

Balance problems after mild traumatic brain injury (mild TBI) among Young Adults in Lahore, Pakistan

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Abstract

Objective:

To find out balance problems after mild traumatic brain injury among young adults in Lahore, Pakistan.

Material and Methods:

The descriptive case series was conducted at Lahore General Hospital 20 patients were recruited who completed the inclusion criteria. In the study, the data was collected by conducting interviews and balance test. The static and dynamic balance of the patients was assessed by Berg Balance Scale.

Results:

In the study population, the mean age of the patients was 26.40, with a range of (18-35years). Out of them, 75 % of the patients were male and 25 % were female. In the study (N=20), it was found that 30% patients were at high risk of falling, whereas 55% patients were at medium and 15% patients were at low risk of fall respectively according to the Berg Balance Scale.

Conclusion:

Mild traumatic brain injury significantly influences the balance of the individuals resulting in marked limitation in physical activities and increases the risk of falling and related consequences.

Key Words: Mild traumatic brain injury, young adult, postural balance

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INTRODUCTION

Traumatic brain injury (TBI), previously called head injury is defined as any injury to scalp, skull or brain, the absence of concussion indicates head injury and presence of concussion is the indicator of TBI (Shukla & Devi, 2010). TBI can be the result of direct or indirect blow to head that leads to neurologic changes in brain and it is the major reason of morbidity and mortality worldwide (Azad, Al Juma, Bhatti, & Delaney, 2016). It can be classified into mild, moderate and severe depending upon clinical presentation of patient's neurologic signs and symptoms (Frieden, Houry, & Baldwin, 2015).

Concussion is the common name of mTBI and it is defined as a "biomechanically induced alteration of brain's function that typically affects memory and orientation and it may or may not involve loss of consciousness" (Honaker, Lester, Patterson, & Jones, 2014). It is mandatory to describe that mild TBI is a clinical defined syndrome, based on self-reported or observed symptoms and it may or may not present with normal neuroimaging (Blyth & Bazarian, 2010).

The patients with mTBI usually exhibit headaches, hypersomnia or hyposomnia, neurocognitive impairments, anxiety, depression, dizziness and balance problems (Lei-Rivera, Sutura, Galatioto, Hujsak, & Gurley, 2013). Though not very sensitive but specific indicator of concussion is Balance problems and Balance Testing may be very different, compared to baseline tests because of different surfaces or cleat types, shoes, use of taping around ankle or presence of any injury to lower leg (Harmon et al., 2013).

Balance is described as the ability of body to keep the body centered over the feet and this ability is affected by many factors such as senses, coordination, physical strength and cognitive ability (Peterson & Greenwald, 2015a). Gait and balance disturbances are considered as causes of fall and thus has become the cause of fear of falling among individuals (Gusi et al., 2012). Among global health problems falls and fall induced injuries are considered as major injuries. Balance and gait disturbances are second leading cause of falls (Ma, Wong, Lam, Wan, & Lee, 2016). Thus body requires a good balance to avoid risks of fall (Gschwind et al., 2013).

The Fall is defined as "an event which results in a person coming to rest inadvertently on ground or floor or other level" (Organization, 2015). 11% of the global disease burden accounts for Falls. Falls are the most common cause of civilian injury, while burden is more on low-income and middle-income countries (LMICs), which experience 75% of the more than 30 million disability-adjusted life years annually from fall injuries (Stewart et al., 2016). The persons with poor neuromuscular function i.e., having problems with gait speed and balance are at the risk of falls (Timsina et al., 2017). Work-related TBI are caused by falls as a catastrophic event that leads to more disabilities and higher medical costs and social problems (Kim, Ro, Shin, & Kim, 2016). The main help & outcome of falls is transfer to hospital (Büchele et al., 2014).

Although sufficient literature is available internationally on Balance problems after mTBI but in Pakistan there is a lack of research on concussion.

Early identification of balance problems after mild traumatic brain injury will help avoid the risks of falls and fall related outcomes such as fear of fall, dislocation and thus fractures. It will also help to reduce the burden of disability resulting from balance problems & falls after mTBI & treatment cost on behalf of patient as well as health care providers.

MATERIALS & METHODS

A Descriptive case series was done on a sample of 20 patients. Non-probability Convenience sampling technique was used and Data was collected from all diagnosed patients of mild TBI coming to General Hospital Lahore who fell in inclusion criteria of research. Patients were assessed for balance problems using Berg Balance Scale. Data was entered by using Statistical Package for Social Sciences (SPSS) version 21 and the same software was used for data analysis. The study variables were presented in the form of descriptive statistics (tables, graph, and percentages). There were no ethical issue in this study. The cultural and religious considerations were duly taken at the time of collection.

