

## Studies on Traumatic Head Injuries and their Predictive Factors at Mnazi Mmoja Hospital Zanzibar

A study to determine the burden and predictive factors of Traumatic Head Injuries in Zanzibar. A case study of Mnazi Mmoja Hospital.

### ABSTRACT

**Introduction:** Traumatic head Injuries represents a significant cause of morbidity and mortality worldwide with road traffic accident accounting for a significant proportion of these injuries. This study is aimed at assessing the burden and predictive factors of Traumatic head injury at Mnazi Mmoja Hospital, a tertiary institution health facility in Zanzibar.

**Method:** A retrospective observational study of head injury clientpatients that are attendeded to at -at Mnazi Mmoja Hospital, Zanzibar from May 2019 to May 2020

**Results:** A total number of 81 client-patients were included in the study and distributed as follows: where 63 were males (77.8%) and 18 females (22.2%) participants. The majority of the clients participantspatients were between the -from the age group of 16-30 year in which and 40 (49.4%) in totalthe number of patients was 40 (49.4%). Road Traffic Accident was the leading cause of injuries (67.9%). Others include assault (13.6%), falling (13.6), and being struck by an object (4.9). The study also recorded a higher prevalence of traumatic brain injury TBI (57.9%), including, concussion (9.8%), contusion (18.5%), epidural hematoma (8.6%), skull fracture (14.8%), and subarachnoid hemorrhage (6.2%). These w-as compared to-with other causes of TBI such asforms (42.1%) as cut wound (9.8%) and soft tissue injuries (32.1%). (64.2%) Most of the client-patients were treated as an outpatients with (64.2%), (33.3%) while the inpatients, were recorded (33.3%) with a very low death rate of 2.5%. The west district recorded the highest prevalence of patients with injury rate compare other districtsies.

**Conclusion:** Public awareness campaigns and health promotions concerning road safety rules are needed to help reduce this ugly incidence and occurrence of road traffic accidents. Government should also pay attention to the improvement of roads as a way to curb this menace.

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## INTRODUCTION

Traumatic brain injury (TBI) is a major public health and socio-economic problem throughout the world. It is one of the leading causes of death, especially among young adults, and lifelong disability is common in those who survive [1]. Hence, exerting undue financial burden on governments and individuals in terms of treatment costs and lost manpower. It is estimated that in the USA, around 5.3 million people are living with a TBI-related disability, and in the European Union 7.7 million people who have experienced a TBI have disabilities[2]. The World Health Organization estimates that each year more than 10 million people in the world sustain TBIs resulting in death or extensive hospitalization. Most recent data indicate that TBI is responsible for more than 4.5 million deaths a year which translates to approximately one in every 10 deaths in the world. This number is expected to increase, especially due to the rapidly increasing rates of TBI in developing countries [3]. It is for this reason that TBI has often been referred to as "the silent epidemic", because most of its consequences, especially cognitive impairments, are not obvious. The incidence of TBI worldwide is rising, mainly owing to injuries associated with the increased use of motor vehicles, particularly in middle-income and low-income countries. Road traffic accidents are responsible for about 60% of brain injuries in the world. Globally, road traffic accidents are responsible for more than 50 million injuries every year, with about 1.2 million ending in death[4]. Other causes are falls, which account for about 25%, and other non-motor-vehicle-related accidents and acts of violence which collectively account for about 15% of TBIs [5].

