechanisms. A similar study in a Vietnamese hospital reported common sites of accident to be on road (67%) and at home (15%) (18).

The three leading outcomes of injury were fracture, bruise or skin laceration and internal organ injury and this is a different pattern as compared to various studies. Cut or bite wound, sprain, bruise, fracture, and internal organ injury were reported to be the most common outcomes in the community based study (9). In a Kenyan hospital study, the most common injuries were fractures, burn, soft-tissue and head injuries (12). In another Nigerian teaching hospital study, laceration and fractures represented most of the injuries (21). Possibly, differences in the definition of what a "case" means in the studies being compared might have also contributed to the variation. Fracture cases were more frequent in 50-64 and 64 years old and above and this is consistent with other report (20).

Almost all patients were presented to the hospital within one week, whereas a similar study in a rural hospital in Ghana reported almost half of the cases were presented within a week after the injury (21). The commonest functional limitations at presentation were; difficulty to use hands, difficulty to use legs and weakness of the body. The community based study in the zone had reported a similar pattern with the most common functional limitations/disability as; difficulty to

use hand, leg, inability to move body, weakness, and limping (9).

With regards to the injury spectrum, around a third of all injuries were classified as severe. This is in agreement with findings from some preliminary data in the registry of both Tikur Anbessa and St Paul's Hospitals where most injuries were reported to be minor (6). Similarly, cases admitted to the Viet Duc Hospital, Vietnam, were mostly patients with moderate or minor injuries, representing 94%, while only 3.18% were in serious condition (18). The commonest outcomes which resulted in severe injuries were road traffic accidents, stab and cut by sharp tools. Eight in ten of the cases were managed at outpatient department which is relatively lower than that of the community based study which showed almost all managed as outpatients (9). Patients who visited the hospital are likely to have had more severe injuries than the community based study, which might have in turn led to more admissions. However, it is comparable to studies conducted in Tikur Anbessa and Gondar where nine in ten were managed as out patients (8, 11). Majority of the admitted patients stayed in the hospital for more than one week which is higher than the finding from community based study (52.6%) (9). Admissions might be related to severity of injury and those with severe injuries are more likely to stay longer in the hospital. However, this may need detailed investigations like extent of injury, host and hospital (service quality) related factors, which is beyond the scope of this study.

Great majority of the cases were discharged with improvement and follow up and mortality rate was 7.5%. This is higher than rates reported by studies in; Tikur Anbessa Hospital, (1.5%), Eldoret, Kenya, (0.9%), Nigerian teaching hospital (2%), Vietnamese hospital 5.3% (18) and Rift Valley Provincial Hospital, Kenya, (6.6%); (10-12, 18, 22). Around two thirds of the deaths occurred both among; males (72.3%) and those between 15-49 years of age (79.5%) and the same result had been reported in Ghanaian rural hospital study (21).

This study has the following limitations. Selection bias might have been introduced as hospital data exclude cases that die before they reach the hospital or minor cases that sought care at other facilities. Moreover, injuries might have

been clustered among particular individuals who were not addressed in this study. Thus, the overall injury magnitude, severity, outcomes and fatality might have been underestimated.

In conclusion, the magnitude of injury in the hospital was considerably high with more intentional injuries; predominantly involving males, people aged 15-44 years, farmers and students. Blunt assault, road traffic accident and cut by sharp tool were the commonest mechanisms. The commonest places of injury were on the road, around and in the home. Fracture, bruise or skin laceration and internal organ injury were the leading outcomes. Road traffic accident, stab and cut by sharp tool resulted in more severe injuries. Age and sex were predictors for cut, stab and road traffic accident injuries, and fracture.

Appropriate prevention strategies should be designed and implemented against assault, road traffic accident and cut by sharp tool. Investigation of specific factors for; intentional injuries, high prevalence of injury among males, farmers and students can be potential research areas. Factors associated with road traffic accident also need to be identified in the future. Eventually, it is expected that teaching hospitals should serve as data providers and research centers. Data from hospital sources can corroborate with community based data and can help practitioners, researchers, program managers and policy makers at different levels identify populations at risk, implement and evaluate prevention programs. However, some patients' records were incomplete for certain important information which JUSH's management and clinical staff should consider for corrective measures.

