

The frequency of dizziness among mild to moderate traumatic brain injury patient

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ABSTRACT

Background: Traumatic brain injury (TBI) is one of the leading factors of disability and death in population after any vehicle accident. Dizziness is one of the common complaints caused by TBI affecting their normal activities of life.

Objective: To determine the frequency of dizziness in mild to moderate traumatic brain injury patients.

Methods: The descriptive cross-sectional study was conducted on 78 patients, after receiving ethical permission from University. The sample was collected through nonprobability convenience sampling technique. The patients were selected according to the designed inclusion criteria in which male and female patients of 20 to 60 years of age with mild to moderate traumatic brain injury having GCS score of 9-15 were enrolled in the study. The dizziness handicap inventory was used for assessment of dizziness. The data was analyzed using software of SPSS version 26 in which frequency and percentage were determined.

Results: Among 78 patients, 44.23±12.42 was the mean age, 57.7% were male and 42.3% were female. Furthermore, 11.5% were mildly handicapped, 47.4% were moderately handicapped and 41% were severely handicapped due to dizziness.

Conclusion: It was concluded that dizziness is highly prevalent among mild to moderate TBI patients that made them moderate to severely handicap in performing their normal activities of life.

Key Terms: Dizziness, Frequency, Mild to moderate traumatic brain injury.

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Introduction:

Traumatic brain injury (TBI) is a major factor of disturbing function of brain leading to increase mortality and morbidity rate. TBI can either be caused by any central nervous system pathology or any other external trauma.(1) Any acceleration and deceleration injury or motor vehicle accidents are the major blunt traumas that causes the laceration of the scalp and changes in the intracranial contents leading to mild to moderate TBIs.(2) It is one of the leading cause of mortality as approximately 1.5 to 2 million annually experience TBI, among which 1.4 million were admitted to emergency department from which 27000

got hospitalized while the death rate was up to 52000 annually.(3) According to survey, 2673 people of 18-34 years of age had history of TBI being a prevalence of 442.4 per 100,000 person.(4)

The most common sign and symptoms of the Traumatic Brain Injury includes loss of consciousness from several minutes to hours, persistent headache, nausea, vomiting, raised intracranial pressure, intracranial hematoma, and cerebral contusions etc. Furthermore; TBI leads to the development of multiple impairments including dizziness, Benign Paroxysmal Positional Vertigo (BPPV) and balance problems.(5)

Dizziness is the vague terminology that described as persistent and unexplained postural sensation of light lightheadedness developing balance and vestibular problems.(6) The pathology of Dizziness is still unknown, however; some vestibular and non-vestibular factors increase its prevalence. Benign Paroxysmal Positional Vertigo (BPPV) is one of the major vestibular issues causing dizziness among patients. Neck injuries, traumatic brain injury, migraine, anxiety and spinal cord injuries cause dizziness.(7, 8) Around 17% of traumatic brain injury patients had post-traumatic dizziness with

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recurrence occurring in 9 (40.9%) of the patients.(9) Dizziness is 46% prevalent among TBI patients in which 38.9% suffering after mild TBI within 6 weeks while 25.4% reported its occurrence after 12 months of TBI.(8)

Harrell et al (2021) reported that TBI is the major risk factor of developing dizziness and balance issues among the patients admitted in emergency department. The trauma causes vestibular hypofunction and swelling of vestibular labyrinth while disturbing the impulses generating from vestibular nucleus causing dizziness, balance issues and BPPV(5). Similarly; Giaonli et al (2022) stated that dizziness is the second most prevalent complaint of patients who had mild Traumatic Brain injury that might have non-vestibular and central or peripheral vestibular causes.(10)

Therefore, the current study was designed to find out the frequency of dizziness in mild to moderate TBI patients as various literature tried to determine the vestibular, musculoskeletal, and neurological abnormalities among these patients. This study will further help in improving the quality of life for the patients who will be prone to developing any vestibular pathology.

Methods:

A descriptive cross-sectional study was conducted after receiving an ethical approval from the Ethical Committee of Lahore college of Physical Therapy, Lahore Medical and Dental College with Reference number LCPT/DPT/22/937. The sample of 78 patients was selected by using WHO sample size calculator ($n = Z^2 P (1-P) / d^2$) as a non-probability convenience sampling technique.(11) Patients were included according to designed inclusion criteria in which males and females patients of 20 to 60 years of age, and having GCS score between (9-15) were included in study for the categorization of TBI injury.(12) Patients suffering with any co-morbidities including stroke, paralysis, spinal cord injuries and patients having TBI from wheeling, blast injuries, falls and sports injuries were excluded from the study.

