

## Original Research Article

# Chest trauma in the older people: epidemiological profile and treatment outcome

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## ABSTRACT

**Background:** There has not been any documented account of chest trauma among the older persons in Nigeria. The aim is to determine the epidemiological profile of chest injury in the old population.

**Methods:** A prospective study of all the patients with chest trauma in two Nigeria tertiary hospitals for 4 years period. The bio-data, cause and type of chest injury, time between injury and presentation in the hospital, number of rib fractures, associated injury, injury severity score (ISS), treatment and outcome were analyzed using range and mean.

**Results:** A total of 38(15.8%) older persons of 241 patients with chest trauma were analysed. Twenty-two (57.9%) patients were male with most of the patients being farmers and unskilled workers. Twenty-four (63.2%) patients sustained chest injury from motor vehicular crash while 10(26.3%) patients were from falls, 2(5.3%) patients from gunshot injury and 2(5.3%) patients from other causes. The time between injury and presentation to the hospital ranged from 30-minutes to 5-days. Twenty-seven patients (71.1%) had rib fracture. The associated injuries were limb bone injuries in 10 (26.3%) patients, blunt abdominal injuries in 2(5.3%) patients and neurological injuries in 4 (10.6%) patients. The treatment in 35 (92.1%) patients was at least by chest tube insertion. The 30-day hospital mortality was 3(7.9%) from patients with injury severity scores of 32, 41 and 48 respectively.

**Conclusions:** Traumatic chest injury in the older persons is still not common. Trauma to the limb bones was the commonest associated injury, and rib fracture was the commonest thoracic injury encountered. However, expeditious management led to reduced mortality recorded in this study.

**Keywords:** Chest trauma, Epidemiology, Nigeria, Older persons

## INTRODUCTION

Chest trauma is known to be a major cause of morbidity and mortality especially among the older persons.<sup>1</sup> However, it is generally not common in this age group in our environment. But when it does occur, it is of a great public health care importance, and challenging a moments for the thoracic or trauma surgeon.<sup>2</sup> The statistics as to the incidence and the treatment outcome of

chest trauma in this age group is still lacking in our country and even in the West African sub-region. Traumatic injuries affecting older people are typically multisystem in nature and life threatening.<sup>3,4</sup> This is because increasing age has been identified by many studies as an independent predictor for morbidity and mortality.<sup>5-7</sup> Regardless of the mechanism of the injury; closed head injuries and blunt chest trauma predominate in the setting of multiple trauma.<sup>8</sup> with severity of injury

as the leading determinant of death, but some severely injured patients often had good functional outcomes.<sup>4,9</sup>

The aim of the present study is to determine the epidemiological profile and treatment outcome of chest trauma in the older persons.

## METHODS

Prospective data of all the patients with chest trauma collated onto a proforma from June 2013 to May 2017 of two tertiary health institutions in Nigeria for older persons defined, according to World Health Organization (WHO) guideline as 60+ years.<sup>10</sup> The bio-data, cause of chest injury, time between injury and presentation in the tertiary institution, type of chest trauma, number of rib fractures, associated injury, Injury severity score (ISS), radiological finding, treatment, hospital stay, mortality were analysed using the SPSS version 21 statistical software package.

## RESULTS

A total of 38 (15.8%) of older persons of the total 241 patients sustained chest trauma with age range from 60 to 79 years. Most of the patients were farmers and unskilled workers while 27 (71.1%) patients were male. Twenty-four (63.2%) patients sustained chest injury by motor vehicular crash (22 were passengers and 2 were Pedestrians); 10 (26.3%) patients were from falls (4 were from palm trees and 6 were at home); 2 (5.3%) patients had gunshot injury, 1 (2.6%) patient was from industrial accident and 1 (2.6%) patient was assaulted (Table 1).

**Table 1: Mechanism of injury.**

Mechanism of Trauma	No. of patients (%)
Motor vehicular crash	24 (63.2%)
Falls	10 (26.3%)
Gunshot injury	2 (5.3%)
Industrial accident	1 (2.6%)
Assault	1 (2.6%)

The time from accident to presentation to hospital ranged from 30 minutes to 5 days. Twenty-seven patients (71.1%) had between 2 to 9 ribs fractured while 4 (10.5%) patients had flail chest. The type of chest injuries encountered were as follows: 12 (31.6%) patients had lung contusion, 20 (52.6%) had haemothorax, 3 (7.8%) had pneumothorax and 4 (10.5%) had haemo-pneumothorax. The associated injuries were as follows: 11 (28.9%) patients sustained injuries of the bones of limbs with 5 (13.2%) patients have upper limb bone injuries (dislocation of the acromio-clavicular joint, dislocation of shoulder joint, fracture of radio-ulnar bones, fracture of the phalanges) and 6 (15.8%) patients had lower limb bone injuries (pelvic bone fracture, fracture-dislocation of left femoral head, left femoral bone fracture, open tibia fracture, tibia and fibular bone fracture, dislocation left ankle joint), 2 patients had features of blunt abdominal

injury diagnosed intraoperatively at emergency laparotomy as diaphragmatic rupture and haemo-peritoneum respectively. Four (13.3%) patients had neurological injuries (3 patients sustained head injuries and 1 patient was spinal cord injury) (Table 2).

