

Original Article**Orthopedic and Major Limb Trauma at the Tikur Anbessa University Hospital, Addis Ababa - Ethiopia.**¹Ahmed Elias, ²Chaka Tezera¹Orthopedic Resident, ²Head of Orthopedic Department, Addis Ababa University, Medical Faculty, P.O. Box 9084, Addis Ababa, Ethiopia. E-mail: orthop@ethionet.et**Corresponding to:** Dr. Ahmed Elias, P.O. Box 8530, Addis Ababa, Ethiopia.E-mail: eliasore2003@yahoo.com

Background: In Ethiopia, Injuries constitute around half of all surgical emergencies, and are the primary reason for an emergency hospital visit in Addis Ababa, Ethiopia. The aim of this study was to determine the frequency and pattern of major limb traumatic injuries and orthopedic conditions treated as emergency at Tikur Anbessa University Hospital (TAUH).

Methods: A three-year retrospective descriptive audit of all the orthopedic and major limb trauma patients who attended the 'surgical' emergency department of TAUH in the three-year period between December 2001 and November 2004, and who received treatment necessitating at least one further visit.

Results: A total of 7317 patients presented to the orthopaedic emergency service at Tikur Anbessa Hospital (TAUH) during the study period. Their median age was 25 years. Males: Female ratio of 3:1. A total of 7151 (98%) had suffered one or more severe limb injuries. Polytrauma was noted in 516 (7%) of the cases. Road Traffic Injuries (RTI's) accounted for 2793 (39%) patients of whom 88% were pedestrians who had been 'hit by a car'. Hand injuries accounted for 841 (12%), and of these 162 (20%) lost either a part of or all of the hand. Ninety nine (61%) of these 'hand' amputations followed a machine injury. Only 740 patients were admitted to TAUH out of 2372 whose condition required urgent inpatient care. One hundred and sixty five patients (2% of total) arrived with an acute orthopedic infection, 120 were children (73%) and 109 (90%) of these arrived 'late'.

Conclusion: It is suggested that a reduction in the number of RTA's together with appropriate education of the public would reduce the number of patients currently being injured in Addis Ababa. Finally we believe that this study recording the relative incidence of fractures and joint injuries by site will provide a base line for further studies.

Introduction

Epidemiological studies and audits by themselves do not lead to better patient management but orthopedic and general surgeons should know the spectrum of major limb trauma and other orthopedic emergencies that they encounter in emergency departments. This is not only for educational purpose but also in order to allow resources to be allocated on the basis of the projected numbers of patients. The audit must include the categories or types of problems presenting and their relative incidence. According to the 1996 World Health Organization report (WHO) injury ranks fifth among all causes of death accounting for 5.2% of all mortality world wide¹. It is a leading cause of death and disability for people under 45 years in the industrialized world^{1,2}. These rates are declining in developed countries³ but injuries

are important and a largely neglected health problem in developing countries^{3,8}.

In Ethiopia, like other developing countries, injuries are common but little attention is being given to this problem⁹. Injuries constitute around a half of all surgical emergencies¹⁰, and were the primary reason for an emergency hospital visit in Addis Ababa during 1999¹¹. Road traffic crashes are the commonest cause of injury in urban areas in Ethiopia with 199 fatalities per 10,000 licensed vehicles per year^{12,13}.

Our study at the Tikur Anbessa University Hospital (TAUH) was aimed at determining the volume and categories of major limb trauma and common orthopedic conditions requiring emergency treatment, and the relative incidence

of specific fractures. It also allowed us to check the adequacy of the information recorded on the 'attendance list proforma' currently used by the Orthopedic Department, as well as how adequately this was being completed.

Patients and Methods

The study included all the orthopedic and major limb trauma patients who attended the 'surgical' emergency department of TAUH in a three-year period between December 2001 and November 2004, and who received treatment necessitating at least one further visit.

