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HEAD INJURIES FROM ROAD TRAFFIC ACCIDENTS: OUTCOME IN THOSE WHO COULD NOT AFFORD COMPUTERIZED TOMOGRAPHY SCAN OF THE BRAIN

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ABSTRACT

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Background
Due to limited resources some of our patients who had head injuries could not afford the cost of computerized tomography (CT) scan of the brain. Our center covers many rural areas populated by peasant farmers and petty traders. Many of them do not have the financial capacity to pay for CT scan. We tried to see what the functional outcome among these poor patients would look like using road traffic accident as an etiological prototype.

Objectives
To find out the functional outcome of patients who had head injuries from road traffic accident but could not afford brain CT scan.

Methods
It was a prospective study of patients who had head injuries from road traffic accident but could not afford CT scan of the brain. The study was carried out from 1st January 2011 to 31st December 2017. Patients were resuscitated in accident and emergency using advanced trauma life support protocols. Patients were admitted into the wards and managed till discharged.
Data were collected using structured proforma and analyzed with Environmental Performance Index (EPI) info 7 software.

Results
There were 155 patients. Males were 122. The age ranged from seven months to 75 years. The favorable functional outcome was 88.38%, while mortality was 11.61%. The outcome was affected by age and severity of injury

Conclusion
The outcome in these patients was good. It was affected by injury severity and age.

Introduction

Human wants are insatiable but the resources to satisfy them are limited says the economist. This also applies to neurosurgical patients who had head injuries but due to lean resources, they could not afford the cost of

computerized tomography (CT) scan of the brain. These patients are seen mainly in developing countries like ours where poverty is high but the burden of head injuries from road traffic accidents with their resultant morbidities and fatalities are high, especially in our continent Africa. [1-8] Computerized tomography scan is the gold standard in assessing intracranial pathology in the acute stage of traumatic head injury [9] but many of our patients could not afford it. Our center is located in a town but has a large number of rural villages populated by peasant farmers and petty traders in its catchment areas. They traveled up to six hours to reach our neurosurgical center. We studied the functional outcome at discharge in those who had head injuries from road traffic accident but could not afford the cost of CT scan of the brain from 1st January 2011 to 31st December 2017.

Materials and Methods

Patients were managed in accident and emergency using our unit protocols which were based on advanced trauma life support protocols. We ensured patent airways and oxygen saturation of ≥95% in room air or by augmentation by the use of oxygen via a face mask, nasal prongs, or endotracheal tube. We gave normal saline/5%Dextrose in adult and 4.3%Dextrose in 1/5saline for children based on the weight of the patients. Intramuscular (i.m.) Paracetamol 900mg 8hourly for adult and 15mg/kg 8hourly for children were given for pain. It was augmented with i.m. Diclofenac 75mg 12hourly as the need be. Intravenous (i.v.) Ceftriaxone 1gm for adult and 50-100mg/kg for children once daily for those with open wounds. Phenytoin sodium was given for seizure, while aggressive patients had Chlorpromazine. Full history and physical examinations, including Glasgow Coma Scores (GCS) were obtained. Investigations requested included full blood count, serum electrolytes/urea/creatinine, random blood sugar, urinalysis and CT of the brain. Other organ injuries were managed by appropriate specialists. Our center does not have a functional CT scan but there have been private CT centers within the town since 2012. Before then they were traveling two states away to do CT scan. At the investigation stage, some patients or their relatives would tell us they could not afford CT scan. Others would wait to know whether their relatives could raise money for the CT scan. Some found out the cost and discharged themselves or their relatives against medical advice in the casualty.

