Demograpics of Patients Admitted with Traumatic Intracranial Bleeds in Kenyatta National Hospital in Nairobi, Kenya.

V.D. Wekesa[1], J.A. Ogengo[2], C.V. Siongei[3], H. Elbusaidy[4], M. Iwaret[4].
[1]Department of Surgery, Division of Neurological Surgery, University of Nairobi (UoN).
[2]Department of Human Anatomy, University of Nairobi.
[3]Department of Nursing, Kenya Methodist University.
[4]Medical Student, University of Nairobi.

Correspondence to: Vincent D. Wekesa, dvwekesa@yahoo.com, vwekesa09@gmail.com

Background: ***This study was designed to describe the demographics of patients presenting with traumatic intracranial bleeds at the Kenyatta National Hospital (KNH).***
Methods: ***A descriptive cross sectional analysis of consecutive patients who had traumatic intracranial bleeds, and admitted at the KNH between December 2010 and March 2011 was performed. A total of 51 patients with traumatic intracranial bleeds were recruited in the study with a male: female ratio of 24:1.***
Results: ***The age of patients ranged from 4-82 years with a mean of 34.3 (+/- 18.5). Ninety six point one (96.1) percent of the patients were males, with a male to female ratio of 24:1. Majority of the patients only had primary school education, 56.9%, while a few had tertiary level education, 3.9%. Eleven point eight (11.8%) percent of the patients did not have any form of education. Most of the patients were in some form of employment, 47.1%, while 7.8% of patients had no employment. A clear majority of these patients were married, 51%, while 47.1% were single. Thirty five point three (35.3%) percent of these patients were alcohol consumers, while 21.6% were cigarette smokers. A number of these patients had other co-morbidities. Only 7.8% of the patients were hypertensive while 2% had HIV infection.***
Conclusion: ***From the foregoing, the population greatly affected by traumatic brain injury involves the young and productive segment of the population. Specific interventions by policy makers and clinicians, based on findings of patient demographics can help prevent some of these preventable causes of traumatic brain injury.***

Introduction

The study of the epidemiology of head trauma, and traumatic brain injury has been a noted challenge[1]. The challenges have ranged from difficulties in reporting mild head trauma, especially those who do not present to hospital, to reporting of polytrauma fatalities, where traumatic brain injury is not factored. Patients who also die at the accident scene from brain injury may be lost to documentation. Whereas CTscan is the main radiological diagnostic modality in traumatic brain injury, it remains beyond reach of most third world countries[2, 3]. This makes diagnosis and documentation, the more difficult among patient populations in most countries with emerging economies.

Other common radiological changes further complicate the study of the epidemiology of traumatic brain injuries. These include 'spat-apoplexie', a condition characterized by delayed posttraumatic intracerebral hemorrhage, or other evolving small intracerebral clots like epidural hematomas[2,4,5]. These changes usually contribute to missed in diagnoses of traumatic brain injury related intracranial bleeds and pathology.

Above challenges notwithstanding, the reported incidence of traumatic brain injury is estimated at 200 per 100,000 populations at risk per year[1]. This estimate again is based on hospital records from admissions. This potentially omits patients who do not present to hospital and thus affects the subsequent estimates. There has been scarcity of data and literature from our part of the world on traumatic brain injury, especially on epidemiology. This is as opposed to most parts of the world, where extensive studies have been done on this important topic. Fife[6] studied head injury in the US, over a 4

year period from 1977-1981. He noted the incidence to be approximately, 825 per 100,000 populations in 1980. In a population based study in the Netherlands, Meerhoff et al[7]. Reported the incidence of traumatic brain injury to be 836 per 100,000 population. Further studies in China and South Africa described various incidences and important aspects of epidemiology of traumatic brain injury. In a randomized population study in six urban areas of China, Wang et al[8] noted an incidence of 56 per 100,000 populations. Nell[9], described the epidemiology of traumatic brain injury in Johannesburg South Africa, where he noted an incidence of 360 per 100,000 populations among the 15-24 year old age group. In all these epidemiological studies, the incidence of traumatic brain injury tends to decline with increasing age, but starts to rise again among the oldest in the populations.