Tikur Anbessa University Hospital has 560 beds and is located in Addis Ababa, Ethiopia. It receives referred patients from all parts of the country and provides a local emergency service. There are 67 beds for orthopedic admissions (12% of the total), of which 49 are for adults and 18 for children. In addition to these 18 children's beds which are largely reserved for elective surgery, all other children with orthopedic emergencies are 'admitted' to the casualty ward. The Hospital provides out patient services for all major medical and surgical disciplines, and the Orthopedic Department holds a follow-up fracture clinic four days each week. There is one minor and three major operating sessions each week and it is very occasionally possible to admit and to operate on a patient in the main operation theater out of normal working hours.

When a patient is first seen in the emergency department an entry is made on an 'attendance list proforma' by the orthopedic resident who manages the patient. This list is available for the early morning department staff meeting when the details of the patients who attended during the previous twenty-four hours are presented and discussed. It contains the usual socio-demographic details together with the diagnosis as well as very limited details of how 'the injury' or 'problem' was caused or arose. In addition a 'registration book' is completed in the emergency department by the nurses, and records practically the same information. This allows useful verification of the admission list data. We believe that these two sources of information although lacking in detail were adequate to allow our audit.

The data included socio-demographic variables (age, sex and address); the diagnosis including

the site, the mechanism of the injury or source of the problem, together with the time which had elapsed before presentation at our Hospital. Diagnoses were based on the history and physical examination, reinforced when indicated by radiology and by laboratory tests. Major limb trauma was considered as acute injuries to the limbs resulting in fracture, dislocation, crushing, open wounds, amputations and neurovascular injuries. 'Polytrauma' was considered as the simultaneous injury of different regions of the body and where either one or the combination of these was life threatening. Children were aged 12 years or under. Diseases were categorized by using a modified (shortened) International Statistical Classification of Diseases and Related Health Problems (ICD-10). Where several injuries had occurred the most serious was classified, but in fact this was only very occasionally necessary. Our audit protocol had been approved by the Orthopedic Department. The data analysis was performed with the aid of EpiInfo-2000 software and results were expressed in absolute numbers, percentage, mean and ratios.

Results

A total of 7317 patients attended during the three years between December 1st, 2001 and November 30th, 2004 with an average of seven per day (range 1-18). Of these 5399 were males (73.3%) and 1910 females (26.1%), giving a male to female ratio of 3:1. Their ages ranged from 5 days to 98 years (median 25 years) (Figure 1). There were 5595 adults (76.5%) and 1712 children (23.4%). Of these 7317 patients 5610 (76.7%) were from Addis Ababa, 1486 (19.9%) out of Addis Ababa, and no information was available for 251(3.4%).

Trauma was responsible for the great majority, 7151 of the 7317 (97.7%). Of these road traffic accidents accounted for 2793 (39.1%), a fall 2505 (35.1%), a 'blow' 740 (10.4%), a machine 347 (4.7%) and 'others' 766 (10.6%) (Table1). Of 759 road traffic accidents in which the actual mechanism was accurately, it was noted that 666 (88%) had been 'hit by car' and only 93 (12%) were injured inside the vehicle. Upper and lower limbs were injured in almost equal proportions 3555 (49.7%) and 3113 (43.5%) respectively, while only 413 (5.8%) had more than one limb involved.

The leg (below knee) was the commonest limb site injured 1602 (22.2%), followed by the forearm 1399 (19.6%) (Table.2). Only 841 (11.8%) of the 7151 injuries involved the hand and digits; 162 of 197 (82.2%) amputations were distal to the wrist joint and involved either one or more fingers, of a thumb or most if not all of the entire hand. Ninety-nine (61.0%) of the 162 hand amputations were caused by a machine. Twenty-three (74.2%) of the 31 lower limb amputations were caused by Road Traffic crushes.

The left side was involved in 3558 (49.8%) compared to 3036 (42.5%) on the right side. But 381(5.2%) were of both sides and in 178 (2.5%) the side was not recorded. At least one limb fracture was noted in 6181 of 7317 patients (84.5%). Of these 1395 (22.8%) were closed, 1229 (19.8%) were either open, or occasionally complicated. However in 3557 (57.5%) this information had not been noted. (Table.3).

