Original article

Pattern of trauma in elderly patients seen at the trauma centre of national hospital Abuja, Nigeria

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ABSTRACT

Introduction: The global population is aging, creating challenges for health systems. The mean age of patients with major trauma has increased over time, posing some challenges for trauma system designs. Elderly trauma patients are said to have higher mortality rates and longer hospital and intensive care unit stays. This study is aimed at assessing the pattern of injuries in elderly population in a dedicated trauma centre of a developing economy.

Methods: This is a retrospective study of all patients aged 60 years and above seen in the trauma centre of a West African tertiary hospital over a three year period from January 2017 to December 2019. Relevant parameters including Sociodemographic data, injury pattern and injury scores were derived from the trauma registry. Data analysis was done using statistical package for social sciences (SPSS) version 24. Results were presented using tables and a figure.

Results: A total of 183 patients aged 60 years and above were enrolled out of 4549 general trauma patients, representing 4% of the trauma patient population seen. Male to female ratio was 2.3 with the mean age of 65 ± 6.3. The most frequent mechanisms of injury were motor vehicular crash (MVC) (48.4%), followed by falls (16.5%). More proportion of females (21.8%) were significantly found to suffer falls compared to their males (14.2%) counterparts ($p < 0.05$). Traumatic brain injury was the commonest diagnosis accounting for 24.3% of cases. The predominant revised trauma scores (RTS) and injury severity scores (ISS) were 12 and 1–15 respectively, with overall mortality of 6.1%.

Conclusion: The proportion of elderly trauma patients studied in this centre is low. MVC is still the leading mechanism of injury in our elderly trauma population. The mortality rate is however low in this study, in line with the low trauma and severity scores. Preventive measures for MVC should be strongly encouraged to reduce the incidence of elderly trauma patients in this part of the world.

African relevance

- The African population is gradually aging but the aged population is still low.
- The article shows that we may not always extrapolate the practice of other climes to our African settings.
- This article will help trauma team and emergency physicians prepare relevant guidelines targeted at elderly in Africa.
- This article will also serve as a baseline data for subsequent study on elderly or geriatric emergencies and trauma in Africa.

Introduction

The global population is aging, creating challenges for health systems [1]. It is estimated that elderly people will represent up to one–fifth of the world population [2–4] and almost 39% of trauma admissions by 2050 [5]. The proportional projected growth in older persons around the world has been termed the 'silver tsunami' [6]. Major trauma has typically been considered a disease of the young, but the mean age of patients with major trauma has increased over time, creating challenges for trauma system designs [7]. A study of almost 200,000 trauma patients found that there was an increase in mortality starting at the age of

40 years [8]. Compared to younger adults with major trauma, older patients have higher mortality rates, longer hospital and intensive care unit stays, and are more commonly discharged to a nursing home [9,10].

Trauma in geriatric patients increases with age, and is a leading cause of disability and institutionalisation, also resulting in morbidity and mortality [11–15]. The immediate and or late consequences which the elderly incurs in after a traumatic event are numerous: fractures, contusions, bruises, wounds, visceral lesions, head injuries, post fall syndrome and death [16–18]. A deficit across the visual, auditory, musculoskeletal and nervous systems, with reduced visual acuity, lower perception of pure tones, postural instability, deterioration of reflexes or slowing of reaction time are closely related to age; as co morbidities and drug therapies increase risk of trauma in the elderly [19–24]. The effect of trauma would decrease both the ability to live an active lifestyle and the physiologic capacity in elderly patients [25].

In Nigeria with current population of over 200 million people, the proportion of elderly, defined as men and women aged 60 years and above is considerably low at less than 6% [26]. Abuja has a current population of slightly more than three million people. The proportion of elderly population in Abuja is even lower [27].

The aim of this study is to assess the pattern of injuries in people aged 60 years and above in a dedicated trauma centre with a view of exploring the common mechanisms, injury types and injury severity among others.

Methods

This is a retrospective study carried out in a dedicated trauma centre, which serve as a referral centre for major trauma in the region.