Patients and Methods

This descriptive cross sectional study was conducted at the Kenyatta National Hospital (KNH), between December 2010 and March 2011. This is a national referral and teaching hospital. Though being a national referral hospital, it is the main hospital for the populous Nairobi suburbs, including the populous Kibera slums, and Nairobi's East lands. It largely caters for the middle class and the lower socio-economic groups of the population who can't afford private care. The hospital has a fully functional neurosurgical service with an independent ward and a neurosurgical intensive treatment area, within the ward. There are three general surgical wards, and a paediatric surgical ward where all head trauma patients admitted within 24 hours of injury, are managed by the neurosurgical service.

All head trauma patients admitted after 24 hours of injury, are admitted in the neurosurgical ward. All critically head injured patients (GCS less than 8), are admitted and managed from the main hospital Intensive care unit. Once improvement is noted clinically, they are upgraded to the neurosurgical intensive treatment area, in the neurosurgical ward. Patients admitted with head injury were clerked, and upon confirmation of the diagnosis, were recruited in the study after signing the informed consent to participate in the study. Relatives and guardians signed consent on behalf of those patients who could not do so on account of clinical condition. Data on socio-demographic characteristics, pattern and causes was collected using a questionnaire administered to patients who met the inclusion criteria.
Data collected was analyzed using statistical package for social sciences (SPSS) version 16.0. Approval for the study was granted by Kenyatta National Hospital/ University of Nairobi Research and Ethics Committee.

Results

The ages of the patients ranged from 4 to 82 years with a mean of 34.3 (± 18.5). Forty nine (96.1%) of the patients were males. The majority (56.9% of the patients only had primary education while only 2 (3.9%) had tertiary education, 3.9% (n=2) (Table 1).

Occupation, Marital Status and Social Habits

Twenty four (47.1%) of the patients were employed, 7 (13.7%) were students while the rest were either self employed or did not have any form of employment (Figure 1). Twenty six (51%) of the patients were married, while 47.1% were single (n=24). Regarding the social habits, 18 (35.3%) of the patients were alcohol consumers while 11 (21.6%) were cigarette smokers.

Table 1: Education levels among patients admitted with intracranial bleeds

Level of education	Frequency	Percentage
Primary	29	56.9%
Secondary	12	23.5%
Tertiary	2	3.9%
No education	6	11.8%

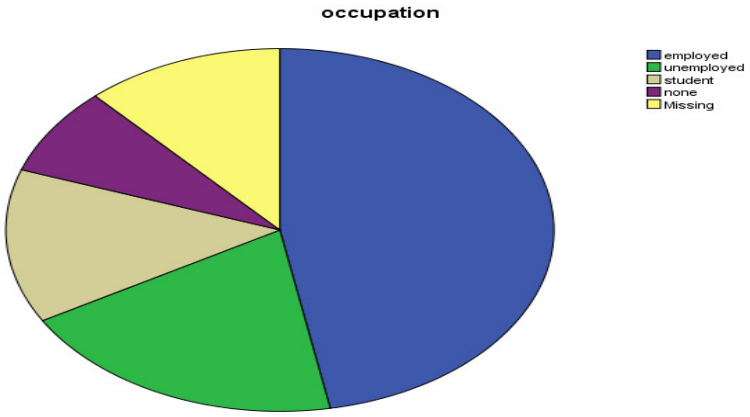

Figure 1. Occupational Distribution

Co-morbidities

Four (7.8%) of the patients were hypertensive while one (2.0%) was HIV infected. .Three of the 4 hypertensive patients had a previous history of spontaneous intracranial bleeding.

Discussion

The epidemiology of traumatic brain injury (TBI) has been studied extensively globally. There however exists a tremendous knowledge gap on this crucial subject in the region. In all the studies reported, males have been noted to be generally more affected than women. Kraus et al[10] noted a male to female ratio of 2:1. The highest male to female ratios have been noted by various studies to involve mainly the young adults, who tend to involve themselves in potentially risky activities.

Studies in the United States which involved emergency department evaluations revealed male to female ratios of 1.5:1[11] and 1.7:1[12]. Studies among South African adults revealed among the highest male to female ratio of greater than 4:1. The noted gender difference was noted to peak among young adults[9]. The findings in our study recorded among the highest male: female ratios globally of 24.5:1. This however, may not represent the exact findings in the population, because this was a hospital based study. The study may have excluded some patients, especially those discharged from the outpatient department with mild head injury, thus having an impact on overall result. The population covered in our study was mainly black and indigenous, so racial differences could not be ascertained.

