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# EPIDEMIOLOGY OF INJURY PATIENTS AT BUGANDO MEDICAL CENTRE, TANZANIA

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## ABSTRACT

***Objective:*** **To describe the epidemiologic characteristics of injury cases at Bugando Medical Centre.**

***Setting:*** **Bugando Medical Centre, Mwanza, Tanzania.**

***Data sources:*** **Records, registries and case notes in the surgical wards and clinic, casualty, medical record department, radiology and theatre from January 1995 to December 1997.**

***Study sample:*** **Cases attended to at Bugando and diagnosed to have had an injury during the stated period. Only those whose records were complete and available were recruited in the study.**

***Data extraction:*** **A special data sheet was used to collect the required information from the registries in surgical wards clinic, casualty, theatre, radiology and medical records. Data analysis was Dbase IV and SPSS (version 9.0).**

***Results:*** **There were 3590 cases of injury recorded at the centre of whom 3340 (93%) whose data were complete were available for analysis. Of the cases, 2443 (73.1%) were males and 897 (26.9%) females while 252 (7.7%) were children under five years. The most affected age group were the 20-59 year category comprising of mostly males. The leading causes of injuries were falls, assault (28.7%) and motor traffic accidents (17.9%). Mortality was (2.2%) for all causes, and permanent disability was two per cent. The mean length of stay in hospital was 21 days (range: 1-321 days).**

***Conclusion:*** **A more comprehensive study is recommended to determine risk factors and magnitude of the problem.**

## INTRODUCTION

Injuries are a major cause of mortality and disability and are increasingly being recognised as a serious public health problem. Injuries also result in financial and production loss to nations while inflicting tremendous personal burdens on the injured and their families. Sixty six per cent of the global deaths from injuries occur in the developing world consuming substantial health sector resources(1). Historically, injuries have been regarded as the consequence of unavoidable accidents or careless behaviour rather than preventable public health problem. However, by analysing injury from a perspective of occurrence and cause, promising interventions can often be made. In the USA, injury accounts for more potential years of life lost before 65 years of age than cancer and heart disease combined. In 1985 one out of every four United States residents sustained injury(2).

Tanzania, like many developing countries lacks reliable and accurate information on injuries. One of the few studies that have been conducted has shown that injury is the second commonest cause of death in some parts of Tanzania with the probability of dying from injuries before age of 60 years being 1.7 to 2.4 times than that of UK(3). Despite the fact that hospital based data provide only a small proportion of the number of injuries, cases seen at hospital are most often severe and account for more severe disability and morbidity compared to those which do not reach the hospital. For instance it has been shown in the UK that injuries requiring hospitalisation tend to be more severe and nearly 10% result in a permanent disability(4).

The objective of this study was to document the epidemiology of injuries at Bugando Medical Centre.

## MATERIALS AND METHODS

Bugando Medical Centre (BMC) is the Lake Zonal referral hospital located in Mwanza, the second largest town in Tanzania. BMC serves a population of seven million in six regions. Eighty per cent of inpatients and outpatients come from Mwanza region. Seriously ill patients and all injury cases from the regional and other five district hospitals and twelve private hospitals and clinics are referred to BMC for further management.

This was a descriptive analysis of secondary data obtained from Bugando hospital records for the year 1995 through 1997. Records, registries, and case notes in the surgical wards and clinic, casualty, medical record department, radiology and theatre were retrieved and reviewed. A special data sheet was used to collect the required information from the registries. Data handling was achieved using Dbase IV which was later statistically analysed using SPSS soft ware for computation for chi square tests through cross tabulation where appropriate.

## RESULTS

Out of 3590 injury cases seen at Bugando Medical Centre over the three-year period, 3340 (93%) complete records available for analysis. A complete record comprised variables including age, sex, cause, type and outcome of injury, body parts injured, permanent disability, properly recorded date of admission and discharges and both x-ray and theatre records available. Sixty seven per cent were males and a majority of cases (67%), were in the age group 15 to 39 years (Table 1). Nearly three quarters (72.1%) of all injury cases were within the economically active group of between 15 and 60 years of age. As shown in Table 2, falls were the leading cause of injury, responsible for 32% of all cases with complete records. Interpersonal violence (assault) accounted for 30%, motor traffic accidents 18%, bicycle accidents 7%, burns 2.4%. Males were more affected than females from all causes except domestic violence where 92% were female. Falls and burns were the predominant causes of injury among the underfives, whereas assault, motor and bicycle accidents affected young adults between 15 and 39 years (Table 3).