Mild and moderate head-injured patients were admitted into wards, while those with severe head injuries were admitted into intensive care unit (ICU) (when functional). Those who had extensive scalp lacerations, scalp avulsion, or open skull fractures were operated and admitted into appropriate wards. After 24hours we discharged patients with mild head injuries who were fully conscious. We instructed the relative staying with each patient to bring him/her back to casualty if patient developed loss of consciousness, weakness of any part of the body, severe headache, vomiting, or irrational behavior. By the third day we commenced high energy/high protein diet prepared thus: 500ml pap, two tablespoonful powdered milk, two tablespoonful soya bean powder, one tablespoonful crayfish powder, and one tablespoonful red oil. The diet was given based on the daily fluid requirement of each patient in divided rations through nasogastric tube. Intravenous fluids were then discontinued. Oral drugs were then given through the tube; Vitamin C, multivitamin, and B/complex tablets one tablet three times daily each. Those with wounds were given Cefuroxime 250 - 500mg tablet twice daily ± metronidazole 200 – 400mg three times daily. They were managed till discharged. Some discharged themselves against medical advice along the course of treatment, while some ran away. On discharge some ran away when they found out their bills; some with their folders. On discharge, we followed them up at surgical out-patient clinics.

Data were collected with structured proforma which was component of our prospective data bank that was approved by our research and ethics committee. In casualty, the biodata, history and physical findings, GCS after resuscitation, and investigation results

were documented. The operative findings were documented in the theater. Their progress in the ICU and wards were documented until they were discharged. Their Glasgow Outcome Scores (GOS) were also documented at discharge.

Data were analyzed using EPI info 7 (Center for Disease Control and Prevention, Atlanta, Georgia, USA). Add Analysis gadget of Visual Dashboard was used in the analysis. The mean component was used for continuous variables. Frequency was used for categorical variables. MXN/2X2 was used for univariate analysis, while the advanced part of it was used for multivariate analysis. At 95% confidence interval, $P < 0.05$ was considered significant.

Results

There were 155 patients in the study. One hundred and twenty-two (78.71%) were males, while 33 (21.29%) were females. The mean age was 28.6 years, with a range of seven months to 75 years. The most common age group involved was 30 – 40 years (40), table 1.

Table 1: Age group frequency

Age group	Number	Percent (%)
0 - <10	21	13.55
10 - <20	24	15.48
20 - <30	35	22.58
30 - <40	40	25.81
40 - <50	21	13.55
50 - <60	8	5.16
60 - <70	4	2.58
70 - <80	2	2.29
Total	**155**	**100**

The most common occupational group was students/pupils, 53 patients, table 2.

Table 2: Occupation frequency

Occupation	Number	Percent (%)
Artisans	15	9.68
Civil servant	4	2.58
Farmers	20	12.90
Jobless	3	1.94
Motorcycle driver	7	4.52
Others	5	3.23
Teachers	3	1.92
Professionals	10	6.45
Students/pupils	53	34.19
Traders	30	19.35
Vehicle drivers	5	3.23
Total	**155**	**100**

The most common etiology was motorcycle, 78 patients table 3.

Table 3: RTA subtypes frequency

Subtypes	Number	Percent (%)
Bicycle	2	1.29
Motorcycle	78	50.32
Tricycle	2	1.29
Vehicle	73	47.10
Total	**155**	**100**

One hundred and two patients had mild, 25 had moderate, while 28 had severe head injuries. Sixteen of the severely injured patients had ICU admission, while 12 patients were not admitted (ICU non-functional). Four patients had hypertension, three had Diabetes and one had asthma. One hundred and forty-three were managed conservatively. Twelve patients had surgery for scalp lacerations and open skull fractures. One hundred and forty-one patients were discharged/died, eleven left against medical advice and three absconded.

One hundred and thirteen (72.9%) had good recovery, 24 (15.48%) had moderate disability, while 18 (11.61%) died. The favorable functional outcome (≥4) was seen in 88.38%. The outcome was significantly related to age groups, *P = 0.0109,* table 4.

Table 4: Age group vs GOS

Age group	**GOS**				
	1(%)	**4 (%)**	**5 (%)**	**≥4 (%)**	**Total (%)**
0 - <10	3 (14.29)	1(4.76)	17 (80.95)	18 (85.71)	21 (100)
10 - <20	3 (12.50)	2 (8.33)	19 (79.17)	21 (87.5)	24 (100)
20 - <30	3 (8.57)	7 (20.00)	25 (71.43)	32 (91.43)	35 (100)
30 - <40	4 (10.00)	8 (20.00)	28 (70)	36 (90)	40 (100)
40 - <50	1 (4.76)	3 (14.29)	17 (80.95)	20 (95.24)	21 (100)
50 - <60	4 (50.00)	0 (0)	4 (50)	4 (50)	8 (100)
60 - <70	0 (0)	1 (25)	3 (75)	4 (100)	4 (100)
70 - <80	0 (0)	2 (100)	0 (0)	2 (100)	2 (100)
Total	**18 (11.61)**	**24 (15.48)**	**113 (72.90)**	**137 (88.38)**	**155 (100)**
P = 0.0109					