While level of education has not been documented exclusively as a factor affecting the epidemiology of traumatic brain injury, it does contribute especially when associated with low socio-economic status. Majority of the patients studied in our series had primary level education. These were mainly low income earners, slum dwellers with high unemployment and poverty levels. They were generally associated with high interpersonal violence. A multicenter study from 1992 to 1994 in the US, involving mainly emergency department evaluations, revealed racial differences in the incidence of traumatic brain injury. Traumatic brain injury per 100,000 populations was noted highest among blacks, 582, whites 429, and 333 for other racial groups[12]. In these studies, findings were closely related to socio-economic status where blacks were generally noted to be poorer. A study in South Africa's Johannesburg city revealed the highest race specific differences in TBI ratios. The rate of sustaining TBI compared to whites was 3.3 in Africans, 2.7 in coloured and 1.9 among Asians[9].

The findings in our study revealed 47.1% of patients had some form of employment. These were however poor paying jobs due to the low level of education among the majority of patients studied. This reflected the high levels of poverty, especially the slum dwellers. Though majority of patients were married, this was not observed to contribute to the rate of TBI. In our study, 4 patients were known

hypertensives, while one patient was HIV infected. These, clearly are not known risk factors for TBI, but were studied as part of the general patient epidemiology. Hypertension and tachycardia have been an observed phenomenon in the acute phase of TBI, but usually as a consequence of[13]. Alcohol intake, especially excessive alcohol intake has been a known factor in TBI causation. Thirty five point five percent of our patient series were known alcohol consumers. In a study of alcohol use at the time of TBI, Chen et al, noted that the risk of TBI related to alcohol use significantly affects outcome and need not be overlooked[14].

Conclusion

The study of epidemiology of traumatic brain injury forms a major basis for intervention in the control and management of TBI patients. Whereas not many studies have not been noted from the region, this will be a major entry point for subsequent studies. These will include population based, and multicenter based studies to give a true reflection of the disease burden.

References

1. John B Jr, W Allen H. The epidemiology of Traumatic Brain Injury: A Review. Epilepsia. 2003; 10: 2-10.
2. Thompson DO, Hurtado TR, Liao MM et al. Validation of the Simplified Motor Score in the Out of Hospital Setting for the Prediction of Outcomes After Traumatic Brain Injury. Ann Emerg Med. 2011(11); 58(5): 417-25.
3. Lee B, Newberg A. Neuroimaging in traumatic brain imaging. NeuroRx. 2005; 2(2): 372-83.
4. Alvarez-Sabin J, Turon A, Lozano-Sanchez M et al. Delayed post traumatic hemorrhage. 'Spat-apoplexie' Stroke. 1995; 26(9): 1531-5.
5. Topal NB, Hakyemez B, Erodan C et al. MR imaging in the detection of diffuse axonal injury with mild traumatic brain injury. Neurol Res. 2008; 30(9): 974-8.
6. Fife D. Head injury with and without hospital admission: Comparison of incidence and short-term disability. Am J Public Health 1987; 77: 810-12.
7. Meerhoff SR, de Kruijk JR, Rutten J et al. Incidence of traumatic head or brain injuries in catchment area of Academic Hospital Maastricht in 1997. Ned Tijdschr Geneeskd 2000; 144:1915-8.
8. Wang CC, Schoenberg BS, Li SC et al. Brain injury due to head trauma in urban areas of the Peoples Republic of China. Arch Neurol 1986; 43:570-2.
9. Nell V, Brown DS. Epidemiology of traumatic brain injury in Johannesburg II: Morbidity, mortality and etiology. Soc Sci Med 1991; 33: 289-96.
10. Kraus JF, Black MA, Hessol N et al. The incidence of acute brain injury and serious impairment in a defined population. Am J Epidemiol. 1984; 119(2): 186-201.
11. Guerrero JL, Thurman DJ, Sniezek JE. Emergency department visits associated with traumatic brain injury: United States, 1995- 1996. Brain Inj 2000; 14:181-6.
12. Jager TE, Weiss HB, Cohen JH et al. Traumatic brain injuries evaluated in US emergency departments, 1992- 1994. Acad Emerg Med 2000; 7:134-40.
13. Tadahiko S. Hypertension and Head injury. Current Hypertension Reports 2005; 7: 450-453.
14. Chen CM, Yi Hy, Yoon YH et al. Alcohol use at time of injury and survival, following TBI: Results from the National Trauma Data Bank. J Stud Alcohol Drugs. 2012; 73(4): 531-41.