-The estimation is that each year more than 10 million people in the world sustain TBIs resulting in death or extensive hospitalization with the survivors often acquiring a permanent disability [1][5]. Most recent data indicate that TBI is responsible for more than 4.5 million deaths a year which translates to approximately one in every 10 deaths in the world. This number is expected to increase, especially due to the rapidly increasing rates of TBI in developing countries. The WHO predicts that by the year 2020, TBI will be the leading cause of mortality and disability in the world, surpassing chronic diseases and other current leading causes of death [6]. That increase is expected to be even more pronounced in developing countries where that trend is already evident. A group of researchers conducted a study that showed that 33415 deaths were resulting from TBI which were identified in the 25 European countries, of which 22886 (68%) were male individuals. Many deaths in the included countries occurred in patients 65 years or older: 7599 (72%) of deaths occurred in this age group in female patients, 10 646 (47%) in male patients, and accounting for 18 245 (55%) deaths in both sexes [7]. In another study conducted at Kenya National Hospital; the study Other workers discussed the demographics of participants with traumatic head injuries and at Kenya National Hospital reiterated the challenges of determining the epidemiology of TBI in developing countries such as Kenya due to the scarcity of CT scans, the main diagnostic tool for TBI, and the issue of polytrauma injuries and fatalities in which brain injury is often not factored [8]. They reiterated the challenges of determining the epidemiology of TBI in developing countries such as Kenya due to the scarcity of CT scans, the main diagnostic tool for TBI, and the issue of polytrauma injuries and fatalities in which brain injury is often not factored.

As with the majority of sub-Saharan countries, data on the burden of injury and TBI in Uganda is scarce. According to a Ministry of Health report, the capital city Kampala had an estimated annual injury incidence of 116/1000, an injury mortality rate of 220/100,000, an incidence of injury leading to disability of 23/1000, and an incidence of non-fatal injuries of 2.8/1000. Facility-based studies from Uganda estimated the cumulative incidence of TBI hospital admissions at 89/100,000, with alarming figures for TBI-related mortality between 45.3% and 75% [9]. As one of the rapidly developing nations in Africa, Tanzania has a significantly high rate of traffic-related deaths and disabilities most of which result from brain injuries. A hospital-based injury surveillance involving six public hospitals in Tanzania, between November 2017 and December 2018, revealed road traffic crashes to be the leading cause of injuries accounting for 47.5% of all injuries seen and 60.5% of injuries mortality [3]. The risk of being killed in a traffic-crash in Tanzania proportionate to the number of vehicles on the road is 20-30 times higher than in the USA and many countries in Western Europe, different from the west, however, is the fact that pre-hospital care is almost nonexistent and health care service deliveries are poor [10]. Police, good Samaritans, or relatives are frequently responsible for transport to healthcare facilities. Efforts to improve transport and trauma management in Tanzania will almost certainly result in improved patient outcomes, from pre-hospital to the emergency department—and ICU,—a simultaneous assessment, monitoring, stabilization, and therapeutic intervention of hypoxia and hypotension is important since a single episode of hypotension increases the risk of disability and death.

The study done at Muhimbili Orthopedic Institute, Dar es salaam Tanzania [3] revealed that among patients with mild TBI, 152/401 (37.9%) patients were discharged on the same day of hospital arrival, while others were discharged after 24 hours of hospital admission and observation. Counseling on symptoms and signs of increasing intracranial pressure, altered level of consciousness, or convulsion was done if that patient was to be discharged. The majority (85.6%) had a CT scan (brain) done, 36.4% had brain contusion, 24.6% Epidural hematoma, 12.7% Subdural hematoma, 7.6% Skull fracture, and 18.6% Intracerebral hemorrhage. Ninety percent of those with Epidural/Subdural hematoma had surgery, and time to surgery was within 6 hours from MOI arrival in 55.6% of patients, 19.1% patients had a good recovery, and 88% of those with good recovery had moderate TBI, 50.2% recovered with disabilities and 30.7% died, 78.3% of those who died had severe TBI.

## METHODOLOGY

### Ethical Consideration

Approval was obtained from the Zanzibar Health Research Institute with No: ZAHREC/03/ST/MARCH/2020/44 and patient informed consent was.....

### Study Setting

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This study was done at Mnazimmoja Hospital from May 2019 to May 2020. The location of Mnazi Mmoja Hospital is at Urban district in the urban west region along the coast of Zanzibar and it is 6km from Abeid Karume airport. ~~The Our study~~ was mainly conducted at ~~the Emergency Unit of Mnazi Mmoja~~ ~~the hospital Emergency Unit whereby~~ and both retrospective and prospective data concerning head injury were collected.