A total of 755 (52.0%) of the 1440 children's fractures involved either the radius or ulna or both, or were supracondylar fractures of the humerus. At least one limb fracture was noted in 6181 (84.5%) of 7317 patients.

In adults the commonest sites were either in the leg or forearm and comprised 2113 of 4740 fractures in these adults (45%). The majority of all the fractures were commonest between the age of 13 – 36 years, but supracondylar fractures

occur between 7-12 years, while pelvic fractures 8 (0.6%) and patellar fractures 1 (0.07%) were rare in children (Figure 2). Femoral and forearm fractures in females had two 'peaks' at the age of 0-12 and 48 – 60 years (Figure 3). Polytrauma was noted in 516 (7.2%) of the trauma patients, and of these RTA's caused 328/516 (63.6%), of whom 477 (92%) were in adults. Of the 315 dislocations 282 (90%) were in adults with the shoulder being most often involved.

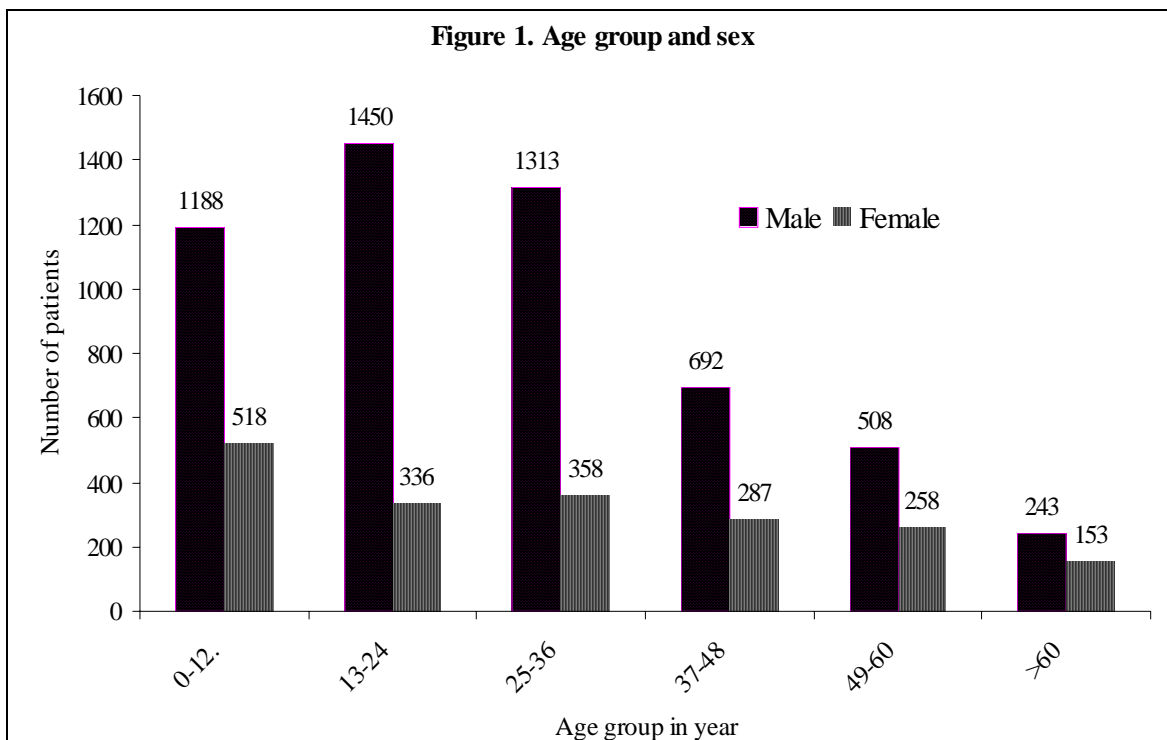
All of the emergency orthopedic patients of whom there were 165 of 7317 (2.3% of the total analyzed) were suffering from an acute infection. There were 68 (41.2%) with septic arthritis, 35 (21.2%) with acute osteomyelitis, 27 (16.4%) with pyomyositis, 16 (9.7%) with cellulitis and 19 (11.4%) 'Others'. Over all 120 (72.7%) were children and 45 (27.3%) were adults. Of these patients the majority 149/165 (90.7%) presented 'late' i.e. after 48 hours. However the majority of our patients 5400/7317 (74.4%) presented within 24 hours of their injury, and 4117 of these (57.7%) within 8 hours. Two thousand three hundred and seventy two of all the 7317 emergency patients (32.4%) required immediate admission but unfortunately a vacant bed in our hospital could only be found for 334/2372 (14.1%). Another 406/2372 (17.1%) (Only children) were accommodated in the casualty ward but the other 1632 (68.8%) (All adult) had to be referred elsewhere.

