OPEN ACCESS
©NIJRMS
Publications 2024
ONLINE ISSN: 2992-5460
PRINT ISSN: 2992-6041

NEWPORT INTERNATIONAL JOURNAL OF RESEARCH IN MEDICAL SCIENCES (NIJRMS)

Volume 5 Issue 2 2024

https://doi.org/10.59298/NIJRMS/2024/5.2.07277

Brain Injuries: A Retrospective Study on the Incidence and Possible Treatment Options of Patients attending Chukwuemeka Odumegu Ojukwu University Teaching Hospital Awka, Nigeria

Ovie F.Ogbo[1] Nwafor C. Charles[2], Nwanama E. Kenechukwu[3], Epelle U. jude[4], Bienonwu E.Osemeke[5] Preyor Ebizimo[6] Franklin C. Uche[4]

[1]Department of Anatomy, Faculty of Basic Medical Sciences, State University of Medical and Allied Health Sciences, Igbo-Eno, Nsukka, Enugu, Nigeria.
[2]Department of Physiology, Faculty of Basic Medical Sciences, Enugu State University College of Medicine, Parklane, Nigeria.
[3]Department of Anatomy, Sancta Maria Catholic College of Nursing Sciences Uzairue, Edo State, Nigeria
[4]Department of Anatomy, Faculty of Basic Medical Sciences, Abia State University, Uturu, Nigeria
[5]Department of Anatomy, School of Basic Medical Sciences, Igbinedion University, Okada, Nigeria.
[6]Department of Anatomy, Faculty of Basic Medical Sciences, College of Medicine, University of Ibadan, Nigeria.
***Correspondence E-mail: Ovie F.O. oviedawnc@gmail.com**

ABSTRACT

Brain injury poses a significant public health challenge due to its potential to cause neurodegeneration. The epidemiological patterns of brain injuries vary across different populations. This study aimed to determine the incidence of trauma-related brain lesions, clinical presentations, risk factors, examination modalities, and potential treatment options. Conducted at Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH) in Awka, Anambra State, Nigeria, between January 2022 and June 2023, this study utilized data obtained from the hospital's medical records across various wards. The study variables included age range, gender, season, consciousness level, use of contrast in imaging, type of examination, computed tomography (CT) scan results, and mechanisms of injury. Data were analyzed using IBM SPSS version 22 and presented as percentages in tables. Among the 855 CT scans reviewed, 724 revealed brain lesions, with 298 cases in females and 426 in males. During examination, 73.4% of patients were conscious, and contrast was applied in 19.0% of scans. Traumatic brain lesions were the most frequent (35.2%), followed by vascular lesions (26.9%). The brain's vascular components were predominantly affected (61.4%), particularly the cerebrum (36.4%). This study highlights a significant incidence of brain injuries among patients at COOUTH, underscoring the substantial financial burden on affected families and communities.

Keywords: Computed Tomography, Brain Incidence, Brain Lesion.

INTRODUCTION

Brain injury (BI) is a common type of neurologic damage that comes from several impacts on the head such as road accidents, and it is linked to morbidity. It causes morphological lesions or functional impairment of cranial or encephalic organs in the brain [1]. Additionally, it is the main contributor to trauma-related impairments and comas. BI is a significant global public health concern [2]. The causes of BI are majorlyhead injuries from falls or automobile accidents. Traumatic brain injuries (TBIs) are life-threatening and the main cause of death among patients under the age of 25. In developed countries, the rate of deaths induced by head injury has been about 21% and this rate goes up to 50% in developing countries. The prevalence of BI is rising as motor vehicles are utilized more often in developing nations [3]. The recognition of head injury as a major health problem has led researchers in developed countries to source epidemiologic data over the past decade which is helpful for devising effective preventive measures [3]. Also, it is helpful to set out guidelines to ensure proper health care is provided for both acute care and the rehabilitation of disabled survivors [4, 5]. A study by [6], demonstrated the need for additional reports on the epidemiologic pattern of accidents in low- and middle-income countries to quantify the