#### Study design:

The study used ~~the~~ descriptive cross-sectional method and random sampling techniques to collect data at the Mnazi Mmoja Hospital Emergency unit. ~~The study involves -was done by-~~ checking the number of head injury cases that were attended ~~to~~ at the Emergency Unit and their outcomes after being managed.

#### Study population:

The study comprised both males and females of different age groups(children, adults, and elderly people) involved in head injury.

#### Inclusion~~ive~~ and exclusion~~ive~~ criteria:

All cases of TBI presented at the emergency unit in MMH were included and referral cases were excluded.

#### ~~Sampling method:~~

~~A random sampling method was used in conducting this research.~~

#### ~~Ethical Consideration~~

~~Approval was obtained from the Zanzibar Health Research Institute with No; ZAHREC/03/ST/MARCH/2020/44~~

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## RESULTS

**Table 1: Socio Demographic Characteristics of the Subjects**

Variable	Frequency	Percentage (%)
<b>SEX</b>		
Female	18	22.2
Male	63	77.8
Total	81	100.0
<b>Age (years)</b>		
0-15	21	25.9
16-30	40	49.4
31-45	13	16.0
46-60	7	8.6
Total	81	100.0
Mean age = 24.06±13.13		

DISTRICT	Frequency	Percentage (%)
CENTRAL	1	1.2
NORTH	2	2.5
URBAN	27	33.3
WEST	51	63.0
Total	81	100.0

**Table 2: Causes of the Traumatic Head injuries**

ASSAULT	11	13.6
FALLING	11	13.6
RTA	55	67.9
STRUCK BY OBJECT	4	4.9
Total	81	100.0

**Table 3: Classification of the Head injuries**

DIAGNOSIS	Frequency	Percentage (%)
CONCUSSION	8	9.8
CONTUSSION	15	18.5
EPIDURAL HEMATOMA	7	8.6
SKULL FRACTURE	12	14.8
SUBARACHNOID HEMORHAGE	5	6.2
Total (TBI)	47	57.9
SOFT TISSUE INJURY	26	32.1
Cut Wound	8	9.8
Total ( Non TBI)	34	41.9

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**Table 4: Status of the subjects in all the classes of head injuries**

STATUS	Frequency	Percentage (%)
DEATH	2	2.5
INPATIENT	24	29.6
OUTPATIENT	55	67.9
Total	81	100.0

**Table 5: Result of the management of the subjects with the head injuries**

MANAGEMENT	Frequency	Percentage (%)
DONE	78	96.3
NOT DONE	3	3.7
Total	81	100.0

## Discussion

The demographic characteristics of this study revealed prominent gender bias with males outnumbering females in as far as head injuries as well as fatal outcomes. The age bracket with the highest outcome was 16-30 years. This may not be unconnected with the fact that most of the cases are due to road traffic accidents, and the increased participation of young males in high-risk activities like boarding and disembarking from moving city public buses as well as motorbikes, ~~popularly called boda boda in this axis~~. The study agreed with the findings of other workers [3], with road crashes appearing as the highest cases among young adult males. This is very worrisome and a wake-up call to the government to increase health promotion in the form of health education to curtail this menace with dire consequences on this important age group in our society. The study also recorded a higher prevalence of traumatic head injury THI (57.9%), including, concussion, contusion, epidural hematoma, skull fracture, and subarachnoid hemorrhage as compared to other forms (42.1%) of injuries such as cut wound and soft tissue injuries.

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Incidentally, the death rate among these cases was very low (2.5%). This could be attributed to the timely and efficient management mechanism at the Mnazi Moja Hospital. TBI patients' survival is highly dependent on timely and accurate management including appropriate nursing care [11][12]. The west district with the highest prevalence of 63% could be attributed to its large size as well as the nature of the roads. The non-availability of constant road monitors as traffic wardens around these districts may have affected this high disparity.

