

Geriatric injuries among patients attending a regional hospital in Shinyanga Tanzania

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Abstract: Geriatric injuries pose a major challenge to surgeons and general practitioners in developing countries. The objective of this study was to determine the prevalence, injury characteristics and outcomes of geriatric injury among patients at Shinyanga Regional Hospital in Tanzania. Data was collected using a pre-tested, coded questionnaire and analyzed using SPSS computer system. A total of 94 geriatric trauma patients constituting 22.7% of all trauma admissions were studied. The male to female ratio was 1.4:1. Their mean age was 68.5 years (ranged 60-98 years). Premorbid illness was reported in 38.3% of patients. Most injuries were intentional in fifty-three (56.4%) patients. Assaults, falls and road traffic crashes were the mechanism of injuries in 52.1%, 19.1% and 11.7% of cases, respectively. The majority of cases of assault were females accounting for 64.6%. The majority of injuries (81.9%) occurred at home. Pre-hospital care was recorded in 5.3% of cases. The musculoskeletal (72.3%) and head (66.0%) regions were commonly affected. Soft tissue injuries (wounds) (89.4%) and fractures (52.2%) were the most common type of injuries. The majority of patients (90.4%) underwent surgical treatment of which wound debridement was the most common procedure performed in 91.8% of cases. Complication rate was 39.4%. The mean length of hospital stay was 28.6 days (ranged 1 – 124 days). The length of hospital stay was significantly longer in patients with co-morbidities, long bone fractures and those with complications ($P<0.05$). Mortality rate was 14.9% and it was significantly related to advanced age, presence of pre-morbid illness, high injury severity score, severe head injuries and the need for ventilatory support ($P< 0.05$). In conclusion, traumatic injuries in elderly constitute a major but preventable public health problem in Shinyanga region and contribute significantly to high morbidity and mortality. Urgent preventive measures focusing at the root causes of the injuries and early appropriate treatment is highly needed to reduce the occurrence, morbidity and mortality associated with these injuries.

Key words: Geriatric, injuries, characteristics, outcome, Tanzania

Introduction

Geriatric injuries constitute a major but neglected public health problem and pose a great challenge to surgeons and general practitioners in developing countries (Iaria *et al*, 2009). The developing world is experiencing an aging population with its attendant increase in the burden of chronic diseases (Adam *et al*, 2008; Onwuchekwa & Asekomeh, 2009). It is projected that the population of elderly persons will double in sub-Saharan Africa between 2000 and 2030 (Onwuchekwa & Asekomeh, 2009). As the geriatric population grows, the fraction of geriatric

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trauma patients seen in trauma centres in developing countries is rapidly increasing (Iaria *et al.*, 2009). The increase in general and geriatric injuries in developing countries including Tanzania is associated with the increase in urbanization, motorization, civil violence, wars and criminal activities and are the leading cause of death and disability in trauma victims (Mbembati *et al.*, 2009). In Shinyanga region in Tanzania, geriatric injuries constitute a major but neglected public health problem and for decades, the incidence of these injuries has been increasing at an alarming rate (Shinyanga Regional Hospital Annual Report, 2008/2009 unpubl.).

Geriatric trauma patients constitute a large part of trauma patients and consume tremendous health care resources (Stevens *et al.*, 2006); having a cost of almost three times that of young patients (Kauder *et al.*, 2004). It is well established that outcomes after geriatric injury are significantly worse than in younger patients, resulting in disproportionate healthcare costs, increased mortality, and long-term morbidity (Jacobs, 2003; Stevens *et al.*, 2006). The poor outcome in geriatric trauma can be ascribed to pre-existing medical conditions like cancers, cardiac, renal and hepatic diseases as well as to a poor physiological reserve resulting from aging process (Jacobs, 2003).

The causes and mechanism of injury in the elderly have been reported to vary with age and socio-cultural settings (Thanni, 2006). Road traffic crashes (RTCs) and falls are the major mechanism of injury in the elderly (Nagurney *et al.*, 1998; Moore, 2003; Thanni, 2006). Advanced age is a well-recognized risk factor for poor outcomes following trauma (Vollmer, 1991). Effective treatment of the elderly injured patient is an important aspect of trauma care. The challenge to the trauma surgeon is in the reducing morbidity, preventing mortality and contributing to the development of strategies for prevention of injuries in general and injuries in the elderly in particular (Moore, 2003; Thanni, 2006). The outcome of treatment of geriatric injury patients may be poor especially in developing countries where lack of advanced pre-hospital care system and trauma centres together with ineffective ambulance system for transportation of patients from the site of injury to hospital continues to be an area of neglect that prevents optimal trauma care (Kauder *et al.*, 2004; Adam *et al.*, 2008).