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## REFERENCES

1. World Health Organization (WHO). The injury record book: A graphical overview of the global burden of injuries,

- 2002.<http://whqlibdoc.who.int/publications/924156220X.pdf>.
2. World Health Organization (WHO). Measurement and Health Information Data sheet, Geneva, Switzerland: WHO; 2004.
  3. Krug E. Injury: A leading cause of the global burden of disease. Geneva, World Health Organization, 1999. Available on the Internet at:[www.who.int/violence\\_injury\\_prevention](http://www.who.int/violence_injury_prevention).
  4. Karter MJ. Fire loss in the United States during 2006, Quincy (MA): National Fire Protection Association, Fire Analysis and Research Division; 2007.
  5. Selassie AW. Invited Commentary: The Management of Epilepsy in sub-Saharan Africa. *Epilepsia*, 2008;49(9): 644-46.
  6. Injury pyramid. Geneva, World Health Organization (WHO). Available on the Internet at:[www.who.int/violence\\_injury\\_prevention](http://www.who.int/violence_injury_prevention). Last updated 2001.
  7. Gebeyehu K, Mehari E. Injury Prevention. *Public Health Information*. 2009, 2:1-13.
  8. Osman M, Kebede Y, Anberbir S. Magnitude and pattern of injuries in North Gondar Administrative Zone, Northwest Ethiopia. *Ethiop Med J*, 2003; 41:213-220.
  9. Woldemichael K, Tessema F, Sena L, et al. Community based survey of injury in Jimma zone, southwest Ethiopia. *Ethiop J Health Sci*, 2008; 17 (4):179-188.
  10. Odero WO, Kibosia JC. Incidence and characteristics of injuries in Eldoret, Kenya. *East Afr Med J*, 1995;72(11):706-10.
  11. Taye M, Munie T. Trauma registry in Tikur Anbessa Hospital, Addis Ababa, Ethiopia. *Ethiop Med J*, 2003;41(3):221-6.
  12. Masiira-Mukasa N, Ombito BR. Surgical admissions to the Rift Valley Provincial General Hospital, Kenya. *East Afr Med J*, 2002;79(7):373-8.
  13. Daniel E, Melaku G, Yoo MC, et al. Analysis of surgical admissions to the Ethio-Swedish Children's Hospital (1984-1988) in Addis Ababa. *Ethiop Med J*, 1990;28(1):15-22.
  14. Gedlu E. Accidental Injuries among Children in Northwest Ethiopia. *East Afr Med J*, 1994; 71(12): 807-810.
  15. Federal Democratic Republic of Ethiopia. Three Year National Multi-Sectoral Strategic Plan on Violence and Injury Prevention and Emergency Medical Services Strategy for 2008/9-2010/11; June 2008, Addis Ababa, Ethiopia.
  16. Injury pyramid. Geneva, World Health Organization (WHO). Available on the Internet at: [www.who.int/violence\\_injury\\_prevention](http://www.who.int/violence_injury_prevention). Last updated 2001.
  17. World Health Organization (WHO). Injury Surveillance Guidelines, Geneva, Switzerland: WHO; 2001.
  18. Nguyen D, Cao D, Nguyen DH. Preliminary Results of Injury Surveillance at Viet Duc Hospital. *The Thai Journal of Surgery*, 2007; 28:83-89.
  19. Odero WO, Kibosia JC. Incidence and characteristics of injuries presenting to a rural health centers in western Kenya. *East Afr Med J*, 2007; 84(8):367-37.
  20. William P, Lisa H, Robert J. A Population-based Study of Hospitalized Injuries in Kingston, Ontario, Identified via the Canadian Hospitals Injury Reporting and Prevention Program. *Public Health Agency of Canada (PHAC), Chronic disease in Canada*; 18 (2), 1997.
  21. Charles N. Ellis A. & Donna D. et al. Admissions for Injury at a Rural Hospital in Ghana: Implications for Prevention in the Developing World. *Am J Public Health*, 1995; 85:927.
  22. Thanni LO, Kehinde OA. Trauma at a Nigerian teaching hospital: pattern and documentation of presentation. *Afr Health Sci*, 2006;6 (2):104-7.