The outcome was also significantly related to the severity of the injury, *P = 0.00,* table 5. There was no significant relationship between occupation or comorbidity and outcome, *P =0.4955., 0.2116* respectively. Among patients with severe head injuries the mortality was 50% in those admitted in ICU, and 50% in those without ICU admission. No significant difference in outcome between those admitted in ICU and those not admitted in ICU, *P = 0.9871.* The RTA subtypes did not relate significantly to the outcome, *P = 0.7324.*

Discussion

More males in their productive ages were affected in this study. The majority were involved in motorcycle and vehicle accidents. Students/pupils, traders, farmers, and artisans were mainly involved. Only seven and five were commercial motorcycle and vehicle drivers respectively. Farmers own motorcycles which they use to go to their farms and use them to carry produce back to the villages or markets. They use them to convey their children to schools. Most of the roads to the farms are track roads or graded roads laden with potholes. Some have tarred roads crossing their villages as they lead from one city to another. Some traders drove vehicles to the farms to buy farm produce in spite of the bad roads. Others wait at the local markets to buy them. Head–on-collision among motorcycles on track roads in the villages are common. Many fell with their produce on the motorcycles when they enter potholes, and so do some vehicles. Many of the vehicles used in evacuating the farm produce were not roadworthy. The level of overloading of the vehicles is better seen than imagined. With poor enforcement of traffic laws and poor driving habits, their involvement in accidents was high. The students/pupils were mainly knocked down while crossing the roads, especially the crossing tarred roads, but some also had an accident as passengers on motorcycles or vehicles. They failed to look both sides of the road to ensure it was safe to cross before crossing the roads. Some vehicle drivers do not obey speed limit where people

live. Farming, trading and artisan works are mainly men occupations. In Ibadan, Nigeria, Adeleye and Ogun [10] found that males in their productive ages were involved in road traffic accidents. They also found that 56.8% were from motorcycle accidents, while 43.2% were vehicular. Agrawal et al. [11] in India found that patients they studied for traumatic brain injuries were mainly from the rural populace and majority of the patients were involved in two-wheeler accidents. They were mainly males in their productive ages. In Ghana, Adam et al. [12] in their study found that majority of their patients were 11-40 years and 84.20% were males. They were mainly students/children, unemployed, farmers and traders.

The favorable functional outcome was 88.38% with a mortality of 11.61%. The outcome was significantly affected by the severity of injury and age. Mortality in patients above 50 years was highest. They also had more disability. Adeleye and Ogun [10] found a 71.3% favorable outcome in Ibadan. Among their patients, 72.2% did CT scan. The outcome was for both who did CT scan and those who did not do CT scan. The outcome was also significantly affected by injury severity. Agrawal et al, [11] found mortality of 7.12% among their patients. They also studied both who did CT and those who did not do CT. They found that age significantly affected the outcome. In Uganda, Tran et al [13] found that mortality was highest (40%) in patients aged 45 years and above. Aging with associated slowing of metabolism with less protein turnover had been found to be responsible for poor recovery in the elders. [14, 15] In Tanzania, Boniface et al [16] found high mortality among moderate TBI (21.7%) and severe TBI (78.3%). Injury severity affected their outcome. In their study, 85.6% did CT scan. The diet given to our patients might have contributed to the good outcome in our patients. It had been found that nutrition in traumatic brain injury patients significantly affected the outcome. [17, 18]

Conclusion

The favorable functional outcome among these patients was good. The outcome was affected by injury severity and age. The findings in this study should encourage neurosurgeons to go to the rural areas and practice even if CT is not available as their know-how will make a lot of difference.

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