

PREVALENCE OF TRAUMATIC BRAIN INJURY IN MULTIPLE TRAUMA EVALUATIONS AT THE EMERGENCY DEPARTMENT OF HAYATABAD MEDICAL COMPLEX, PESHAWAR

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ABSTRACT

OBJECTIVES

The study aimed to determine the prevalence of traumatic brain injury resulting from multiple trauma cases presented at the Emergency Department of Hayatabad Medical Complex, Peshawar.

METHODOLOGY

A prospective study was conducted over six months, from January-May 2022. The study included 580 patients with both major and minor traumas who sought medical attention at the facility. A thorough neurological and systemic assessment, including the Glasgow Coma Score (GCS), was conducted. Neuroimaging, along with other essential system imaging, was performed to aid diagnosis. Diagnosis of traumatic brain injury was based on clinical signs, symptoms, physical examination findings, and special investigations such as X-ray, CT brain, and MRI scans. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 23 to determine the prevalence and characteristics of traumatic brain injury among the study participants.

RESULTS

During the study period, a total of 580 patients visited the accident and emergency department of Hayatabad Medical Complex, Peshawar. All 580 individuals were eligible for a CT scan of the brain. Among these patients, 455 (78%) had normal CT scans. Traumatic brain injuries were identified in the following proportions: brain contusion in 14.1% of cases, subarachnoid hemorrhage (SAH) in 7.1%, acute subdural hematoma (SDH) in 7.6%, extradural hematoma (EDH) in 5.8%, and depressed skull fracture in 4.6%. Additionally, pneumocephalus was observed in 5.1% of CT images.

CONCLUSION

The findings highlight the importance of prompt and thorough evaluation, including CT scans, in the management of such cases to ensure timely and appropriate interventions.

KEYWORDS: Traumatic Brain Injury (TBI), out-of-hospital fatal, Road Traffic Accident (RTA)

INTRODUCTION

Traumatic Brain Injury (TBI) is considered a non-degenerative and acquired brain injury caused by an external mechanical impact.¹ It can be triggered by sensorium loss or change. It is still the world's most common cause of sickness, death, and economic losses. In wealthy countries, it is projected to cost \$30 billion every year.² More than 1.7 million brain injuries are predicted to occur in the United States alone.¹⁰ Traumatic brain injury (TBI), sometimes known as the "silent pandemic" is a significant public health problem and the main reason behind mortality and disability across the world among all trauma-related injuries.⁴ Traumatic brain injury (TBI) is this population's prominent cause of disability, morbidity, and mortality, accounting for a large percentage of all traumatic fatalities. Slight behavioural and cognitive abnormalities may be the only indication of mild TBI.

Traumatic brain injury is due to "a hit or jolt to the head or a penetrating head injury that affects the normal function of the brain," It is most usually caused by falls, motor vehicle traffic accidents, and assaults.⁵ In affluent nations, the overall incidence of TBI is typically claimed to be 200 / 100,000 people at risk each year. Only TBI patients admitted to hospitals are often included in this estimate. In certain studies, medically unattended and ED-managed TBIs are not counted, leading to an underestimation of the incidence of milder TBIs and an overestimation of the proportion of more severe TBIs. Furthermore, even these facilities lack the essential ambulances and experienced paramedics to transfer TBI patients from the point of injury to these facilities and gather all pertinent information. According to multicenter TBI emergency care research, out-of-pocket expenditures may be one of the leading causes of TBI-related fatalities or impairments.⁸ In wealthy countries, it is projected to

cost \$30 billion every year.² More than 1.7 million brain injuries are predicted to occur in the United States alone.⁹ WHO estimates that the Incidence of TBI is more than 600 per 100,000 cases, resulting in roughly 90 per 100,000 hospital admissions in the United States.¹⁰ This effect is magnified in underdeveloped nations with low per capita income and a high dependency ratio. Furthermore, illiteracy, poverty, neglect, and repeated delays in seeking medical help increase the disease's progress and consequences. Unfortunately, there is a scarcity of data on TBI epidemiology in our area. Based on statistics from public sector hospitals, the yearly Incidence of head injury in Pakistan is estimated to be 50 per 100,000 people.¹¹ Males in their prime working years are the most common victims and typically the breadwinners in their families.¹² Furthermore, due to underreporting and inadequate record keeping, the scope of the problem is often overestimated.¹³ The Incidence and risks of brain injuries in Pakistan were thoroughly reviewed by Razzak et al. from the standpoint of a low-middle income nation. The authors of this review noted that the Road Traffic Mortality Rates (RTM) across South Asian countries show that the Eastern Mediterranean region of the World Health Organization, which includes Pakistan, has some of the highest death rates from injuries. For instance, in road traffic incidents and political conflicts (146,000 deaths and 2.8 million injuries just from road traffic crashes), Pakistan reported the highest RTM at 25.5 per 100,000 people, surpassing India. 42 deaths per 100,000 people, or 6% of all deaths, were caused by injuries.^{14,45} Injury-related deaths account for about 11% of all deaths in people over 60; injuries account for 57% of all deaths in people between the ages of 15 and 59, with men more likely to sustain injuries (8% vs. 4% of females).¹⁵ The absence of coordinated prehospital and hospital-based trauma care is another risk factor.¹⁶ Pakistan also has a severe issue with domestic violence against women, with rates of physical and sexual abuse estimated to be as high as 80 and 77 percent, respectively.¹⁷ Pakistan is one of the top five nations in the world, where terrorism has the most significant impact in terms of political unrest.¹⁸ Between 2009 and 2016, there were over 12,000 terrorist attacks in the nation, which resulted in 16,526 fatalities. Almost all civilians are victims of suicide terrorist attacks, which account for 74.1 percent of all fatalities and 93.8 percent of all injuries.⁴⁹ There were 885 injuries and 298 fatalities due to terrorist attacks and violent clashes between political parties during the general elections.¹⁹