ONLINE ISSN: 2992-5460
PRINT ISSN: 2992-6041
issue and identify those who are vulnerable. BIs appear to be more prevalent in low-income nations, however, there is a paucity of data from these areas [6]. In low-income nations, there is still a lack of political commitment, awareness of the issue, and the ability to prevent head injuries [7]. As a result, less has been done to adopt effective management and prevention strategies than has been done in high-income nations. There is hence a need for ongoing research to clarify the scope of the issue as well as the possibilities for averting deaths and injuries [8]. There is a paucity of information about BI in Nigeria. The study aims to evaluate the clinical epidemiologic characteristics of brain injury discovered by computed tomography at a Nigerian tertiary hospital. This study will, directly or indirectly, have an impact both locally and internationally on the clinical expertise of this group of clinicians. It will aid in early identification, appropriate early treatment, and the execution of adequate health education initiatives, in addition to setting the foundation for future investigations.

METHODOLOGY

This retrospective study was carried out over a period of 17 months (January 2022 to June 2023) at Chukwuemeka Odumegu Ojukwu University Teaching Hospital Awka, Anambra State, Nigeria. The hospital card numbers of patients with traumatic brain injury were traced from the Surgical Ward, Orthopaedic Ward, Neurological Ward, Pediatric Ward, Accident and Emergency Unit. The data on the CT-diagnosed brain injury were acquired from patients' records that had been stored in the Radiology Department. Data extraction from the Radiology Information System (RIS) was the main method used to acquire data for dosimetry. A total of 855 Patients were used in this stud withage range of ≤5 to ≥ 90.Contrast and Clinical methods of CT scan were deployed.Patients that were registered for visitation, admitted and completed their treatment with the hospital within the period of January 2022 to June 2023 were included in this study. Exclusion criteria included CT scans not involving head trauma, and patients with incomplete profile. Data were analyzed using IBM Statistical Package for Social Sciences (SPSS) version 22 (IBM Corporation, Armonk, New York, USA) and presented as percentages in tables.

RESULTS

In the 17 months study period, there were a total number of 724 patients diagnosed with brain injury.The peak age was between 18-35 years, accounting for 30.9%. 64.5% of the patients were male, and 35.5% were female (Table 2). Among the 724 patients with a brain injury that presented for the CT test, 73.4% were conscious. (Table 3). Three hundred and eight patients (35.2%) had a traumatic brain injury, while one hundred and sixty-two patients (26.9%) had vascular cases (Table 4).52.0% of males had a traumatic brain injuryin contrast to females (38.8%). 32.4%) of vascular origin were in females and 26.5% in males (Table 5). Table 6 demonstrated that 82.3% of traumatic injury occurred in the age range 18-35, followed by 74.0% in the age range<5-17, and 63.9% in the age range 36-53. 97.0% vascularinjury were seen mostly in older patients of the age range 72-89 and 56.0% in 54-71 years of the patients, respectively. Table 7 shows distributions of various parts of the brain affected by the lesion. Vascular lesions were found in 61.4% ofpatients' andin the cerebrum in 36.4% of patients.

Table 1: Number of CT scan and brain lesion

Year	Number of CT scan	Number of brain lesions
2021	367	311
2022	498	413
Total	855	724

Table 2: Bio-demographic characteristics of the patients.

Characteristics	Number (n-724)	Percentage (%)
Age range		
≤5 – 17	82	13.7
18 – 35	289	30.9
36 – 53	135	20.2
54 – 71	141	20.9
72 – 89	63	12.4
≥ 90	14	1.6
Sex		
Male	426	64.5
Female	298	35.5

OPEN ACCESS
ONLINE ISSN: 2992-5460
PRINT ISSN: 2992-6041

Table 3: Distribution of the various methods of CT scan

Method of CT scan	Number (n-724)	Percentage (%)
Contrast		
Yes	180	19.7
No	544	80.3
Clinical Condition		
Conscious	643	73.4
Unconscious	81	26.6