All the trauma patients aged 60 years and above seen over a three year period from January 2017 to December 2019 at the trauma centre were recruited into this study. Their records were retrieved from the trauma registry. Parameters gotten from the registry included demographic information like age and sex, place of injury, referral status and mechanism of injury. Findings on primary and secondary surveys including pulse rate, blood pressure, respiratory rate, Glasgow coma score, oxygen saturation, identified injuries and diagnosis were recorded. Patients' dispositions from the emergency centre as well as their final outcome from admission were equally included.

Additional information was obtained from their case notes where necessary. Calculations of injury severity scores (ISS) and revised trauma scores (RTS) were derived and categorised into three groups for the purpose of this study. Data was analysed using statistical package for social sciences (SPSS) version 24. Test of significance was done using student t-test and chi square at $p < 0.05$ for discrete and non-discrete variables respectively. Results were presented using tables and a figure.

Results

Out of the total volume of 4549 patients seen over the study period, only 183 patients were 60 years and above and so eligible to be enrolled into this study. This represents 4% of the trauma cases seen in the centre. The study population comprised 128 males and 55 females with male to female ratio of 2.3 and mean age of 65 ± 6.3. Majority of the injuries (44.3%) occurred at the city centre while the least (24.0%) occurred outside the federal capital territory (FCT). In general, 79.6% of the injuries sustained by the study population were isolated injuries while 20.4% were multiple injuries. Most of the patients (68.3%) were brought in by their relatives, followed by police/ federal road safety corps (FRSC) in 10.9%, passersby (6.6%), friends/colleagues, hospital staff and self each consisting of 4.4% and by culprit in 1.1% of cases. These are shown in Table 1.

The most frequent mechanism of injury among the patients was motor vehicular crash (MVC) which is responsible for 48.4% of cases, followed by falls (16.5%), pedestrian vehicular crash (PVC) in 13.2%, assaults (9.3%), motor bike crash (MBC) in 7.7% and others including

Table 1
Socio-demographic profiles, location and reception of the patients.

Variables		Frequency	Percentage (%)
Sex	Female	55	30.1
	Male	128	69.9
	Total	183	100.0
Age (mean ± standard deviation)		65.0 ± 6.3	
Where it happened?	Abuja city	81	44.3
	Suburb	58	31.7
	Outside FCT	44	24.0
	Total	183	100.0
Type of injury (multiple or isolated)	Isolated	146	79.6
	Multiple	37	20.4
Patient was brought by?	Police/FRSC	20	10.9
	Relatives	125	68.3
	Friends/colleagues	8	4.4
	Culprit	2	1.1
	Passerby (good Nigerian)	12	6.6
	Hospital staff	8	4.4
	Self	8	4.4

burns in 1.1% of cases. When put together, road traffic-related accidents (RTA) accounted for 69.3% of injuries. These are shown in Fig. 1.

More proportion of men were involved in MBC (9.4% vs 3.6%), in PVC (17.3% vs 3.6%) and assault (10.2% vs 7.3%) while more females (21.8%) suffered falls than males (14.2%).This observed difference in the proportion of falls is statistically significant ($p = 0.048$). About 43.7% of the patients received some form of pre-hospital care. More males (46.7%) proportionately received pre-hospital care than their female counterpart (36.4%). However, this difference is not statistically significant ($p = 0.198$). These are shown in Table 2.

Majority of the patients (77%) recorded RTS of 12, followed by a score of three to ten in 16.4% and then a score of 11 in 6.6% of cases. Similarly, up to 67.3% had ISS of 1–15, followed by a score of 16–74 in 36.1% and a score of 75 in 1.6% of cases. While more males had a score of 75 (2.3% vs 0%), more females had a score of 1–15 (78.2% vs 55.5%). This calculated difference in severity scores between males and females is significant ($p = 0.009$). These are shown in Table 3.

Table 4 shows that the deaths (3.3%) recorded in the emergency centre were all males. In addition, while more proportion of females were discharged (38.2%) or admitted to the ward (47.2%), more males (7.0%) left against medical advice (LAMA) and more males (14.1%) were admitted into the intensive care unit (ICU). Out of the 108 patients who were admitted into the ward and ICU, 104 (96.3%) were ultimately discharged, 3 (2.8%) later died and 1 (0.9%) left again medical advice. Again, all the recorded deaths were males.

