



Neurotrauma burden in a tropical urban conurbation level I trauma centre



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ABSTRACT

Background: Neurotrauma is a preventable public health problem whose quantum is said to be increasing in Third-World countries. This evaluation was performed to collate data which is needed to guide in designing, implementing, and evaluating public health prevention programmes with respect to neurotrauma.

Methods: A single institution prospective study was carried out. Data was collected at the surgical emergency (SE) room over a year period (1st October 2012–30th September 2013). These included patients' demographics, cause of injury, region of the body involved, Glasgow coma scale score, and outcome. The patients were further divided into patients with traumatic brain (TBI) and spine injury (TSI). Analysis of the variables was by simple proportion, percentages, Chi-square and analysis of variance was used to determine the differences between group means. A probability (*p*) of less than 0.05 was considered statistically significant.

Results: A total of 2149 neurotrauma cases (38.8%) out of a total of 5541 surgical trauma cases were seen within the study period at our SE unit. Of the neurotrauma cases, 1621 were males, giving a male:female ratio of 3.1:1. The mean age was 31 years (median 30 years). The most common age group was 20–29 (29.6%) and 30–39 years (29.6%). Assault was the cause of neurotrauma in 903 patients (42%), closely followed by road traffic injury in 744 patients (34.6%). Brain and spine injury separately occurred in 93.2% and 5.3% of cases, respectively. Five hundred patients (23.3%) were resuscitated and referred to other centres due to lack of bed space. Forty (1.9%) patients were dead on arrival, while twenty-six (1.2%) died while on treatment at the emergency room.

Conclusion: Neurotrauma is one of the most common form of trauma at our surgical emergency. Assault and road traffic injury (RTI) were the most common cause of TBI and TSI respectively, with RTI being the most common cause of moderate and severe TBI. The incidence and aetiology of TBI varies according to age and gender.

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Introduction

Neurotrauma is generally regarded as a public health problem that has earned the attention of the world's health community. It may be in the form of traumatic brain injury (TBI) or traumatic spinal cord/caudal equinal injury (TSI). Their treatment and management frequently necessitates long-term care and consequently incurs economic cost to health systems.

The impairments leading to permanent disabilities and sometimes mortalities associated with neurotrauma account for substantial losses in terms of pains and economics to individuals, families, and communities. Traumatic brain injury may lead to an eclectic range of short- or long-term issues affecting: cognitive, emotion, motor and sensory functions. For individuals hospitalized after a TBI, almost half (43%) have a related disability one year after the injury [1]. When severe, TBI can adversely affect all aspects of an individual's life [2]. This can include impaired interactions with family and friends, capability to do household tasks, and/or participate in other activities of daily living, ability to drive, to work or be employed. Among the many issues that can follow TBI (as part of post-concussion syndrome), are problems related to the eyes and vision [3].

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Blurred vision, photophobia, and diplopia have been reported [4–6]. These can occur subsequent to TBI from all causes, regardless of severity. Problems with binocular vision, extraocular muscle function, and the accommodative system have also been found at relatively high frequencies [4–6]. These and other TBI-related vision problems have the potential to affect daily functioning in affected patients. On the other hand TSI especially when the spinal cord is involved, results in complications affecting nearly all systems of the body, leading to an increased morbidity and mortality in this group of patients. The complications profile reported from the developing countries are similar to that of the developed world with notably increased incidence [7].

When compared with common conditions TBI occurs more than any other disease, including breast cancer, acquired immune deficiency syndrome, Parkinson's disease and multiple sclerosis, and affects all age groups and both genders [8]. Traumatic brain injury (TBI) afflicts more Americans annually than Alzheimer's and Parkinson's disease combined [9]. In many countries, it affects the younger age group, but unlike some diseases the causes are known and quite preventable. With respect to TSI, the general demographics in the developing world share some similarities with the epidemiological pattern reported from the developed countries [10].

A retrospective study in Ilorin, Nigeria in 2008, over a 10-year period noted 648 patients aged 1–105 years (mean = 37 years) with TBI [11]. A cross-sectional study of all neurotrauma cases admitted to the neurosurgical service at Ile-Ife, southwestern Nigeria in 2013, over an 18-month period noted 143 patients [12]. A recent estimate indicates that each year 235,000 Americans are hospitalized for nonfatal TBI, 1.1 million are treated in emergency departments, and 50,000 die [13]. A northern Finland birth cohort study noted that the annual incidence of and mortality from TBI were 118 and 14/100,000, respectively; case fatality was 12%; an estimated prevalence of TBI at the age of 34 years was 269/100,000 [14]. On the other hand, a Christchurch New Zealand birth cohort article noted that the average incidence for 0–25 year age group ranged from 1.10 to 2.36 per 100 per year, with an overall prevalence of approximately 30% [15].