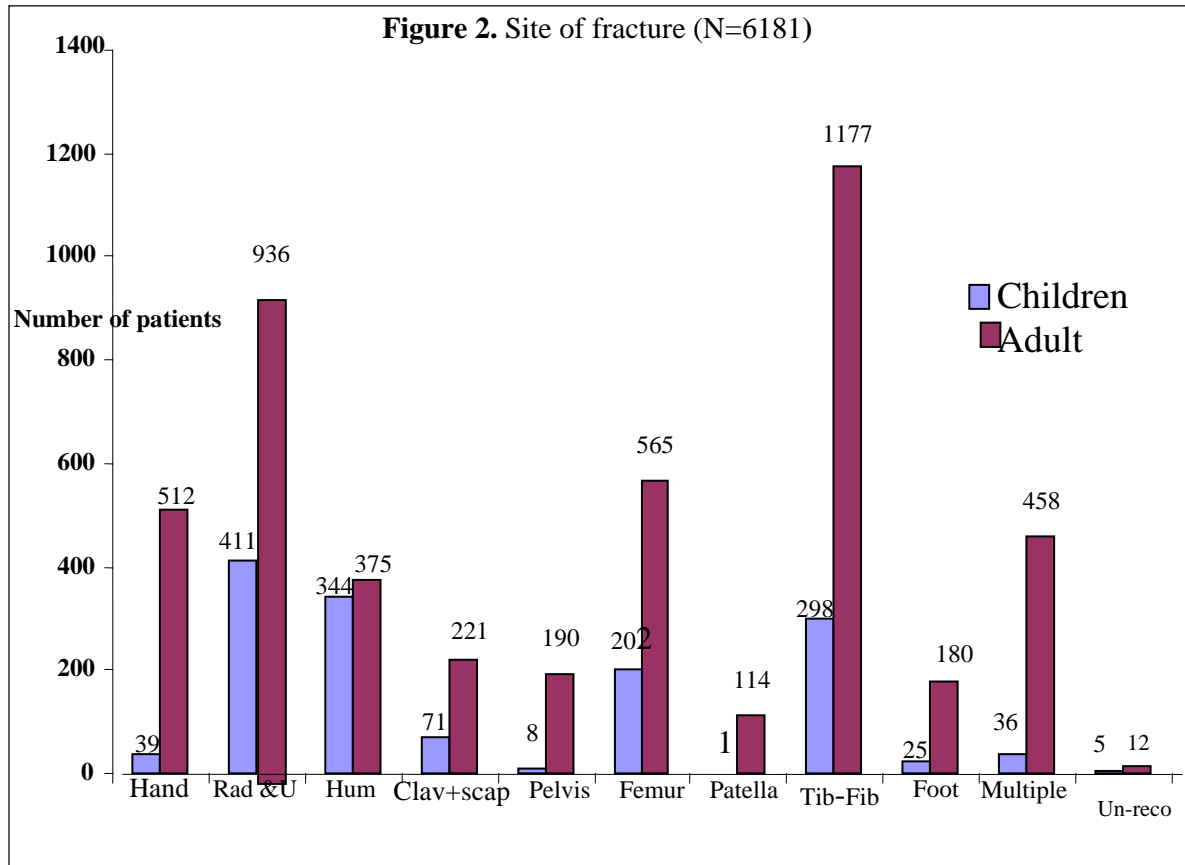
Table 1. Causes of major limb trauma at Tikur Anbessa University Hospital

