

Demographic and Clinical Profiles of Patients with Traumatic Brain Injury Managed in a District Hospital in Nepal

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ABSTRACT

Background

Traumatic brain injury (TBI) is a significant cause of disability and mortality globally. Information regarding clinical presentation and management of TBI patients in the district hospital settings is inadequate, especially in low- and middle-income countries.

Objective

This study aims to describe the demographic and clinical profiles of traumatic brain injury patients in a district hospital setting in Nepal.

Method

This study was done at Chautara Hospital in Sindhupalchowk district from December 2021 to June 2022. Sixty-one patients were included using non-probability sampling. The age and sex of patients, cause of injury, distance from the hospital, the severity of the injury based on the Glasgow Coma Scale, site of trauma on the head, and disposition of patients were analyzed.

Result

Sixty-one patients met the inclusion criteria out of which 29 were males and 32 were females. The mean age of the patients was 42.5 years. The most frequent cause was fall from height (23), and the most common injury site was the frontal region of the head (29). Most patients had a mild injury (52) followed by severe (five). Only two patients had moderate injury. Forty-two patients sustained injury within 5 kilometres of the hospital. Thirty patients were referred to higher centres for further treatment.

Conclusion

Falls from height is the most common cause of traumatic brain injury followed by road traffic accidents. As most of the cases are mild in severity, the availability of trained human resources and telemedicine consultation in district hospitals can substantially decrease referral to higher centres and therefore decrease the burden of traumatic brain injury patients in the higher centres.

KEY WORDS

Glasgow coma scale, Imaging, Referral, Traumatic brain injury

INTRODUCTION

Traumatic brain injury (TBI) is defined as a spectrum of brain injury with primary impact or secondary insults from impact leading to temporary or permanent impairment in brain function.^{1,2} TBI is the leading cause of severe disability in people under 40 in Africa and Southeast Asia.³ 90 % of estimated deaths due to injuries occur in low- and middle-income countries (LMICs) despite advancements in prevention and treatments.^{4,5} According to the Nepal Burden of Disease (NBoD) 2017 report, 9% of the estimated injuries-related deaths were attributed to trauma-related intracerebral haemorrhage.⁶

Sindhupalchowk district lies in the central part of Nepal 90 kilometres (km) away from Kathmandu. This district has major rural areas which are prone to floods and landslides. Chautara hospital, a 15-bed hospital has a catchment population of 287,798 as of 2022 with the nearest neurosurgical facility (Dhulikhel Hospital) being 50 km away.^{7,8} Factors like low socio-economic condition, unavailability of computed tomography (CT) and neurosurgeons, and delayed referral to a neurosurgical facility cause an adverse impact on the outcome of TBI cases.^{10,17} The unavailability of medicines and service facilities to serve those patients further complicates the management. Although some studies related to TBI have been conducted in Nepal, they are primarily based on data from tertiary-level hospitals.⁹⁻¹⁶

This study aims to describe the demographic and clinical characteristics of TBI patients managed in a district hospital in the central part of Nepal. This will have policy implications for the proper planning and management of neuro-trauma patients in Nepal.

METHODS

This study was conducted at Chautara Hospital of Sindhupalchowk district after approval from the Ethical Review Board of Nepal Health Research Council (protocol registration no: 635/2021 P) from December 2021 to June 2022. Patients were enrolled based on inclusion and exclusion criteria. Only the patients that met the criteria of TBI were included.¹⁸ Patients with pre-existing neurological disorders such as cerebrovascular disease, brain tumour, and dementia were excluded.

Patients were clinically evaluated with detailed history and neurological examination. After an initial assessment, TBI was graded as mild (13-15), moderate (9-12) and severe (≤ 8) based on the Glasgow coma scale (GCS). Our study variables were demographic characteristics (age, sex, site of trauma on the head, distance from hospital), cause of injury, the severity of TBI as mild, moderate and severe, length of hospital stay, disposition (discharged, admitted, referred or in-hospital mortality) and the reason for referral.

The data regarding the profile of patients was stored and analyzed in electronic format using Microsoft Excel Spreadsheet. Mean, median, and mode were used for the analysis of continuous variables, and proportions were used for categorical variables. As our sample size was small, no attempt was made to analyze the relationship between the variables.

RESULTS

As shown in fig. 1 out of 63 patients, 61 were included in our analysis as two patients had a pre-existing stroke. Thirty were referred and 31 were kept for observation in the hospital.

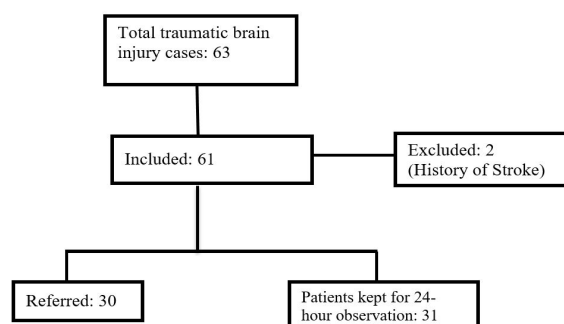


Figure 1. Flowchart showing the process of recruitment and analysis in our study

Age and sex distribution

The age of patients ranged from 3 years to 89 years with a median age of 35 yrs (with Q1 and Q3 as 28 and 60 yrs). Thirty-one patients were adults between 21 and 50 years. 23 patients were above 50 years.