Proper written and verbal consent was taken from each patient by therapist. Data was collected using a questionnaire including demographic variables (age and gender) and Dizziness Handicap Inventory Scale (DHI). The DHI is a highly reliable assessment tool for analyzing self-perceived severity of dizziness. The

questionnaire includes 25 questions focusing on functional, physical, and emotional aspects of patients with maximum score of 100. The score ranging from 16-34 is marked as mild handicap, 36-52 scores shows moderate handicap and above 54 scores are marked as severe handicapped. It provides subjective and objective assessment for dizziness among vestibular diseases, brain injury, persistent whiplash-associated disorders, major anxiety disorders and older population.(13-15) Furthermore, DHI has positive correlation with functional gait and balance assessment.(15, 16)

The data was analyzed by using SPSS version 26 in which results were described in the form of frequency and percentage along with graphs.

Results:

The results of the current study were described in tabulated method including frequency and percentage along with the histogram form. Table 1 described the results of demographic variables of TBI population. The mean age of patients was 44.23 ± 12.42 years having the minimum age of 20 years and maximum age of 60 years. Similarly. Out of total, 45 (57.7%) were males and 33 (42.3%) were females.

Table 2 and Figure 1 described the severity of dizziness assessed by DHI among TBI patients. According to analysis, 9 (11.6%) were suffering with a mild handicap, 37 (47.4%) were with moderate dizziness handicap and 32 (41%) were suffering with severe dizziness handicap.

Table 1: Descriptive table of Demographics variables:

Variables	Category	Frequency (%)
Age	20-30	16 (20.5%)
	30-40	22 (28.2%)
	40-50	26 (33.3%)
	50-60	14 (17.9%)
Gender	Male	45 (57.7%)
	Female	33 (42.3%)

Table 2: Frequency of DHI among TBI population:

Category of DHI	Frequency (%)
Mild dizziness	9 (11.6%)
Moderate dizziness	37 (47.4%)
Severe dizziness	32 (41.0%)

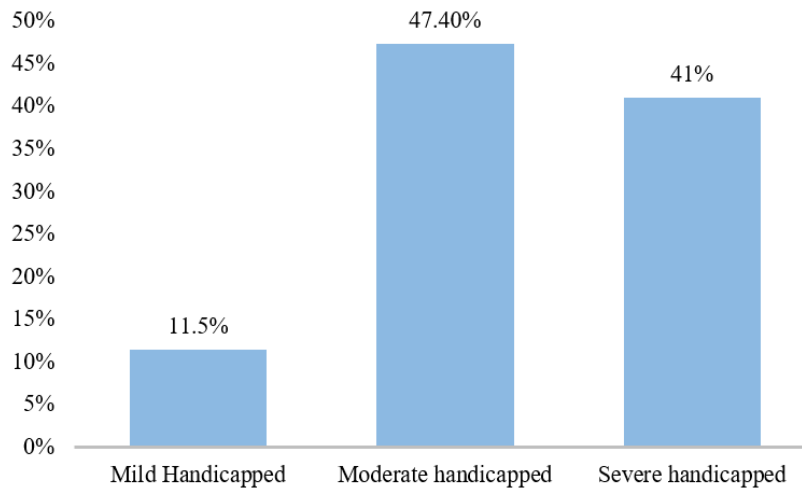


Figure 1: Frequency of DHI among TBI population:

Discussion:

Traumatic brain injury has been considered as one of the major causes of dizziness. The current descriptive cross-sectional study shows that moderate dizziness is frequent in traumatic brain injury. This study has the consistent results with the previous study which was done by Harrell et al and reported that prevalence of dizziness is above 50% among patients who were admitted with TBI with value $\chi^2_{1} = 5.715$, $p = 0.017$ and Cohen's $W = 0.279$.(17)

Chae et al. stated that prevalence of TBI was common in age above 17 years in which incidence of dizziness was significantly present in age of 41.6. Furthermore; among TBI patients; 40-60% had episode of dizziness in which 26% suffered with moderate or severe dizziness.(18)

Kleffelgaard et al. further supported that dizziness is one of the major problem among TBI patients as it was 23.8%-81% prevalent; affecting their social and personal life. (11) Additionally; Storlos et al stated that mild to moderate TBI develops dizziness in more than 36% patients affecting their activities and prevent them from performing their professional work on daily basis.(19)

Dizziness is a major symptom associated with the TBI pathology supported by Kleffelgaard et al. as TBI leads to the development of multiple comorbidities including headache, vertigo, BBPV, dizziness, neck pain and post-concussion symptoms. These conditions further increase dizziness related disability in patients after one year that affects their quality of life. This highly supported current study results as patients showed significant dizziness level with moderate to

severe handicap.(20)

The study has its own strength while it also had some limitations. Firstly, the sample size of the study was very small. Therefore, it is highly recommended that a new study should be conducted with a larger sample size for better analysis and the outcome of study. Secondly, the study included all the patients who were suffering with TBI rather than focusing on the specific time duration of the TBI. Therefore, it is recommended to conduct a study in which patient should be enrolled in acute, subacute, and chronic TBI condition as it will help in analyzing which type of patients are suffering with mild or severe dizziness. Thirdly, the study just focusses on determining the prevalence of dizziness. Therefore, it is required to determine what are the major complications or pathologies that can be developed due to dizziness in TBI patients that affect their quality of life. Fourthly, the study did not find prevalence of any comorbidity associated with TBI or that increase or reduce the severity of dizziness and handicap. Therefore, a study will be recommended with the aim of determining other pathologies that affect the quality of life and severity of dizziness among TBI patients.