### Conclusion

The result of this study has shown the burden of head injuries in Zanzibar. Since most of these head injury cases are due to road traffic accidents, there is a need for appropriate preventive measures to help reduce this high frequency of head injury in our population. Public awareness campaigns and health promotions concerning road safety rules are needed to help reduce this ugly incidence and occurrence of road traffic crashes. This should be carried out as frequent radio and television jingles in the Kiswahili language to reach the grassroots and the entire population. Government should also pay attention to the improvement of roads as a way to curb this menace.

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### Reference

1. Roozenbeek B, Maas AIR, Menon DK. Changing patterns in the epidemiology of traumatic brain injury. *Nat Rev Neurol* [Internet]. 2013;9(4):231–6. Available from: <https://doi.org/10.1038/nrneurol.2013.22>
2. Langlois JA, Sattin RW. Preface. *J Head Trauma Rehabil* [Internet]. 2005;20(3). Available from: <https://journals.lww.com/headtraumarehab/Fulltext/2005/05000/Preface.1.aspx>
3. Boniface R, Lugazia ER, Ntungi AM, Kiloloma O. Management and outcome of traumatic brain injury patients at Muhimbili Orthopaedic Institute Dar es Salaam, Tanzania [Internet]. Vol. 26, *The Pan African medical journal*. Muhimbili Orthopaedic Institute (MOI), Dar es Salaam, Tanzania.; 2017. p. 140. Available from: <http://europepmc.org/abstract/MED/28533863>
4. Kinyanjui B. Traumatic Brain Injury in Kenya: A Preliminary Review of the Literature. SAGE

- Open. 2016;6(1).
5. Hyder AA, Wunderlich CA, Puvanachandra P, Gururaj G, Kobusingye OC. The impact of traumatic brain injuries: a global perspective. *NeuroRehabilitation*. 2007;22(5):341–53.
  6. Mathers CD, Loncar D. Projections of Global Mortality and Burden of Disease from 2002 to 2030. *PLOS Med* [Internet]. 2006 Nov 28;3(11):e442. Available from: <https://doi.org/10.1371/journal.pmed.0030442>
  7. Brazinova A, Rehorcikova V, Taylor MS, Buckova V, Majdan M, Psota M, et al. Epidemiology of Traumatic Brain Injury in Europe: A Living Systematic Review. *J Neurotrauma*. 2021;38(10):1411–40.
  8. Wekesa VD, Ogengo JA, Siongei C V, Elbusaidy H, Iwaret M, Student M. Demographics of Patients Admitted with Traumatic Intracranial Bleeds in Kenyatta National Hospital in Nairobi, Kenya. *East Cent African J Surg*. 2013;18(3):67–70.
  9. Mehmood A, Zia N, Kobusingye O, Namaganda RH, Ssenyonjo H, Kiryabwire J, et al. Determinants of emergency department disposition of patients with traumatic brain injury in Uganda: results from a registry. *Trauma Surg acute care open*. 2018;3(1):e000253.
  10. Museru LM, N M, Leshabari MT. Road Traffic Accidents in Tanzania: A Ten Year Epidemiological Appraisal. *East Cent African J Surg* (ISSN 1024-297X) Vol 7 Num 1. 2001 Nov 30;7.
  11. Petroni G, Quaglini M, Lujan S, Kovalevski L, Rondina C, Videtta W, et al. Early prognosis of severe traumatic brain injury in an urban argentinian trauma center. *J Trauma*. 2010 Mar;68(3):564–70.
  12. Bullock R, Chesnut RM, Clifton G, Ghajar J, Marion DW, Narayan RK, et al. Guidelines for the management of severe head injury. Brain Trauma Foundation. *Eur J Emerg Med Off J Eur Soc Emerg Med*. 1996 Jun;3(2):109–27.