The common causes of TBI are road traffic crashes, falls and violence. The most common source of injury was falls for individuals 0–14 years of age and contact sports and motor vehicle accidents for 15–25 year olds [16]. Among all age groups, motor vehicle crashes and traffic-related incidents result in the largest percentage of TBI-related deaths (31.8%) [16]. The World Health Organization (WHO) predicts that unless there are changes in present policies including putting in place additional road safety countermeasures, there will be a major increase in road traffic fatalities over the next two decade and beyond [17].

In Nigeria, a developing, West African country, trauma system design has not been well addressed. Our Nation like most low-income and middle-income developing countries does not have established national trauma, TBI or TSI registries, which is an integral component of modern comprehensive trauma care systems.

The quantum of TBI is on the rise in Third-World countries, where it over burdens an already inadequate health care resources [18]. The workload emanating from neurotrauma increase will also affect the ability of neurosurgeons to function in their specialty, particularly if working independently or in a small group practice. However, the number of deaths and burden of disability of neurotrauma can be reduced through preventive measures after an epidemiological survey on trauma. In the light of this, countries need to develop surveillance systems and conduct epidemiologic studies to measure the impact of neurotrauma among their people to guide in designing, implementing, and evaluating public health prevention programmes.

Our aim is to collate data which is needed to be able to apply public health tools in prevention strategies, identify research and education priorities in neurotrauma.

Patients and methods

A single institution prospective study was carried out at the Lagos State University Teaching Hospital, Ikeja, Lagos, Nigeria, over a one-year period.

Setting

The hospital is a 750 bed hospital, a 2003 upgrading of the General Hospital at Ikeja (itself a 1967 upgrade of a Cottage Hospital built in 1955 during the British colonial rule in Nigeria). It is located in the most densely populated state in Nigeria with population of over 13 million in 2006 census and 18 million in 2012 estimate [19]. The State is located in the southwestern part of Nigeria and is the smallest in area of Nigeria's states; it is the most populous state and the nation's largest urban area, and arguably the most economically important state of the country and West Africa. The Nigerian population is 167 million – about 20% of population of Africa, the largest population of any African country.

Traumatic brain injury was defined as brain dysfunction emanating from an external mechanical force, and subsequently classified as mild in a person who has had a traumatically induced physiological disruption of brain function, as manifested by at least one of the following, Glasgow coma scale score (GCS) of 13 or 14, any period of loss of consciousness, any loss of memory for events immediately before or after the accident, any alteration in mental state at the time of the accident (e.g., feeling dazed, disoriented, or confused); and focal neurological deficit that may or may not be transient; moderate was defined with a GCS of 9–12 and severe injury with a GCS of 3–8. Traumatic spine injury was defined as acute injury following trauma to the spinal cord and or cauda equina that leads to varying degrees of motor and/or sensory deficits and paralysis, the definition excludes isolated injuries to peripheral nerves.

Data collection and analysis

Data collection was from all surgical emergency (SE) room admissions from 1st October 2012 to 30th September 2013. This was commenced two months after a ban on two wheeler commercial vehicles on major highways in the state. The information collected included demographics, cause of injury, region of the body involved, severity and outcome. These were entered into an electronic database. Analysis of the variables was by simple proportion, percentages, Chi-square and analysis of variance was used to determine the differences between group means. A probability (*p*) of less than 0.05 was considered statistically significant. Data analysis was performed using Statistical Package for the social Sciences version 17, Chicago, Illinois.

Results

A total of 2149 neurotrauma cases out of a total of 5541 surgical trauma cases were seen within the study period at our SE unit. Of the neurotrauma cases, 1621 were males and the rest were females, giving a male:female ratio of 3.1:1. The mean age was 31 years (median 30 years). The most common age group were 20–29 and 30–39 years which accounted for 29.6% each (Fig. 1).

Assault was the cause of neurotrauma in 903 patients (42%), closely followed by road traffic injury in 744 patients (34.6%). Road traffic injury was more common among young adults as compared

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