Conclusion:

Post-traumatic complications, especially dizziness, is one of the major complications of traumatic brain injury. Patients having mild to moderate traumatic brain injury had moderate to severe dizziness level that made them handicapped for performing their daily activities of life.

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References:

1. Savitsky B, Givon A, Rozenfeld M, Radomislensky I, Peleg KJBi. Traumatic brain injury: it is all about definition. 2016;30(10):1194-200.
2. Tucker M, Degeneffe CEJTAJoRC. Future concerns among families following brain injury in the United States: Views from the Brain Injury Association of America state affiliates. 2013;19(2):135-41.
3. Tamber A-L, Wilhelmsen KT, Strand LIJH, outcomes qol. Measurement properties of the Dizziness Handicap Inventory by cross-sectional and longitudinal designs. 2009;7(1):1-16.
4. Sun D, Jiang B, Ru X, Sun H, Fu J, Wu S, et al. Prevalence and altered causes of traumatic brain injury in China: a nationwide survey in 2013. 2020;54(2):106-13.
5. Harrell RG, Manetta CJ, Gorgacz MPJCPM, Reports R. Dizziness and balance disorders in a traumatic brain injury population: current clinical approaches. 2021;9(2):41-6.
6. Kaski DJJon. Neurological update: dizziness. 2020;267(6):1864-9.
7. Ellis MJ, Leddy JJ, Willer BJBj. Physiological, vestibulo-ocular and cervicogenic post-concussion disorders: an evidence-based classification system with directions for treatment. 2015;29(2):238-48.
8. Kleffelgaard I, Langhammer B, Hellstrom T, Sandhaug M, Tamber A, Soberg HJBi. Dizziness-related disability following mild-moderate traumatic brain injury. 2017;31(11):1436-44.
9. Andersson H, Jablonski GE, Nordahl SHG, Nordfalk K, Helseth E, Martens C, et al. The risk of benign paroxysmal positional vertigo after head trauma. 2022;132(2):443-8.
10. Gianoli GJJFin. Post-concussive dizziness: a review and clinical approach to the patient. 2022;12:718318.
11. Kleffelgaard I, Soberg HL, Tamber A-L, Bruusgaard KA, Pripp AH, Sandhaug M, et al. The effects of vestibular rehabilitation on dizziness and balance problems in patients after traumatic brain injury: a randomized controlled trial. 2019;33(1):74-84.
12. Bodien YG, Barra A, Temkin NR, Barber J, Foreman B, Vassar M, et al. Diagnosing level of consciousness: the limits of the glasgow coma scale total score. 2021;38(23):3295-305.
13. Kaufman KR, Brey RH, Chou L-S, Rabatin A, Brown AW, Basford JRJMe, et al. Comparison of subjective and objective measurements of balance disorders following traumatic brain injury. 2006;28(3):234-9.
14. Treleaven JJAJP. Dizziness handicap inventory (DHI). 2006;52(1):67.
15. Mutlu B, Serbetcioglu BJJovr. Discussion of the dizziness handicap inventory. 2013;23(6):271-7.
16. Schmid D, Allum J, Sleptsova M, Welge-Lüssen A, Schaefer R, Meinschmidt G, et al. Relation of anxiety and other psychometric measures, balance deficits, impaired quality of life, and perceived state of health to dizziness handicap inventory scores for patients with dizziness. 2020;18:1-15.
17. Harrell R, Manetta C, Guthrie M, Enam NJO, Neurotology. The prevalence of symptom reporting for benign paroxysmal positional vertigo in a traumatic brain injury population. 2023;44(2):172-6.
18. Chae R, Barber J, Temkin NR, Sharon JD, Badjatia N, Diaz-Arrastia R, et al. Dizziness after traumatic brain injury: a prospective TRACK-TBI analysis of risk factors, quality of life, and neurocognitive effects. 2022;43(10):e1148-e56.
19. Storlås B, Roaldsen KS, Soberg HL, Kleffelgaard IJCM. Patient-specific functioning related to dizziness and balance problems after traumatic brain injury—A cross sectional study using an ICF perspective. 2021;8(1):1932247.
20. Kleffelgård I, Andelic N, Bruusgaard KA, Langhammer B, Tamber A-L, Soberg HLJJoem. Dizziness-Related Disability One Year after a Mild-to-Moderate TBI—A Follow-Up Study. 2023;12(16):5192.

Authors contribution:

Ahmad M: Conception of work, design, acquisition

Safdar N: Conception of work, final approval and agreement to be accountable for all the work

Salik S: Acquisition, interpretation, drafting, revising

Faisal S: Acquisition, analysis, interpretation, drafting, revising

Tabassum MN: Final approval and agreement to be accountable for all the work

Munawar R: Acquisition, interpretation, drafting, revising

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