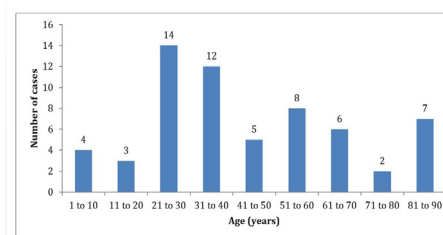


Figure 2. Bar diagram showing an age-wise frequency of cases

Among the total patients, 29 were females and 32 were males with a male-to-female ratio of 1.1: 1.

Aetiology

The most common cause of TBI was found to be falls from height (23) followed by physical assaults (21) and road traffic accidents (17).

Site of injury and Clinical severity

The most common site of impact was on the frontal region (29) followed by the parietal region (18) as shown in table 1.

Table 1. Location of Injury on Head

Site of Impact	Frequency
Frontal region	29
Temporal region	4
Occipital region	10
Parietal region	18

In our study, 54 patients presented with a mild TBI. Out of them, 23 were referred for neurological consultation for loss of consciousness, 30 cases were kept for observation and 1 case was discharged on request. Moderate head injury was present in two cases and both were referred due to loss of consciousness. Also, all of the total five cases of severe head injury were referred for neurological consultation after appropriate primary management.

Geographic location of injury

Out of the total patients, 42 cases were from places within a 5 km distance from the hospital and 55 from places within a 10 km distance from the hospital.

Disposition

Out of 54 cases of mild head injury, 23 cases were referred due to loss of consciousness, 30 cases were kept for observation and 1 case was discharged on request. Both cases of moderate TBI were referred elsewhere due to loss of consciousness. All cases of severe TBI (5) were referred after appropriate primary management.

Out of 61 cases, 31 were discharged after 24-hour observation. There was no mortality or further progression of symptoms in patients kept in observation for 24 hours.

DISCUSSION

Head and neck injury is one of the most common injuries presenting to the emergency department in tertiary health care centres in Nepal.⁸ Many patients with TBI have limited access to care due to the unavailability of trained manpower, resources, and suboptimal referral mechanisms. Moreover, the cost of acute care and the long-term rehabilitation required for many of these patients further complicates the management. This study is the first of its kind to be conducted in a district hospital setting in Nepal with the aim to describe the clinical and epidemiological scenario and disposition pattern of TBI cases.

Demographic and clinical profiles

Sixty-one patients were included in our study with a median age of 35 years. Our study shows that the male-to-female ratio is almost equal. This is in sharp contrast with the previous studies conducted at Tribhuvan University Teaching Hospital, Kathmandu in 2021

where there was a strong male predilection for TBI.⁸ This could be attributed to the active involvement of females in outdoor activities and fieldwork in the rural setting as

well as the progressive empowerment of women in socio-economic activities in the post-earthquake period.²¹ Young population of 20 to 40 years forms the majority (26) of our cases. This can be because this age group forms the major proportion of the population and is economically active. This finding is similar to previously published relevant studies from Nepal and rural settings of other countries.^{17,22-25}

Our study showed that falls from height was the most common cause of TBI. This might be due to difficult geographical conditions in the rural areas in the district. This seems to hold true for all rural settings.⁷ This finding correlates with the findings of studies related to neuro-trauma conducted in various national-level tertiary care centres across the world.^{13,25,26}

A similar study conducted by Feigin et al in the urban and rural populations in New Zealand and Ghimire et al. in the eastern part of Nepal showed that most TBI cases were due to falls and the prevalence is more in the young adult age group, especially the male.²⁷⁻³⁰

Our study showed the majority of TBI patients presented with a mild injury which is consistent with previous publications where almost 80% of TBIs are mild.^{8-10,13} The most common site of impact was the frontal part of the head (29) which is similar to the findings of studies done by Isokuortti et al in Finland in 2010 and by Kayastha et al. in Nepal in 2020.^{12,30}

Since our study is the first of its kind to be conducted at the district hospital level, we couldn't correlate our findings to other studies done in a similar environment.

In our study, the majority of cases (42) were within the catchment area of 5 km from the hospital followed by a catchment area of 06 to 10 km (13 cases). The maximum area covered is within a radius of 10 km. This has an important policy implication as this hospital could serve as an important healthcare delivery centre for early intervention of neuro-trauma cases in the district if appropriate resources are made available.

Management and disposition

During our study, 29 cases were referred to higher centres for a head computed tomography (CT) scan. The major reason for referral was the loss of consciousness. More than half of the mild cases along with all of the moderate-to-severe cases had to be referred. This indicates the need for neuroimaging modalities like a CT scan in our facility. Early clinical and radiological assessment by trained health workers and on-time telemedicine consultation in rural areas could help in minimizing referrals to tertiary care centres. This would reduce both the cost as well as the hassle for the patients and their families. This could also reduce the burden of mild cases, which can be effectively managed in primary health centres, in the tertiary care centres of the country.

This is a single-centre study conducted on a small number of patients. For this reason, the results of this study may not be fully generalized to other district hospitals in Nepal. Moreover, seasonal variability of trauma can not be addressed by this study due to the short duration of the study.

CONCLUSION

This is the first study from Nepal addressing the management strategy in the rural hospital setting. Since the majority of TBI cases were mild, proper training of healthcare workers and monitoring/imaging facilities in district hospitals could vastly reduce the need for referral

and therefore, the burden in the tertiary centres. However, a large-scale, multi-centric study is required to explore this topic further.

CONCLUSION

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