Table 4: Computed Tomographic findings of patients

Types of Lesions	Number (n-724)	Percentage (%)
Traumatic	308	35.2
Infectious	107	18.7
Malignant	45	5.9
Vascular	162	26.9
Benign	17	2.3
Normal	85	11.0

Table 5: Distribution of CT scan findings of patients according to their gender

Types of Lesions	Male		Female	
	Number	%	Number	%
Traumatic	202	52.0	126	38.8
Infectious	21	5.6	39	13.8
Malignant	19	4.6	13	6.5
Vascular	121	26.5	102	32.4
Benign	16	3.6	7	3.7
Normal	47	7.7	11	4.8

Table 6: Distribution of the CT scan findings of patients based on their age

Types of Lesions	≤5 – 17		18 – 35		36 – 53		54 – 71		72 – 89	
	n	%	N	%	N	%	n	%	n	%
Traumatic	45	74.0	173	82.3	77	63.9	47	42.0	0	0
Infectious	18	13.3	26	4.9	9	5.6	5	2.0	0	0
Malignant	2	1.7	0	0	3	2.8	0	0	0	0
Vascular	0	0	55	8.6	44	26.2	78	53.0	63	97.0
Benign	11	7.5	13	1.7	0	0	0	0	0	0
Normal	6	3.8	22	2.4	2	1.6	11	3.0	14	3.0

ONLINE ISSN: 2992-5460
PRINT ISSN: 2992-6041

Table 7: Distribution of the various combination of parts of the brain affected by Lesions

Location of Lesions	Number (n-724)	Percentage (%)
Right Basal Ganglia	12	2.3
Left Basal Ganglia	25	4.5
Vascular	332	61.4
Meninges	108	11.4
Cerebellum	25	4.5
Cerebrum	222	36.4

DISCUSSION

The findings of this study demonstrate that malepatients experienced a much greater number of brain injuries and more between 18 to 71years. The greater of brain injury in malesimpacts their employment outside the home. This result is consistent with other research findings that the ratio of head injuries among men and women is 3 to 1 [9]. The reason for this male predominance seen in head trauma studies from Sokoto State, Nigeria, is because of age-old sociocultural practices whereby men go out to work to meet the family's financial needs while domestic work and caring activities within the household are socially constructed as women's work [10]. Furthermore, higher cases of brain injury in males than in women were recorded in some regions and worldwide studies. Although the proportion of women who suffer from TBI is increasing and this ratio is changing in more recent studies [11]. Few of patients (26.6%) were found to be unconsciousfor the examination. Clinically, unconscious patients have dilated pupils which are associated with poor prognosis, especially when bilateral [12]. It indicates head injury or compression of the third cranial nerve and the upper brain stem from an expanding mass lesion or diffuse brain injury. The most occurring brain CT scan findings were traumatic (35.2%) and vascular (26.9%) lesions in this study. Infectious, malignant, and benign lesion were also presented while 11.0% of the patients presented normal CT scans. This is similar to what was found in a study carried out in Cambodia [12]. This may be attributed to their exposure to both occupational and social risks and the predisposing risk factors of brain injury associated with various regions. Also, this finding correlates to the findings conducted in Ibadan, Nigeria, where only 19.9% of the patient showed normal brain on CT scan [13].