**Table 1**

*Age and sex profile of study population*

| Age (years) | Sex | | | | Total | % |
|---|---|---|---|---|---|---|
| | Male | % | Female | % | | |
| 0 - 4 | 163 | 4.3 | 115 | 3.4 | 258 | 7.7 |
| 5 - 14 | 479 | 14.3 | 198 | 5.9 | 677 | 20.3 |
| 15 - 39 | 1412 | 42.3 | 441 | 13.2 | 1853 | 55.5 |
| 40 - 59 | 322 | 9.6 | 94 | 2.8 | 416 | 12.5 |
| 60+ | 87 | 2.6 | 49 | 1.5 | 136 | 4.1 |
| Total | 2443 | 73.1 | 897 | 100 | 3340 | 100 |

**Table 2**

*Main causes of injury categorised by sex*

| Cause | Male | % | Female | % | Total | % |
|---|---|---|---|---|---|---|
| Falls | 686 | 20.5 | 383 | 11.5 | 1069 | 32 |
| Assaults | 765 | 22.9 | 195 | 5.8 | 960 | 28.7 |
| Motor traffic | 450 | 13.5 | 147 | 4.4 | 597 | 17.9 |
| Accident by bicycle | 186 | 5.6 | 48 | 1.4 | 234 | 7.0 |
| Dog bite | 104 | 3.1 | 36 | 1.1 | 140 | 4.2 |
| Accident falling heavy object | 79 | 2.4 | 25 | 0.7 | 104 | 3.1 |
| Injuries caused by burn | 49 | 1.5 | 31 | .09 | 80 | 2.4 |
| Sports related | 50 | 1.5 | 3 | .08 | 53 | 1.6 |
| Occupational related injury | 46 | 1.4 | 5 | 0.1 | 51 | 1.5 |
| Snake bite | 15 | 0.5 | 11 | .33 | 26 | 0.8 |
| Others** | 13 | 0.3 | 13 | 0.3 | 26 | 0.8 |
| Total | 2443 | 73.2 | 897 | 26.9 | 3340 | 100 |

*Assault was more categorised by E-code into assaulted by police (26 cases assault by husband/wife (90 cases), assault by thugs/robbers (480 cases) and assault not specified (361) cases.

** Self-injury by knifes etc., 81 cases, drowning 25 cases, firearms 21 cases, human bite 13 cases.

**Table 3**

*Main causes of injury categorised by age group*

| Age (years) | Falls | MTA | Accident bicycle | Assault | Burn | Accident falling object | Other causes | All |
|---|---|---|---|---|---|---|---|---|
| 0 - 4 | 175 | 17 | 11 | 6 | 23 | 16 | 11 | 258 (7.7%) |
| 5 - 14 | 410 | 59 | 69 | 49 | 12 | 15 | 63 | 677 (20.3%) |
| 15 - 39 | 314 | 398 | 128 | 733 | 34 | 57 | 248 | 1853 (55.5%) |
| 40 - 59 | 98 | 100 | 18 | 153 | 7 | 9 | 38 | 416 (12.5%) |
| 60+ | 72 | 23 | 8 | 19 | 4 | 7 | 4 | 136 (4.1%) |
| Total | 1069 (32%) | 597 (179%) | 234 (7%) | 960 (28.7%) | 80 (2.4%) | 104 (3.1%) | 364 (10.6%) | |

Mortality arising from injury indicated that 73 (2.2%) patients died of whom 81% were males. The leading causes of death were motor traffic accidents 40%, assault 22%, falls 19.2% and burns 15.1%. Other causes of death were bicycle accidents, drowning, and occupational injuries. The number of deaths from specific injury cases (case fatality rate-CFR) were high in cases with visceral tear and multiple injuries (Table 4).

**Table 4**

*Mortality by type of injury related to case fatality rates*

| Type of injury | No. | (%) | Death No. | Death % | Case fatality rate (%) |
|---|---|---|---|---|---|
| Fracture | 1140 | 34.1 | 34 | 46.6 | 3 |
| Cut wounds | 1609 | 48.1 | 19 | 26 | 1.2 |
| Burns and scalds | 87 | 2.6 | 11 | 15.1 | 13 |
| Visceral tear | 30 | 0.9 | 6 | 8.1 | 20 |
| Traumatic amputation | 23 | 0.7 | 2 | 2.7 | 8.7 |
| Bullet injury/gun shot wounds | 17 | 0.5 | 0 | 0 | 0 |
| Sprains/strains/ dislocations | 309 | 9.3 | 0 | 0 | 0 |
| Others | 125 | 3.7 | 0 | 0 | 0 |
| Total | 3340 | 100 | 73 | 100 | - |

*Case fatality rate = proportion of deaths from specific injury cases

Cut wounds were the most frequent type of injuries among the cases (48.1%) followed by fractures which led to a high death rate (47%). The most frequent body regions affected among the cases were the upper extremities (30%), lower extremities and pelvis (22%), head, neck and spine (17%) and maxillofacial organs (17%). Fifty one patients (2%) suffered permanent disability including those at the time of admission or discharge had traumatic amputation of the upper and lower extremities, nerve injury resulting into permanent neurological deficit, quadriplegia and hemiplegia resulting from head, neck and spinal injuries.