Despite the fact that injury to the elderly consumes a significant proportion of trauma care resources, many trauma researches in Tanzania have focused on the paediatric and young adult populations (Mbembati *et al.*, 2009). A comprehensive picture of injury to the elderly has not emerged and the implications for health care planning remain largely unknown, unquantified, or dimly perceived. This study was therefore, conducted to establish the prevalence, injury characteristics and outcome of geriatric injury patients who were treated at Shinyanga Regional Hospital in Tanzania. The study results will provide basis for planning of preventive strategies and establishment of treatment guidelines.

Methods and Patients

Study design and setting

Between March 2010 and September 2010, a descriptive prospective study was conducted at the Accident and Emergency Department of Shinyanga Regional Hospital (SRH). SRH is a regional hospital located in Shinyanga Municipality and has a bed capacity of 350. The hospital serves as a referral hospital for seven districts namely, Shinyanga Urban, Kishapu, Kahama, Bukombe,

Maswa, Meatu and Bariadi. During this study, the Accident and Emergency (A&E) Department was the catchment area for geriatric trauma victims.

Study subjects

The study population included all geriatric injury patients aged 60 years (Adam *et al.*, 2008) and above seen at the A&E department of SRH during the study period. Unconscious patients without next of kin to consent for the study and give information were excluded from the study. Recruitment of patient to participate in the study was done after primary and secondary surveys done by the admitting surgical team. Patients the inclusion criteria were offered explanations about the study and requested to consent before being enrolled into the study. All recruited patients were managed according to advanced trauma life support (ATLS) and detected injuries were managed appropriately according to type of injury.

Data was collected using a pre-tested coded questionnaire. Data administered in the questionnaire included demographic characteristics (i.e. age, sex, area of residence), circumstances of the injury (i.e. time of injury, place of injury, pre-hospital care, timing of medical care), characteristics of injury (mechanism of injury, body region affected, type of injury, severity of injury), treatment parameters and outcome measures (i.e. length of hospital stay, mortality and complications). Patients were followed up until discharge or death.

Statistical analysis

Statistical analyses were performed using descriptive methods and SPSS version 15.0. Categorical variables were presented as frequencies and percentages, and continuous variables as mean, standard deviation (SD) or median values. Significance level was determined at p -value < 0.05

Ethical considerations

The permission to conduct the study was obtained from Shinyanga Regional Hospital authorities (Hospital Management Team) before the commencement of the study. Informed consent was sought from each patient before recruitment into the study.

Results

During the period under study, a total of 414 trauma patients were seen at the Accident and Emergency department. Of these, 94 (22.7%) were elderly aged 60 years and above. Fifty-four (57.4%) of the elderly were males while 40 (42.6%) were females (male: female= 1.4:1). Their ages ranged from 60 to 98 years (mean = 68.5 years). Thirty-six (38.3%) patients presented with history of pre-morbid illness namely chronic chest infections in eight (22.2%), cardiac diseases in six (16.7%), diabetic mellitus in 6 (16.7%), hepatic disease in five (13.9%), renal disease in four (11.1%), cancer in four (11.1%) and hypertension in three (8.3%) patients. The majority of the geriatric injuries (56.4%) were intentional. Unintentional injuries were recorded in 37 (39.4%) of cases and the remaining four (4.3%) patients were cases of indeterminate intent. Assaults, falls and road traffic crashes were the common mechanism of injuries in 52.1%, 19.1% and 11.7% of cases, respectively. The vast majority (64.6%) of cases of assault were females (Table 1).

Table 1: Mechanism of injury among the victims

Mechanism of injury	Male	Female	Total
Assaults	17	31	48 (52.1%)
Falls	10	8	18 (19.1%)
Road traffic crashes	10	1	11 (11.7%)
Suicide	5	-	5 (5.3%)
Burns	4	-	4 (4.3%)
Animal bite	2	-	2 (2.1%)
Collapsing wall	2	-	2 (2.1%)
Unknown	4	-	4 (4.3%)
Total	54	40	94 (100%)

Most (81.9%) of injuries occurred at home and on road (11.7%) and other places (7.4%). The majority (64.9%) of injuries occurred during night hours. Fifty-two (55.%) patients presented to the A& E department within 6 hours of injury, while twenty-four (25.5%) and eighteen (19.1%) patients presented between 6 and 72 hours and beyond 72 hours of injury, respectively. Regarding the mode of arrival at the hospital, sixty-four (68.1%) patients were brought in by friends, relatives or good Samaritans, twenty-three (24.5%) patients by the police, and only four (4.3%) patients by ambulance. The mode of arrival was not known in three (3.2%) patients. Only five (5.3%) of the patients had pre-hospital care.