In this study, more of the traumatic brain lesions presented from CT scan findings were in males (52.0%) than females (38.8%). The vascular lesion was seen more in female patients than in males. This is consistent with studies by [14]. This high frequency of head injury among men is perhaps because men are more frequently engaged in commercial activities in many cultures in developing countries, especially countries in Africa where the bulk of this problem resides. The infectious lesion was seen more in males than females, and the benign lesion was seen in 2.9% of female patients. The prevalence of TBI is also higher in young people under the age of 35 (82.3%) [15]. This is consistent with a similar study in the Northern part of Nigeria that noted that this age group experiences more trauma and accidents on average than other age groups [16]. Similarly, [17] reported a frequency of traumatic brain injury (84.5%) among people between 11 and 30 years of age. According to their studies, the majority of their patients were found to be in their second, third, and fourth decades of life. People of this age range are the most active and productive group in our society and are most likely to be exposed to head injury. However, recent studies in high-income countries showed a notable shift in the traumatic brain injury-related head trauma population toward older age groups. Patients between 53 and 71 years also were seen with vascular brain lesions in this study [18, 19]. This report corresponded to the findings in Yenagoa, Bayelsa State, Nigeria [20]. The reason for this, according to the experts, is that the populations' behaviours, lifestyles, and approaches to health treatment vary. According to our findings, vascular-type of lesions was seen in most of the CT scan findings in older patients. Neuroimaging is an important tool in establishing the prognosis for brain injury. Among those who had brain CT scans in this study, vascular 61.4% was the peak of the location of the lesion from radiological CT scan findings. Cerebrum was seen in 36.4%, meninges were seen in 11.4%, cerebellum and left basal ganglia were seen in 4.5%, and right basal ganglia were seen in 2.3% of the cases. However, it is well known that the more severe the brain lesion, the more likely the patient is to have neuroimaging changes. Our results confirm that more than half of the patients with head injury had cranial CT changes [21, 22]. The fact that this study was a retrospective analysis is a drawback. Studies on patient profiles are frequently plagued by loss of data because of incomplete records or poor data entry. This explains why numerous potentially fatal risk factors, such as blood pressure levels at the time of hospital admission, categories of falls, type of traumatic brain injury,

levels of consciousness (GSC score), follow up check-up, hospital admission, and mortality rate, were not examined in the research described above. The results may, however, be applied to the entire population due to the study's use of straightforward random sampling.

CONCLUSION

This study demonstrated a remarkably incidence of brain injuries in patients attending COOUTH, and this inevitably places a heavy financial strain on the families and communities involved.It is important to promote CT scan examinations since they can help determine the severity of brain lesions and reduce the risk of traumatic brain injury-related death. This study suggests that a policy be created to avoid head injuries by mandating that road transport users, businesses, and other fields use safety equipment; therefore, there is a need for national laws to be enacted and enforced to reduce the incidence and severity of injuries.