The study was limited by the lack of long-term follow up information to ascertain the sequelae of injuries. Thirty eighty (1%) injury cases were intoxicated with alcohol and were mostly males (n=32) aged between 15-39 years, however, the difference was not statistically significant ($\chi 2 = 187$) probably due to the small sample size. Alcohol intoxication in this hospital was purely made from clinical diagnosis of drunkenness after clinical conditions that may mimic drunkenness excluding any form of head injury and cerebral malaria. The mean length of hospital stay was 21 days, (range 1-321 days). The majority of cases 2543 (76.1%), were treated at casualty as outpatients and discharged. Eight hundred and sixty cases (26%) had surgery and required the use of operating theatre. Radiological investigation were indicated in 2253 (68%) cases, where at least one x-ray film was taken.

## DISCUSSION

This paper highlights the epidemiology of injuries as a public health problem with respect to the causes, mortality and morbidity burden in terms of hospital stay, use of theatre and radiological services and the characteristics of cases. The usefulness of hospital data as a reflection of disease pattern in the community depends upon a number of factors. The area served by a hospital, if most patients die before reaching the hospital, as is often the case with drowning victims, it may be erroneously assumed that cause of death such as drowning is not a serious public health problem(5). Hospitals in isolated areas with a defined catchment population may be more useful for sampling purposes than those in areas where patients have a choice of multiple institutions. In spite of these limitations, hospital data are usually readily available and can be a useful guide as to whether particular injuries are a problem(5).

Lack of complete morbidity data for injuries is common in developing countries(6,7). As a consequence of inadequate population - based data, much of the information on injuries is derived from hospital admission which provide a measure of severe non-fatal injuries. If the cause of an injury is routinely obtained as part of the patient's history and if the hospital discharge summary is classified by external cause code E800-E949 discharge data would be extremely useful for surveillance(8,9). This was the case with hospital data analysed in this study. Our limitations in this study were lack of follow up data on the long term sequel of all injuries, data on alcohol intoxication lacked some clearly defined criteria apart from one documenting "dead drunk" or "intoxicated" which makes it difficult for objective assessment and reliability. Also there were some missing case notes including important entries in various registries.

The results of this study are similar to what has been observed elsewhere(3,10,11). More males aged between 15 and 59 years, suffer various forms of injuries than females. Injuries as a noncommunicable disease need to be appreciated as at public health concern. Some studies in other parts of Tanzania have demonstrated that injuries (accidental and intentional) are a major cause of death among adults 15 -59 years and men are three to five times more likely than women to die from injury or accidents(3).

The major causes of injuries in this study were found to have been falls (32%), assault (29.3%) and motor accidents (18%). However, other injuries that are not very common, but still important in this area include drowning 25 (1%) cases, snake and dog bites 26 (1%) cases each, human bites 13 cases and firearms 21 (1%) cases. This is a substantial number, with the exception of firearms, the remaining are more likely to be treated by traditional healers or at local institutions or never reported to the hospital. Snake bites are often overlooked as an important cause of death in many countries and have been described by one author as "the most neglected area of tropical

Medicine"(12). In a survey of rural health centres in the Ivory Coast, the incidence of animal bites predominated in the north of the country, and snake bites in the south(13).

Burns and falls seem to have proportionally affected more children both the underfives and those in the school-going age-group than any other causes. Similar observations were made in Ethiopia and Nigeria(14,15). It is evident that disabilities are important consequences of injuries. In addition to causing premature death, injuries are a significant cause of disability or time lost from normal activities including work, and subsistence farming, and are also a significant cause of permanent disability(16). The impact on the family of a permanently disabled member of the family and deaths of parents or other "bread winners" is likely to have 'serious consequences in developing countries, due to the universal lack of welfare systems. In fast-growing urban areas, large extended families are often financially dependent on one or two working members of the household(17). In rural areas the loss of a farmer may adversely affect food production.

The cost of injuries in this study was not examined but suspected to have been enormous. The hospital bed utilisation of injury cases was the second in surgical department with mean length of stay of 21 days. The use of operating theatre and radiological investigation was very substantial and this is very costly for the hospital. The indirect cost both for the cases and the hospitals are also quite enormous. More detailed studies on the cost of injuries are needed.

In this study 38 cases were reported to have been alcohol intoxicated, thirty six of these (95%) were aged between 20-59 years, only six (16%) were females. The fact that only 38 cases of injury were intoxicated with alcohol does underestimate this important risk factor as no routine blood alcohol concentrations (BACs) or breathalyser tests are measured in this centre. The clinical definition and criteria used for alcohol intoxication was inadequate. To conclude that one is drunk can only be arrived at by the result of the consideration of a combination of several tests of observation such as: general demeanour, state of the clothing, appearance of conjunctivae, state of the tongue, smell of breath, character of speech, manner of walking, turning sharply, sitting down and rising, picking up a pencil or a coin. Also some crude test of the cognitive functions such as memory of incidents from previous hours, estimation of their interval(20) .

This study is the first to be taken in Mwanza, overall it can be seen from the above that injuries are an important cause of morbidity and mortality in Mwanza. This situation does not differ from other more densely populated cities.

Further comprehensive studies need to be undertaken to provide more information on the contribution of risk factors such as alcohol, occupation and poverty.

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