Table 5 shows that traumatic brain injury (TBI) was the commonest diagnosis in the studied group accounting for 24.3% of cases, followed by soft tissue injuries (22.1%), fractures/dislocations and multiple injuries accounting for 20.4% each, chest injuries (5%), spinal injuries (2.5%), abdominal injuries (2.2%) while the least diagnoses were eye and crush injuries accounting for 0.6% each.

Discussion

This study reviewed a data of 183 patients aged 60 years and older, over a three year period. This small proportion (4%) of elderly trauma patients seen over this period is revealing. It shows that quite a large number of trauma patients in our environment are still young people [7,28]. This finding also reflects the small elderly proportion of Nigerian population which is currently put at less than 6% [26,27]. This small proportion of elderly trauma patients has been found to be similarly less than 5% in other studies in Africa [29,30]. This age trend has since changed in different parts of the world with progressive increase in the elderly population [7,31,32]. In particular, a landmark study in Europe has recorded up to 20.2% of elderly trauma population over a similar
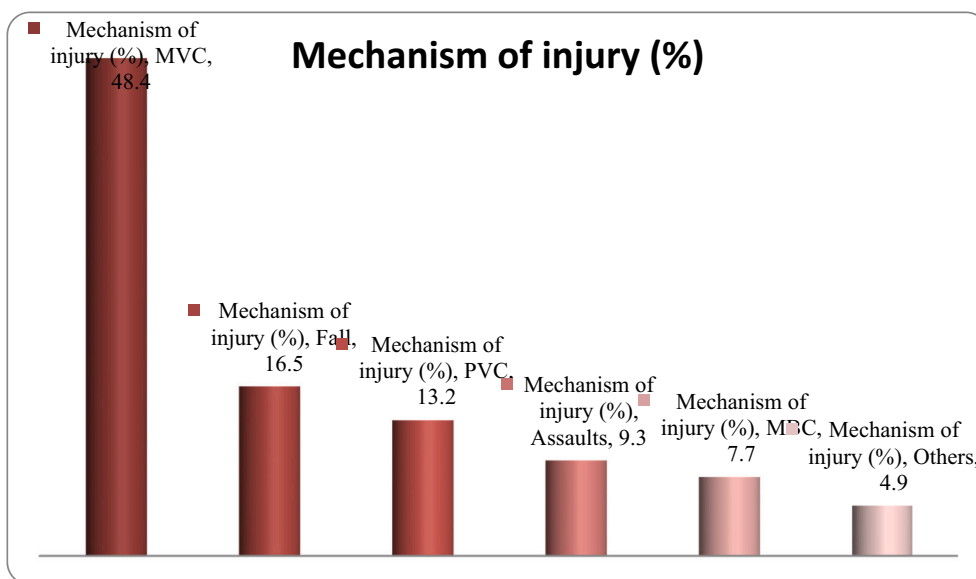
Fig. 1. Distribution of mechanism of injury.

Table 2
Association between mechanism of injury and gender.

Variable	Female (%)	Male (%)	Total (%)	Test statistic (χ^2)	p-Value
Mechanism of injury:					
Assault	4 (7.3)	13 (10.2)	17 (9.3)	10.879	0.048
Fall	12 (21.8)	18 (14.2)	30 (16.5)		
MBC	2 (3.6)	12 (9.4)	14 (7.7)		
MVC	32 (58.2)	56 (44.1)	88 (48.4)		
PVC	2 (3.6)	22 (17.3)	24 (13.2)		
Others	3 (5.5)	6 (4.7)	9 (4.9)		
Total	55 (100.0)	127 (100.0)	182 (100.0)		
Transfer/pre-hospital care:					
YES	20 (36.4)	60 (46.9)	80 (43.7)	1.727	0.198
NO	35 (63.6)	68 (53.1)	103 (56.3)		
Total	55 (100.0)	128 (100.0)	183 (100.0)		

Table 3
Association between RTS, ISS and gender.