| Aetiology | Adult | Children | Total No. (%) |
|-----------------------|--------------|-----------------|----------------------|
| Road traffic accident | 2278 | 515 | 2793 (39.1) |
| Fall | 1569 | 936 | 2505 (35.1) |
| Blow/assault | 700 | 40 | 740 (10.4) |
| Machine | 347 | 0 | 347 (4.7) |
| Crush by heavy object | 230 | 41 | 271 (3.8) |
| Bullet /blast | 249 | 18 | 267 (3.7) |
| Other | 168 | 60 | 228 (3.2) |
| Total | 5537 | 1614 | 7151 (100.0) |

Table 2. Classification according to site of injury

| Body Parts | Number | Percentage |
|---------------------------------------|-------------|--------------|
| Upper extremity | 3555 | 49.7 |
| Shoulder | 440 | 6.2 |
| Arm + elbow joint | 818 | 11.4 |
| Forearm + wrist joint | 1399 | 19.6 |
| Hand + digits | 841 | 11.8 |
| Multiple sites | 57 | 0.8 |
| Lower extremity | 3113 | 43.5 |
| Pelvis + hip joint | 233 | 3.3 |
| Thigh + knee joint | 954 | 13.3 |
| Leg + ankle joint | 1603 | 22.2 |
| Foot + toe | 277 | 3.9 |
| Multiple sites | 46 | 0.6 |
| C. Multiple limb injury | 413 | 5.8 |
| D. Site of injury not recorded | 70 | 1.0 |
| Total | 7151 | 100.0 |