The musculoskeletal (extremities) and head regions were commonly affected accounting for 72.3% and 66.0% of cases, respectively. Of those patients with injuries to the extremities, the upper limbs were commonly affected (Table 2). Most of lower limb injuries sustained by falls on the same level were fractured neck of femur and were more common in females. Spine, upper limbs and lower limb injuries were most frequent in fall from height and were more predominantly found in males. The difference between males and females was statistically significant ($P= 0.014$).

Table 2: Site of injuries among the victims

Site of injury	Frequency	Percentage
Musculoskeletal (extremities)	68	72.3
Head/neck	62	66.0
Chest	24	25.5
Abdomen	16	17.0
Lumbosacral spine	6	6.4
Pelvis	5	5.3
Multiple body regions	45	47.9

Soft tissue injuries (wounds) (89.4%) and fractures (52.1%) were the most common type of injuries (Table 3). Injury severity score (ISS) was recorded in 45 patients who had multiple injuries. The overall ISS ranged from 1-45 with a mean of 9.8. The majority of patients had minor to moderate injuries (ISS < 16) and accounted for 64 (68.1%) of cases. Severe injuries accounted for 30 (31.9%) of cases. In patients who had head injuries, 42 (67.7%) had mild to

moderate head injuries (Glasgow coma score 9-15) and the remaining 20 (32.3%) patients had severe head injuries.

Table 3: Type of injuries among the victims

Type of injury	Frequency	Percentage
Soft tissue injuries (wounds)	84	89.4
Fractures	49	52.1
Cranio-cerebral injury	46	48.9
Visceral injury	37	39.4
Burns	4	4.2
Other injuries	6	6.4

Nine (9.6%) patients were treated conservatively with simple wound dressing, broad spectrum antibiotics, tetanus prophylaxis and analgesics and discharged. The remaining 85 patients (90.4%) were admitted and underwent definitive surgical treatment of which wound debridement was the most common surgical procedure performed in 78 (91.8%) of cases (Table 4)..

Table 4: Type of surgical procedure performed (N= 85)

Type of surgical procedure	Frequency	Percentage
Wound debridement	78	91.8
Treatment of fractures	40	47.1
Craniotomy/burr holes	32	37.6
Exploratory laparotomy	12	14.1
Underwater seal drainage	9	10.6
Others	4	4.7

Thirty-seven (39.4%) patients developed sixty-four complications of which wound sepsis (48.5%) and complications of fractures (26.6%) were the most common. Other complications were septic shock (12.5%), limb amputation (7.8%), tetanus (3.1%) and compartment syndrome (1.6%).

The mean length of hospital stay (LOS) was 28.6 days (ranged 1– 124 days). The LOS was significantly longer in patients with co-morbidities, long bone fractures and those with complications ($P < 0.05$). Fourteen patients died giving a mortality rate of 14.9%. Mortality was significantly related to advanced age, presence of pre-morbid illness, high injury severity score (ISC), severe head injuries and the need for ventilatory support ($P < 0.05$). Seven deaths resulted from severe head injuries, three from cardiopulmonary arrest, two from haemorrhagic shock resulting from severe bleeding and one each from tetanus and septic shock respectively in patients. The outcome of geriatric injuries in this study was good in 45 (47.9%) patients who were successfully treated and discharged. Thirty-four (36.2%) patients were referred to tertiary care hospital (Bugando Medical Centre in Mwanza) for more specialized treatment and one (1.1%) patient discharged himself against medical advice.

Discussion

In this study, the geriatric trauma admissions to Shinyanga Regional Hospital account for over one-fifth of the total hospital trauma admissions, which are comparable to findings of a

retrospective study in southern Italy (Iaria *et al.*, 2009). The prevalence of geriatric trauma admissions in this study may actually be an underestimate. The magnitude of the problem may not be apparent because the study did not include pre-hospital deaths, patients who did not report to the hospital and patients who were treated in other hospitals. A better picture of the magnitude of geriatric injuries in this region requires comprehensive data collection including police records, hospital admissions, mortuary records and population-based study. Better data could support useful policy guidance and help abate geriatric injuries and their related morbidity and mortality.