Variable	Female (%)	Male (%)	Total (%)	Test statistic (χ^2)	p-Value
RTS					
3–10	4 (7.3)	26 (20.3)	30 (16.4)	5.294	0.062
11	3 (5.5)	9 (7.0)	12 (6.6)		
12	48 (87.3)	93 (72.7)	141 (77.0)		
Total	55 (100.0)	128 (100.0)	183 (100.0)		
ISS					
1–15	43 (78.2)	71 (55.5)	114 (62.3)	8.474	0.009
16–74	12 (21.8)	54 (42.2)	66 (36.1)		
75	0 (0.0)	3 (2.3)	3 (1.6)		
Total	55 (100.0)	128 (100.0)	183 (100.0)		

RTS, Revised Trauma Scores; ISS, Injury Severity Scores.

Table 4
Disposition of the patients from emergency centre and final outcome based on gender.

Variable	Female (%) ($n = 55$)	Male (%) ($n = 128$)	Total (%) ($N = 183$)	Test statistic (χ^2)	p-Value
Disposition from emergency centre					
ICU/burns unit	6 (10.9)	18 (14.1)	24 (13.1)	4.154	0.376
Died	0 (0.0)	6 (4.7)	6 (3.3)		
Discharged	21 (38.2)	37 (28.9)	58 (31.7)		
Ward	26 (47.3)	58 (45.3)	84 (45.9)		
LAMA	2 (3.6)	9 (7.0)	11 (6.0)		
Final outcome from admission					
Discharged	32 (100.0)	72 (94.7)	104 (96.3)	1.258	0.685
Died	0 (0.0)	3 (3.9)	3 (2.8)		
LAMA	0 (0.0)	1 (1.3)	1 (0.9)		
Total	32 (100.0)	76 (100.0)	108 (100.0)		
Days before outcome ($\pm$ SD)	9.5 $\pm$ 8.7	11.0 $\pm$ 8.5	10.5 $\pm$ 8.5	t-Test −1.729	0.088

world even at old age. This bread winning role of the elderly in some parts of East and West Africa has been documented [36]. Men are said to be busier and industrious in the African context, and so more prone to trauma. This may also be linked to the predominant male population in Abuja, Nigeria [26,37]. This higher male involvement in injuries is supported by findings in some settings [28,38]. It is however not the same in other locations, particularly in elderly population [33,39].

Majority of the injuries happened at the city centre (44.3%). This is partly due to the fact that the centre where this study was carried out is located in the heart of Abuja city. It is therefore, more likely to have more patients coming from the city centre. More interesting is the fact that the proportion of the patients coming from outside the FCT (24%) is relatively high, more than half of those coming from the city centre. This is not surprising since the hospital is a referral centre catering for major trauma patients in the region. Majority of the patients were brought to the hospital by their relatives (68.3%). This may be linked to the family support system accorded to the elderly in Nigeria. In addition, the

duration [33]. Some studies from low and middle income countries in Asia and South America have also shown similar trend of increasing elderly population [34,35].

The male to female ratio of 2.3 is generally believed to be due to men's adventurous nature and bread winning role in this part of the

Table 5
Diagnosis of the patients by gender.

Diagnosis	Female (%) ($n = 53$)	Male (%) ($n = 128$)	Total (%) ($N = 181$)	Test statistic (χ^2)[a]	p-Value
Soft tissue injuries	18 (34.0)	22 (17.2)	40 (22.1)	13.971	0.078
Chest injuries	2 (3.8)	7 (5.5)	9 (5.0)		
Abdominal injuries	1 (1.9)	3 (2.3)	4 (2.2)		
TBI	7 (13.2)	37 (28.9)	44 (24.3)		
Fractures/ dislocation	13 (24.5)	24 (18.8)	37 (20.4)		
Burns	1 (1.9)	2 (1.6)	3 (1.7)		
Spinal injuries	0 (0.0)	5 (3.9)	5 (2.8)		
Eye injuries	1 (1.9)	0 (0.0)	1 (0.6)		
Crush injuries	0 (0.0)	1 (0.8)	1 (0.6)		
Multiple injuries	10 (18.9)	27 (21.1)	37 (20.4)		

[a] Fisher's exact test used.

second most common mechanism of injury in this study (falls) would have happened at home necessitating a family member to accompany the patient.