Key: Rad & U = Radius and Ulna.
Tib – Fib = Tibia and Fibula

Clav+scap = Clavicle + scapular.
Un-rec = Not recorded

Figure 3. Forearm and femoral fracture in females

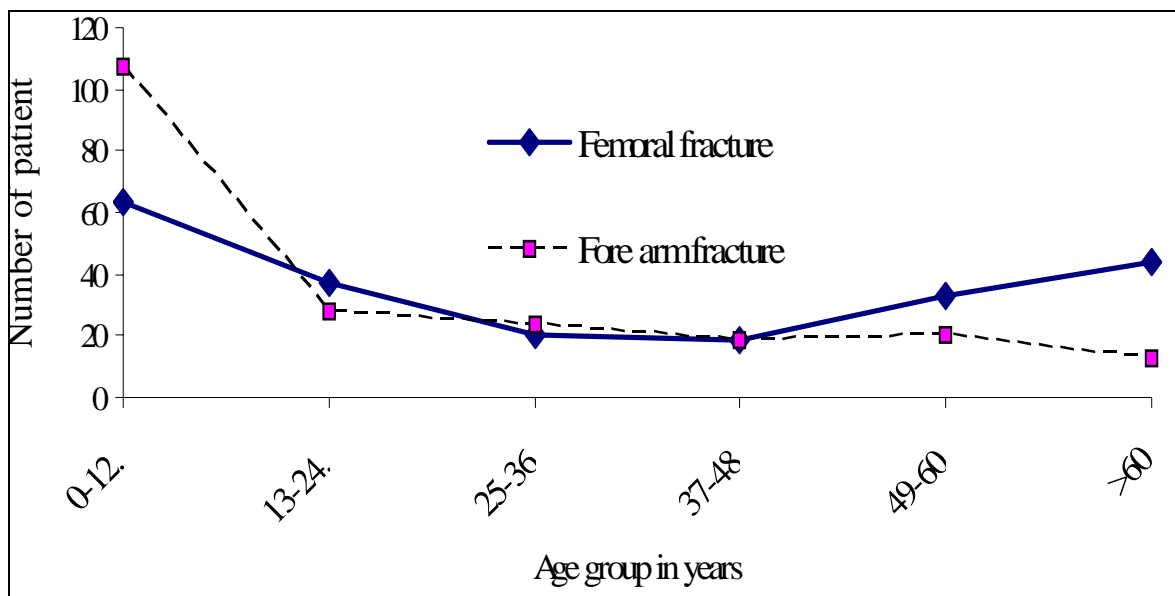


Table 3. Disease category

| Types Of Injury | No. (%) |
|---------------------------------------|---------------------|
| Soft tissue injury | 307 (4.2) |
| Fractures | 6181 (84.5) |
| Closed | 1395 (19.1) |
| Open and/or complicated | 1005 (13.7) |
| Fracture-Dislocation | 224 (3.1) |
| Not specified | 3557(48.6) |
| Dislocations and sprain | 360 (4.9) |
| Dislocation | 315 (4.3) |
| Ligament injury | 45 (0.6) |
| Traumatic Amputations | 197 (2.7) |
| Infections | 165(2.3) |
| Other specific types of injury | 107 (1.4) |
| Gangrene | 68 (0.9) |
| Others | 39 (0.5) |
| Total | 7317 (100.0) |

Discussion

The composition of our study population was similar to that found in developing countries, being a relatively young (median age of 25 yrs) and predominantly male group (M:F ratio of 3:1) many of whom were likely to be heads of households and thus responsible for several family members.^{7,10,12-15} Although rarely reported by local radio or television large numbers of road traffic accidents occur every day in Addis Ababa.

In our three year audit at TAUH there were 2793 patients injured in road traffic accidents producing limb trauma, and these accounted for 39% of all 7151 patients with major limb trauma. RTA's were the commonest cause of severe limb trauma (2793/7151 (39%)). Previous studies in Addis Ababa^{12,13,16} and in Kampala¹⁷ agree with our findings. Pedestrians were the largest group injured in road traffic accidents (88%). This is largely because of a lack of separation between pedestrians and vehicles, the lack of education of drivers and pedestrians and the lack of respect of the highway regulations. It is interesting that currently pedal cycles, and motorcycles are rare in Addis Ababa and thus injuries caused by these means of transport are rare.

In spite of major attempts to increase our turnover of in-patients it remains sad that 69% of emergency patients requiring urgent admission had in practice to be referred to other hospitals. Some of the reasons and possible remedies for many of our inadequate facilities for dealing with emergency injury patients as well these with acute orthopedic problem have been recorded in a previous publication which is also related to this study¹⁸.

Another distressing, but hopefully remediable problem is the delay which occurs before presentation at our hospital of adults and children with orthopedic infections. It is of relevance that in the last year 50 children (included in our survey)¹⁸ were admitted to our orthopedic department with established chronic osteomyelitis. It is possible that this could have been prevented had the children presented much earlier with their primary acute osteomyelitis.

As restoration of function is one of the major goals of the treatment of fractures and orthopedic problems we suggest that the patients' occupation should always be noted on the 'attendance list proforma'. It is

interesting that the data recorded on this list correlated very closely with that in the nursing register.

Conclusion

1. Major attempt must be made to reduce the current number of RTA's.
2. Further education of the public should decrease the delay in the presentation of children and adults with orthopedic infection
3. A general increase in facilities for dealing with severely injured patients including hand injuries is urgently required.
4. We believe that 'the attendance list proforma' in current use does give useful and reliable information.
5. We also believe that this audit recording the incidence of fractures and joint injuries by site will provide a base line for further studies.

Acknowledgement

The cooperation of the Orthopaedic Department is greatly appreciated. Thanks are due to Professor Geoffrey Walker FRCS, for assistance with the preparation of the manuscript.

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