

Posttraumatic Behavioral and Cognitive Alterations Among Patients with Head Injury

V.C. Jayalakshmi*

Department of Medical Surgical Nursing, KMCH College of Nursing, Coimbatore, Tamil Nadu, India

ABSTRACT

Trauma to the Central Nervous System constitutes an important cause of death and permanent disability. According to CDC the yearly incidence of TBI is eight times greater than that of breast cancer and 34 times greater than HIV/AIDS. TBI meaningfully touch cognitive, physical, and emotional skills. It comprises ambulation, equilibrium, coordination, fine motor skills, strength, communication, data processing, and recollection and so on. Need for the study: injury to the brain and neurological deficits are very common to all over the world. Neurobehavioral deficits especially in cognition are often the cause of significant disability after TBI. Since all patients with TBI manifest themselves in a different way, it is the responsibility of the nurse to understand the way the individuals behave and the potentialities in order to provide better nursing care. The cognitive and behavioral alterations of patients after TBI should be evaluated carefully along with the other neurological assessments. Objectives: To assess the behavioral and cognitive alterations and associate them with selected demographic variables. Design and Sampling: Nonexperimental descriptive research design was used for this study. Nonprobability purposive sampling technique was adopted to select the samples. Instruments: Consisted of demographic proforma, Nurses Observation Scale for Inpatient Evaluation (NOSIE-30) to assess the behavioral alterations and Mini Mental State Examination to assess the cognitive alterations. Data was collected and analyzed using descriptive & inferential statistics. Discussion: Among 30 samples majority were males (97%) and between the age group of 20 and 30 years. 87% had TBI due to RTA. 53% were conscious after TBI. Only 10% had convulsions after the trauma, 83% had first aid immediately after the trauma. Regarding the behavioral alterations there was a significant difference found in the positive (social competence) & negative (irritability) behavioral dimensions at the level of 0.05. While considering the cognitive alterations there was a significant difference found in the language at the level of 0.05. Conclusion: There was a significant behavioral and cognitive alteration after head trauma. NOSIE-30 and MMSE helped to understand the behavioral & cognitive alteration of patients with TBI respectively.

Keywords: behavioral, cognitive alterations

***Corresponding Author**

E-mail: jayashalu25@gmail.com

INTRODUCTION

Traumatic brain injury (TBI) is a compound injury with a wide-ranging spectrum of symptoms and incapacities. The influence on a person and his or her family can be devastating [1]. A traumatic brain injury can occur in any number of

ways. According to National Institute of Neurological Disorders and Stroke (NINDS) 2003 head trauma can affect any one at any age. Males between 15 and 24 years are more vulnerable for TBI because of their high-risk life style [2]. Some of the most common causes of a TBI are motor

vehicle accidents, falls, and assaults. Other causes of TBI include stroke, cerebral hypoxia (resulting from heart attack or near drowning), hypoglycemia, carbon monoxide poisoning, cerebral infections such as meningitis or encephalitis, or subarachnoid hemorrhage, usually due to an aneurysm [3].

Behavior change is difficult for any individual to accomplish [4, 5]. Moderate-to-severe traumatic brain injury (TBI) can cause varying degrees of cognitive control deficits, which in turn have negative impact on long-term functional outcome [6-8].

Need for the Study

According to the World Health Organization, the Traumatic brain injury (TBI) will exceed many diseases as the main reason of death and incapacity by the year 2020. Nearly 10 million people are affected annually by TBI, the burden of mortality and morbidity that this condition imposes on society makes TBI a pressing public health and medical problem [9]. The burden of TBI is proved throughout the world and is especially prominent in Low and Middle Income Countries which face a higher preponderance of risk factors for causes of TBI and have ineffectively arranged health systems to address the related health results [10, 11]. Rapid industrialization, urbanization, motorization, economic liberalization and changing social environments are the hallmarks of new India in recent years. The number of vehicles on Indian roads has increased from 5.3 to 59 million during 1981–2002. The complex interactions of human, vehicle and environmental factors along with absence of safety environments and regulations has led to an increase of morbidity, mortality, disabilities and social economic losses from TBI in India [12].

Behavioral and Cognitive impairments due to traumatic brain injury (TBI) are

substantial sources of morbidity for affected individuals, their family members, and society [13, 15]. Disturbances of attention, memory, and executive functioning are the most common neuro sensory consequences of TBI at all levels of severity [15]. Instabilities of attention and memory are mainly difficult, as disturbance of these relatively elementary cognitive purposes may cause or worsen additional instabilities in decision-making function, communication, and other comparatively more complex cognitive functions [16, 17].

Statement of the Problem

A study to assess the post traumatic behavioral and cognitive alterations among patients with head injury at KMCH, Coimbatore.

Objective

To assess the behavioral and cognitive alterations and associate them with selected demographic variables.