The most frequent mechanisms of injury were MVC and falls. MVC when combined with PVC and MBC shows that 69.3% of the injuries are road traffic related. This is generally known to be the commonest mechanism of injury in different parts of the world [38]. This finding of road traffic related accidents predominance in elderly patients is corroborated in other parts of Africa [29,30]. However, falls have been identified as the leading mechanism of injury in elderly patients in many climes [31,32,39,40]. Old people are prone to falls for obvious reasons: unsteady gait, arthritic joints, poor vision and drug therapies among others [19–24]. Understandably, while more proportion of men were involved in MBC, PVC and assault, it is not so clear why more females were involved in falls. Factors such as more aged population of females and females higher life expectancy in Nigeria may be contributory. This female preponderance in falls was also seen in a large study by Rau and his colleagues in Taiwan [40]. Furthermore, It is an established fact that non-fatal falls are more common in females [41]. In general, it is interesting to note that MBC (7.7%) was not a frequent mechanism of injury in this study, as it is not common for old people to ride on motorbike in this part of the world.

The large numbers of patients (77%) with RTS of 12 showed that majority of the patients were triaged to delayed category at presentation while only 16.4% of cases with RTS of 3 to 10 required immediate care. This supported by the corresponding severity of injuries seen in this studied population. The ISS of 1 to 15 recorded in 67.3% of the population signifying less severe injury pattern corresponds fairly to the RTS stated above. Furthermore, the ISS of 75 seen only in 1.6% of cases explains the overall low mortality rate seen in this studied group. In contrast, higher mortality rates have been recorded in elderly patients following trauma in different parts of the world [9,10,31,40,42]. Males were found to have higher ISS scores than the females. Males are often more frequently involved in dangerous mechanism of injury associated with adventure and brevity while females are usually more careful. The recorded deaths were among the males and more males were admitted in the ICU. This reaffirms the higher ISS seen among males. In sharp contrast to this, all recorded deaths were females in another Italian study [33].

Traumatic brain injury (24.3%) and soft tissue injuries (22.1%) being the most frequent diagnoses can be extrapolated from the common mechanisms of injury described above. The arrays of diagnosis found in our study are similar to the findings in elderly trauma population in different parts of the world [16–18]. Given the average ISS in this studied group, it is possible that the TBI were mainly mild to moderate

category. This later classification was not further assessed in this study. Traumatic brain injury was found to be the commonest diagnosis in a couple of other works similar to this study [33,40]. The 20.4% with multiple injuries is low compared to the proportion of patients with ISS of more than 15. Recall that ISS of above 15 which accounted for 37.7% of the patients defines severe injuries in general terms [43].

The proportion of elderly trauma patients studied in this centre is low. MVC is still the leading mechanism of injury in our elderly trauma population. The mortality rate is however low in this study, in line with the low trauma and severity scores. Preventive measures against MVC should be strongly encouraged to reduce the incidence of trauma in elderly patients in this part of the world.

This study, being one of the few works that focused on elderly trauma population in this region of West Africa will serve as a background reference for future studies in the elderly. However, some of the limitations of the study include the retrospective methodology, small sample size and inability to include the impact of co-morbidity data on the outcome of this group.

Dissemination of results

Results from this article are yet to be disseminated outside the institution. However, it was informally discussed in the trauma team's regular weekly presentation. It is intended to be considered in the next revision of the existing trauma protocol of the trauma centre. There is plan to share the article with other hospitals through various platforms on publication.

Authors' contribution

Authors contributed as follow to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: OGO contributed 50%; OOO 20%; OO 15% and UAG contributed 15%. All authors approved the version to be published and agreed to be accountable for all aspects of the work.

Declaration of competing interest

The authors declared no conflicts of interest.

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