REFERENCES

1. Howlett R. Jonathon, Lindsay D.Nelson, Murray B. Stein. (2022). Mental Health Consequences of Traumatic Brain Injury. Biological Psychiatry. Volume 91, Issue 5, Pages 413-420
2. Taylor CA, Bell JM, Breiding MJ, Xu L. (2017). Traumatic brain injuryrelated emergency department visits, hospitalizations, and deaths—United States, 2007 and 2013. MMWR SurveillSumm 66: 1–16
3. Kim H-K, Leigh J-H, Lee YS, et al. (2020). Decreasing incidence and mortality in traumatic brain injury in Korea, 2008–2017: a population-based longitudinal study. Int J Environ Res Public Health 17: 6197. 8
4. Global Health Data Exchange. https://ghdx.healthdata.org/gbdresults-tool (accessed Aug 9, 2022).
5. Dewan MC, Rattani A, Gupta S, et al. (2018). Estimating the global incidence of traumatic brain injury. J Neurosurg 130: 1–18. 18
6. Clark D, Joannides A, Adeleye AO, et al. (2022). Casemix, management, and mortality of patients receiving emergency neurosurgery for traumatic brain injury in the Global Neurotrauma Outcomes Study: a prospective observational cohort study. Lancet Neurol 21: 438–49.
7. Waltzman D, Haarbauer-Krupa J, Womack LS. (2022). Traumatic brain injury in older adults—a public health perspective. JAMA Neurol 79: 437–38; Epub ahead of print
8. Rabiu T.B, B. Adetunmbi. (2017). Posttraumatic seizures in a rural Nigerian neurosurgical service. World Neurosurg10:367-371.
9. Gardner RC, Dams-O'Connor K, Morrissey MR, Manley GT. (2018). Geriatric traumatic brain injury: epidemiology, outcomes, knowledge gaps, and future directions. J Neurotrauma 35: 889–906
10. Peden M, D.J. Clark, T.A. Malomo. (2019) Trauma demography and clinical epidemiology of motorcycle crash-related head injury in a neurosurgery practice in an African developing countryTrafficInjPrev, 20, pp. 211-215
11. Peeters S, C. Blaine, I.V. Vycheth, S. Nang, D. Vuthy, K.B. Park. (2017). Epidemiology of traumatic brain injuries at a major government hospital in CambodiaWorldNeurosurg, 97, pp. 580-589
12. GayawanE., S.B. Adebayo. (2015). Spatial analysis of women employment status in Nigeria. CBN J Appl Stat, 6, p. 2
13. Okolo N.C, C.A. Okolo, A.C. Okolo. (2013). Domestic division of labour among couples in Sokoto metropolis. Glob J ApplManagSocSci, 6 pp. 60-66
14. Ohaegbulam SC, Mezue WC, Ndubuisi CA, Erechukwu UA, Ani CO. (2011). Cranial computed tomography scan findings in head trauma patients in Enugu, Nigeria. Surg Neurol Int. 2:182.
15. Adeleye AO, Clark DJ, Malomo TA. (2019). Trauma demography and clinical epidemiology of motorcycle crash-related head injury in a neurosurgery practice in an African developing country. Traffic InjPrev 20 (02) 211-215
16. Magalhães A. G, de Barros J.M, Maíra G. Cardoso, Natália P. Rochar, Moreira Faleiro, Leonardo C. de Souza, Aline S. de Miranda, Antônio L. Teixeira. (2022). Traumatic brain injury in Brazil: an epidemiological study and systematic review of the literature. Arq. Neuro-Psiquiatr. 80 (4)
17. Obanife H. Olayere, Ismail J. Nasiru, Olugbenga O. Ogunleye, Misbahu A., Ega J. Otorkpa, Bello B. Shehu. (2022). Severity and Predictors of Outcome of Motorcycle-Associated Head Injury: An Experience from a Regional Neurosurgery Centre in Northern Nigeria. World Neurosurg. 158:e103-e110
18. RoozenbeekB, Maas AIR, Menon DK. (2013). Changing patterns in the epidemiology of traumatic brain injury. Nat Rev Neurol 9 (04) 231-236
19. Kasmaei V. Monsef, PaymanAsadi, BehzadZohrevandi, Mohammad Taghi Raouf. (2015). An Epidemiologic Study of Traumatic Brain Injuries in Emergency Department. Emergency 3 (4): 141-145
20. Kiridi EK, Dambo ND. (2015). CT scan in Yenagoa, Bayelsa State: a review of the first 156 cases. AASCIT J Health. 2:93-97
21. Loane DJ, Kumar A, Stoica BA, Cabatbat R, Faden AI. (2014). Progressive neurodegeneration after experimental brain trauma: Association with chronic microglial activation. J NeuropatholExp Neurol. 73(1):14-29.

ONLINE ISSN: 2992-5460
PRINT ISSN: 2992-6041

22. Silverberg ND, Iaccarino MA, Panenka WJ, Iverson GL, McCulloch KL, Dams-O'Connor K, et al. (2020). Management of concussion and mild traumatic brain injury: a synthesis of practice guidelines. Arch Phys Med Rehabilitation. 101(2):382-93.

CITE AS: Ovie F.Ogbo, Nwafor C. Charles, Nwanama E. Kenechukwu, Epelle U. jude, Bienonwu E.Osemeke, Preyor Ebizimo and Franklin C. Uche (2024). Brain Injuries: A Retrospective Study on the Incidence and Possible Treatment Options of Patients attending Chukwuemeka Odumegu Ojukwu University Teaching Hospital Awka, Nigeria. NEWPORT INTERNATIONAL JOURNAL OF RESEARCH IN MEDICAL SCIENCES, 5(2):72-77. https://doi.org/10.59298/NIJRMS/2024/5.2.07277