METHODOLOGY

This study followed a descriptive design to investigate the prevalence of traumatic brain injury (TBI) in

patients presenting with multiple major and minor traumas at the Emergency Department of Hayatabad Medical Complex, Peshawar. The study included 200 patients who were presented to the emergency department between January-May 2022, with various levels of traumatic injuries. Both males and females of different ages were considered for inclusion in the study. Patients with intoxication-related brain injuries were excluded from the study. Upon presentation, all patients underwent initial stabilization followed by a comprehensive clinical assessment to evaluate overall body trauma and exclude interference from additional organ systems. In the post-resuscitation phase, detailed reports were obtained from witnesses and family members. A thorough neurological and systemic assessment, including the Glasgow Coma Score (GCS), was conducted. Neuroimaging, along with other essential system imaging, was performed to aid diagnosis. After initial emergency care, patients with minor head injuries and normal CT brain scans were discharged, while those with mild to severe head injuries were admitted to the neurosurgical unit for further management. Patients with severe organ system damage were admitted to the appropriate care unit with routine neurosurgery follow-up. Data were collected using structured questionnaires administered to the 200 casualties who visited Hayatabad Medical Complex, Peshawar. Diagnosis of traumatic brain injury was based on clinical signs, symptoms, physical examination findings, and special investigations such as X-ray, CT brain, and MRI scans. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 23 to determine the prevalence and characteristics of traumatic brain injury among the study participants.

RESULTS

In the given study duration, a total of 580 patients visited the accident and emergency department of Hayat Abad Medical Complex Peshawar. A total of 580 individuals were eligible for a CT scan of the brain. Most of the patients, 455 (78 percent), had a normal CT scan.

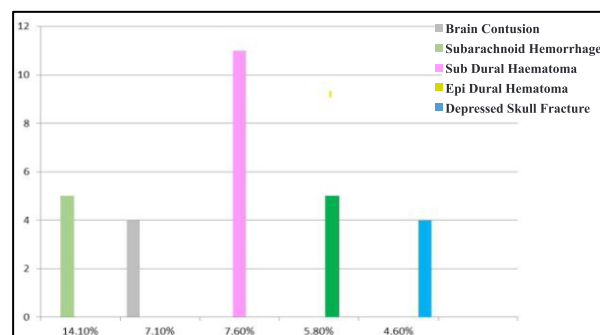


Figure 1: Prevalence of Diagnosed TBI

Table 1: Prevalence of TBI based on Gender

Gender	TBI n(%)
Male	103(82.4)
Female	22(17.6)

Table 2: Prevalence of TBI Based on Causes

Cause	Cases	f (%)
Road Traffic Accident (RTA)	Two-wheeler	55 (70)
	Automobile passenger	08 (13.2)
	Walker	06 (0.7)
Falling From	Stair	28 (07)
	Roof	05 (0.12)
	Balcony	05 (0.125)
	Electric pole	01 (0.02)
Other	Sharp weapon	06 (15.5)

DISCUSSION

In our country, the fatality rate from traumatic brain damage is estimated to be around 15%³. Traumatic brain injury has a significant impact on the physical, mental, and emotional health of individuals, putting additional strain on the community. The consequences of closed head injuries are extremely unpleasant and painful for patients who arrive at the hospital.^{4,5} TBI is most caused by car accidents, and men are disproportionately affected since they are more actively involved in daily activities. CT is one of the most essential modalities since it is less expensive, faster, and more generally available, and it is an important diagnostic tool for many brain hematomas.^{9,10} The most common reports of epidural hematoma were from middle-aged adults who had sustained head injuries, which is consistent with international studies. Studies reported that males had a higher frequency of head trauma than females, which is consistent with our findings.^{11,13} In Pakistan, Hyder et al.¹⁴ found a proportionate increase in RTA-related mortality with higher levels of motorization. Not more than 1% of patients were recorded wearing suitable helmets with the necessary straps, even though helmets have been shown to be effective in reducing TBI for riders on two wheels. With this caveat in mind, we see that, in general, TBI is more prevalent among people aged <25 years and among people >75 years. In three studies an increase is seen in the elderly percentile or the mean age over the years of the study.^{14,18} RTAs are reported as the main cause of TBI. Falls were dominant in the remaining five studies. Some studies even report an evolution of the mean age over the years. These findings confirm the shift reported towards older age groups over recent decades, especially in high-income countries. In contrast to Tagliaferri et al., who reported RTA as the most common event leading to TBI, we find falls to be the leading cause.¹⁹

LIMITATIONS

The limitation of this study research is conducted

solely at Hayatabad Medical Complex, Peshawar, which may limit the generalizability of the findings to other healthcare settings or regions.

CONCLUSIONS

These estimates need more thorough and precise injury reporting because relatively poor-quality data constrain them from LMICs. It is essential to pay attention to and take action to address the global dissimilarities in health care in the fields with less resources and a colossal pressure of disease on those with more resources and a having less pressure of disease.

CONFLICT OF INTEREST: None

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