Assumption

The behavioral and cognitive functions of the individuals are related to the involvement of the frontal lobe of the brain.

REVIEW OF LITERATURE

Belanger et al (2008) conducted a study on characterizing wandering behaviors in patients with TBI with the objective of examining the prevalence and correlating wandering behaviors of patients with TBI. A cross sectional design and logistic regression modelling was used to analyze the national data base. A Total of 625 samples from 164 nursing homes were participated in the study. They found that the prevalence of wandering among patients with TBI was 14%, compared with the general home populations [18]. The results of multivariate logistic regression suggested that wandering was associated with poor memory, poor decision making, behavior problems and

independence in activities of daily living related to basic hygiene.

Michael Groher (2006) conducted a study on language and memory disorders following closed head trauma. The memory and language skills of 14 patients who had suffered closed head trauma were documented after they regained consciousness and at one- month intervals for four months utilizing the Porch Index of Communicative Ability and Wechsler Memory Scale [19]. Results showed that the patients suffered both reduced memory and language skills. After four months expressive and receptive language skills and all memory tasks were within the normal limits after they regained consciousness. No significant correlation existed between the length of unconsciousness and the initial and final language and memory scores.

MATERIALS AND METHODS

A nonexperimental descriptive research design was adopted for the study. Nonprobability purposive sampling technique was used to select the samples. The study was conducted at neuro ICU and neuro wards of KMCH, Coimbatore. 30 patients, between 21 and 60 years of both sexes with frontal lobe injury were included for this study. Patients with tracheostomy and epidural hematoma were excluded from the study.

Development of Tool for Data Collection

Nurses Observation Scale for Inpatient Evaluation (NOSIE-30) and Mini Mental State Examination (MMSE) were used to assess the behavioral and cognitive

alterations respectively. NOSIE consisted 30 items, which included six dimensions such as social competence, social interest and personal neatness for positive behaviors and irritability, manifestation of psychosis and depression for negative behaviors. MMSE consist five dimensions such as orientation, memory, attention, recalling and language.

Data Collection

The data was collected for a period of five weeks. The investigator selected the patients, and informed consent was obtained from the patients. The investigator obtained the data by observing the behavior of the patients and interviewing the cognitive alterations for three alternative days which are mentioned as observation I, observation II and observation III respectively. Information from consultants and nurses were also considered while collecting the data.

Data Analysis and Interpretation

The collected data were analyzed using descriptive and inferential statistics.

Section 1: Comparison of Behavioral Alterations Score

Table 1 depicts the mean difference in positive behavioral alterations. This showed that there was a significant difference between observation I&II, II&III and I&III at 0.05 level (Figure 1)

Table 1. Comparison of subjects according to the positive behavioral score.

S. no	Behavioral factors	Mean	SD	t Value
1	Observation I	32.86	12.09	2.750*
	Observation II	34.5	11.33	
2	Observation II	34.5	11.33	2.067*
	Observation III	33.93	11.66	
3	Observation I	32.86	12.09	2.075*
	Observation III	33.93	11.66	

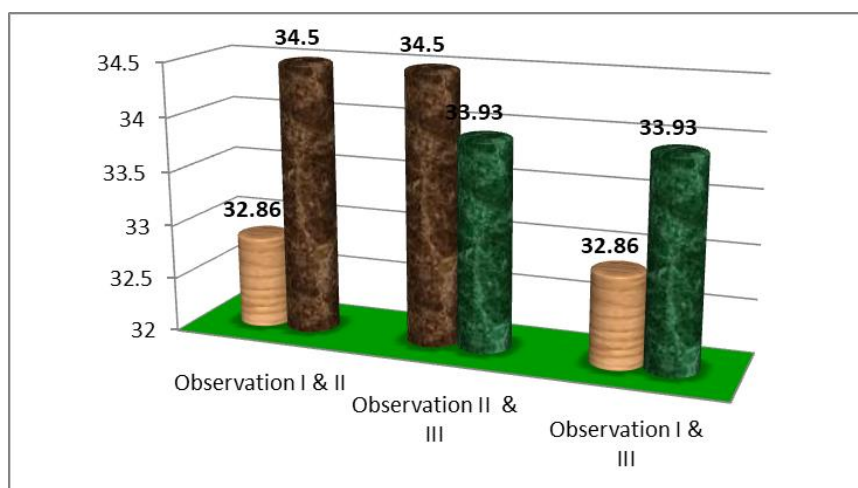


Fig. 1. Depicts that there is significant difference found in observation I&II, II&III and I&III.

Section 2: Comparison of Cognitive Alterations Score

Table 2 shows the mean difference in language under cognitive alterations.

This showed that there was a significant difference found between observation I&III at 0.05 level (Figure 2).

Table 2. Comparison of subjects according to the language score.