RESULTS AND DISCUSSION

Mean age of the patients was 26.40, with a range of (18-35years). 75 % of the patients were male and 25 % patients were female as shown in figure1 and Figure 2. In a sample size of (N=20) 30% patients were at high risk of falling, whereas 55% patients were at medium and 15% patients were at low risk of fall respectively according to the Berg Balance Scale.

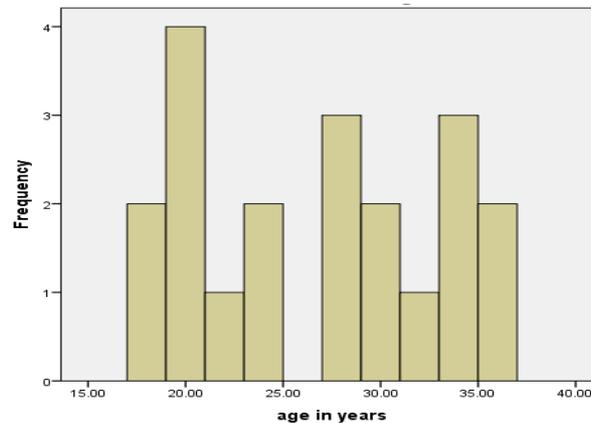


Figure 1. The data showing age and frequency of fall.

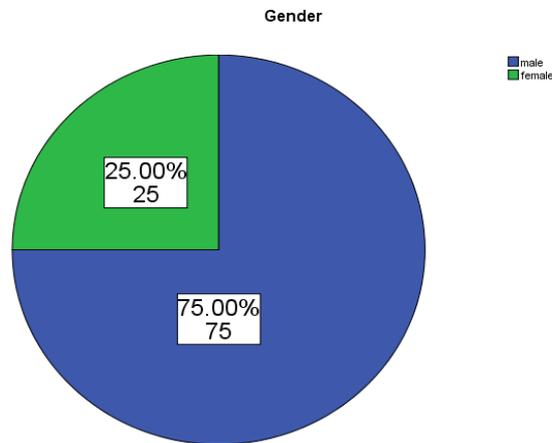


Figure 2. The data showing distribution of gender.

The result of the study according to Berg Balance Scale shows out of total 20 patients 6 fell in the category of “low fall risk (41-56)”, 8 fell in the category of “medium fall risk (21-40)” and 6 patients fell in the category of “ high fall risk (0-20)”.

Table1. Frequency of Fall according to Berg Balance Scale

Variables	Frequency	Percent	Valid Percent	Cumulative Percent
Low risk fall	6	30	30	30
Medium risk fall	11	55	55	85
High risk fall	3	15	15	100
Total	20	100	100	--

In total score males of sample population showed mean of balance problems 30.2667 & standard deviation 1.617521 which according to Berg Balance Scale shows that score lies in category of “moderate fall risk” (21-40) while females of study population showed 37.4000 mean & standard deviation 2.083991 that also lie in “moderate fall risk” (21-40) category of Berg Balance Scale.

DISCUSSION

Since in our study the balance problems after mild traumatic injury are found to be among 60% of the young patients, the same percentage was found to be given in a study by Peterson et al where they said that almost 30-65% of the patients who suffered traumatic brain injury (TBI) face balance issues in a way or another during their course of recovery (Peterson & Greenwald, 2015b). A Study by Row et al showed compromised limits of stability (LOS) in patients with chronic balance problems with mild to moderate traumatic brain injury (Row et al., 2019). Another study by Silverberg et al showed the incidence of mild traumatic brain to be higher in adolescents or young adults aged between 15 to 24 years and more prevalent in men than women which is very consistent with the findings of our study where most of the patients with mild traumatic brain injury belonged to the age group 18 to 35 years and with high ratio of men as compared to women (Silverberg, Duhaime, & Iaccarino, 2020).

CONCLUSION

According to the results it was concluded that patients suffering from mild TBI are effected by impaired balance that increases their risk of fall and majority of the patients suffered by mild traumatic brain injury are falling in the category of “moderate risk” of their fall according to the Berg Balance Scale. Male patients suffering from mTBI were greater in number than female patients owing to the road side accidents as a major contributing factor towards sustaining mild traumatic brain injuries.

Conflict of interest

Authors declare that there is no conflict of interest.

Consent for Publication

All authors approved manuscript for publication.

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