**Table 2: Associated injuries.**

Part of the body affected	No. of patients
Upper limb bone injuries	5
Lower limb bone injuries	6
Neurological injuries	4
Blunt abdominal Injuries	2

The treatment for patients with diagnosed chest injuries was by chest tube insertion in 35 (92.1%) patients to evacuate the pleural spaces of blood and air. The patients who also had rib fractures, had round the clock analgesia was administered (oral paracetamol, ibuprofen and tramadol). Such patients were subjectively assessed and considered adequate for pain management. The 30-day hospital mortality was 3 (7.9%) with the injury severity scores (ISS) of 32, 41 and 48 respectively. The dead in all the 3 patients occurred on first day of admission while the length of hospital stay for the rest was from 4-25 days. Two patients were referred out of the unit for neurological services.

## DISCUSSION

From the review of literatures of previous studies done in the country and the sub-region, this study is the first account of chest trauma in older persons. The reason for lack of report on chest trauma among this age group, may be because chest trauma in the old and elderly persons was not be quite common when compared with chest trauma in the middle age group. With an incidence of 15.8% of chest trauma in the older persons, the previous perception from available literatures worldwide that chest trauma in the elderly not being common may be true.

The reason is that, gunshot and stab injuries which were the main cause of injuries in the young age population were few in the older populations. More of the chest trauma occurred in the male than the female patients; the increase was mainly from occupational occasioned injuries like palm wine tapping and doing artisan works for which safety protective measures were not made a priority.

Blunt chest injury was prevalent in this age group from mainly motor vehicular crash and falls. This is similar to studies documented around the world, the difference was that in our report falls made a significant contribution as a cause of chest injury in this age group.<sup>2-6</sup>

The most common chest injury observed from our study was rib fracture. It has been reported that the commonest thoracic structure affected in chest injury is the rib, leading to rib fracture because of the increased calcium

deposition in this age group as against children whose ribs are elastic and not commonly fractured.<sup>11-13</sup> The clinical significance of rib fracture in the elderly is to show the degree of intra-thoracic organ involvement, determinant for worsening lung pathology, may subsequently be a source of chronic chest pain and indicate the severity of injury.<sup>14</sup>

The patients with fracture more than 3 ribs showed increased morbidity and mortality than those patients with fracture of 3 ribs or less.<sup>2,15</sup> This was not observed in our patients, and the reason as stated was that elderly patients with 3 or more rib fractures accessed health care at centers where specialist care from a thoracic surgeon was given.<sup>2</sup> Authors did not observe increased morbidity and mortality with increasing number of rib fracture as was previously stated.<sup>6,7</sup>

Most elderly patients have accompanying co-morbid factors, of which diabetes caused adverse hospital outcomes, and again trauma in the elderly has all the poor indices with regards to morbidity, however it does appear from present study and studies elsewhere that prolonged hospital stay occurred more than other known complications like empyema thoracic as reported in children.<sup>11,15</sup>

The mortality of 7.9% can be said to be low when considering the high injury severity scores the patients presented with. There are some reasons that ensured that low mortality rate from chest trauma in the old and elderly patients were recorded. Some of the reasons are that most of the patients, at first instance, were treated in the facilities where thoracic surgeons were present, and the adoption of more aggressive approach in the evaluation, resuscitation, diagnosis and treatment of the old and elderly chest trauma patients.<sup>2,8,16-18</sup>

As was reported from a study, that expeditious treatment should take precedence over the tendency to do some investigations, and that the implementation of geriatric trauma programs made compulsory in order to additionally improve outcomes of geriatric trauma victims.<sup>8</sup>

The mortality recorded was in the patients with higher injury severity scores of 32 and above. While this finding was similar to a study showing that the main determinant of mortality was dependent on the severity of the injury sustained by the elderly patients, a previous study done over 3 decades ago gave a contrary result that using the injury severity score alone was not a predictor of poor outcome in the elderly patients.<sup>9,19</sup> The intriguing thing was that most of our patients who sustained chest trauma were able to return to an independent function when they were discharged home, which agrees with reports previous studies.<sup>8,9,19</sup> Elderly patients with severe injury have decreased resource use as a result of increased mortality rates.<sup>5</sup> This is the case with our finding as the patients with severe injuries who died on the first day on

admission leading to the deployment of fewer resources for their management. It is pertinent at this point to state that preventing such injuries is the sine qua non for guaranteeing safety in the elderly patients.

The clinical utility of epidural analgesia for the treatment of rib fractures has not been generally accepted in authors' unit, authors depended on the use of triple analgesia comprising paracetamol, ibuprofen and tramadol, that is spread around the clock to ensure that pain control was uniform.<sup>6</sup> With this, for our elderly patients, we were able to manage the pain that emanated from the rib fracture.

Generally, injuries resulting from falls in the elderly can commonly occur at home as a result of some musculoskeletal or neurological disorders, and due to some home designs and renovations.<sup>20,21</sup> It can also lead to musculoskeletal and neurological systems injuries such as dislocation and fracture of the limb bones and head and spinal injuries respectively. The limb bones were commonly involved in the old and elderly patients as against the neurological system was reported in children.<sup>11</sup> The reason for this is not quite known but the speculation is that the limbs were reflex deployed for protection or defense in order to save the head from injury.

## CONCLUSION

Traumatic chest injury in the older persons is still not common. The injury is mainly caused by motor vehicular crash and falls from occupational related events with rib fracture which constitute the commonest chest injury encountered. The main stay of treatment is by the insertion of chest tube and triple oral analgesics thereafter. Severity of injury was the leading determinant of death, but severely injured patients often had good functional outcome.

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