In this study, pre-morbid illness was found to be significantly associated with high mortality and prolonged hospitalization. The presence of pre-morbid illness has been reported elsewhere to have an effect on the outcome of geriatric trauma patients (Ferrera *et al.*, 1999; Kauder *et al.*, 2004; Bergeron *et al.*, 2006; Adam *et al.*, 2008).

In this study, assault was the most common cause of injuries and showed female predominance. This observation is in contrary to other studies which reported falls as the most common mechanism of injury in geriatric trauma (Nagurney *et al.*, 1998; Ferrera *et al.*, 2000; Sterling *et al.*, 2001; Ghodsi *et al.*, 2003; Bergeron *et al.*, 2006). High incidence of assaults in women in our study may be attributed to the traditional belief in this region that elderly women are involved in witchcraft practices and have been implicated in the use of supernatural or magical powers to inflict harm upon members of a community or their property.

The incidence pattern in this survey showed that most cases of geriatric injuries occurred at home and showed nocturnal prevalence. Similar observation was noted in other studies reported elsewhere (Zautcke *et al.*, 2000; Adam *et al.*, 2008). This observation can be explained by the fact that, night may have enabled the perpetrator the cover of darkness to make their identification difficult; and it is also a period when their targets (victims) are more likely to be at home.

The prehospital advanced life support has been reported to be an important component of trauma care in general and particularly in elderly trauma patients, and plays a vital role in determining the final outcome of treatment when done appropriately (Lane *et al.*, 2003; Jacobs *et al.*, 2003; Scheetz, 2003). In the present study, prehospital treatment was reported in only 5.3% of geriatric injury patients seen at the A&E department as a result the majority of them were brought in by relatives, Good Samaritan and police who are not trained on how to take care these patients during transportation. The lack of advanced pre-hospital care and ineffective ambulance system are a major challenges in providing care for geriatric trauma patients in this region and have contributed significantly to poor outcome of the patients.

The present study showed that the upper extremities and the head were commonly affected in assaults indicating the intent to kill the victim and associated upper limb injuries were sustained as the victims were trying to protect themselves from head injuries. In agreement with other studies (Ghodsi *et al.*, 2003; Bergeron *et al.*, 2006; Adam *et al.*, 2008), this study showed that most of lower limb injuries sustained by falls on the same level were fractured neck of femur and were more prevalent in females. This is attributed to osteoporotic changes in old age. Fall injuries have been shown to have a higher cost in women than men because of fractures sustained in osteoporotic women (Ghodsi *et al.*, 2003; Stevens *et al.*, 2006; Adam *et al.*, 2008).

Most of patients in this study required surgical intervention and a significant number were referred to a tertiary care hospital for more specialized care reflecting a need for urgent planning of preventive strategies and improvement in trauma care in this region. The management and care of the injured geriatric patient is challenging. Studies have shown that compared to younger trauma victims, geriatric trauma victims not only have greater morbidity and mortality, but also have longer hospital stays and consume more hospital resources at the same injury severity scores (DeMaria *et al.*, 1987; Champion *et al.*, 1989; Finnelli *et al.*, 1989; Bergeron *et al.*, 2006; Isaac *et al.*, 2007). This observation reflects the high complication rate, prolonged hospitalization and high mortality rate among geriatric injury patients in this study. Reasons for these differences include a higher number of co-morbidities, lower physiological reserve (leading to a higher risk of hypotension, hypovolaemia, hypoglycaemia and syncope), under triage, lack of prehospital care, ineffective ambulance system and lack of trauma centre care. Any measures to improve the outcome of these patients should therefore focus on these reasons.

In conclusion, this study showed that traumatic injuries in elderly constitute a major but preventable public health problem and contribute significantly to high morbidity and mortality in Shinyanga region of Tanzania. Urgent preventive measures focusing at the root causes of these injuries and early appropriate treatment is highly needed to reduce the occurrence, morbidity and mortality associated with these injuries in this region.

Acknowledgements

The authors acknowledge the hard work and professionalism of the assistant medical officers at Shinyanga Region Hospital who provided quality patient care for our study patients in such a challenging environment. The authors acknowledge the Health Management Team of Shinyanga Regional Hospital for permission to conduct this study.

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