S. no	Behavioral factors	Mean	SD	t Value
1	Observation I	7.36	2.97	2.192*
	Observation II	7.66	2.75	
2	Observation II	7.66	2.75	0.2541(NS)
	Observation III	7.73	2.61	
3	Observation I	7.36	2.97	1.363
	Observation III	7.73	2.61	

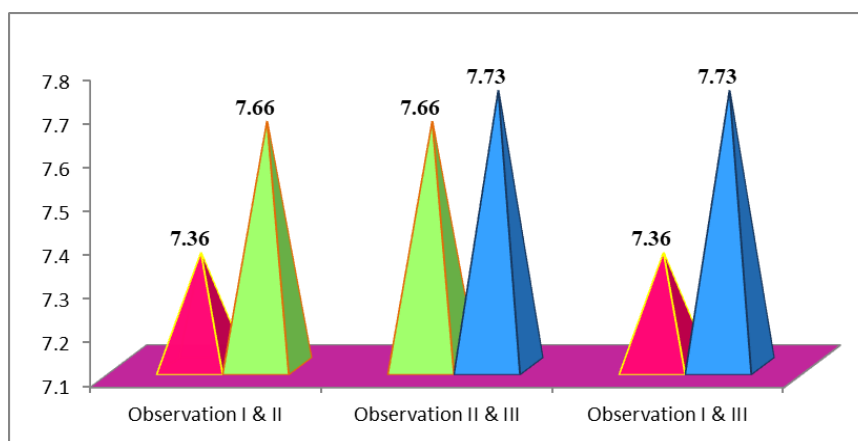


Fig. 2. Analysis and Interpretation

When considering the behavioral alterations the results showed that there was a significant difference found in the dimensions like social competence, personal neatness, irritability, and depression between observations I, II and

III. With regard to the cognitive alterations there was no difference found except in the dimension of language between observations I, II and III.

Limitations

- The study was limited to only 30 samples
- The study included only patients with frontal lobe injury
- The study was limited to only one setting
- The study can be replicated using larger sample size for longer period of time
- A similar study can be done with other types of neurological problems
- A comparative study can be done in different settings

Recommendations

Nurses Observation Scale for Inpatient Evaluation-30 (Nosie-30)

S no	Behaviors	Score				
		Never	Sometimes	Often	Usually	Always
1	Is sloppy					
2	Is impatient					
3	Cries.					
4	Shows curiosity and interest in activities around him/her.					
5	Sits, unless directed into activity					
6	Gets angry or annoyed easily					
7	Hears things that are not there					
8	Keeps his/her clothes neat					
9	Tries to be friendly with others					
10	Becomes upset easily if something doesn't suit him/her					
11	Refuses to do the ordinary things expected of him/her					
12	Is irritable and grouchy					
13	Has trouble remembering					
14	Refuses to speak					
15	Laughs or smiles at funny comments or events					
16	Is messy in his/her eating habits					
17	Starts up a conversation with others					
18	Says he/she feels blue or depressed					
19	Talks about his/her interests					
20	Sees things that are not there					
21*	Has to be reminded what to do					
22	Sleeps, unless directed into activity					
23	Says that he/she is no good					
24	Has to be told to follow hospital routine					
25	Has difficulty completing even simple tasks on his/her own					
26	Talks, mutters, or mumbles to him/her.					
27	Is slow moving or sluggish					
28	Giggles or smiles to him/herself for no apparent reason.					
29	Is quick to fly off the handle					
30	Keeps him/herself clean					

Nosie-30, Subscales

3. Personal Neatness (PN) 1*----- 8----- 16*----- 30----- SUM-----	2. Social Interest (SI) 1----- 9----- 15----- 17----- 19----- SUM-----	1. Social Competence (SC) 11*----- 13*----- 21*----- 24*----- 25*----- SUM-----
--	---	--

Positive Factors

Total Positive Factors = SUM SC+SUM SI+SUM PI=

6. Depression (DEP) 5----- 22----- 27----- SUM-----	5. Manifest Psychosis (PSY) 7----- 20----- 26----- 28----- SUM-----	4. Irritability (IRR) 2----- 6----- 10----- 12----- 29----- SUM-----
--	---	---

Negative Factors

Total Negative Factors = SUM IRR+SUM PSY+SUM DEP=

These items receive reflected scores 0=4

1=3

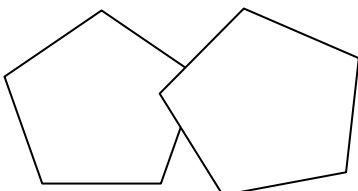
2=2

3=1

4=0

References Mini-Mental State Examination (MMSE)

Domains	Maximum score	Minimum score
Orientation: What is the year? Season? Date? Day of the week? Month?"	5	0
Where are we now: State? County? Town/city? Hospital? Floor?"	5	0

Registration: The examiner names three unrelated objects clearly and slowly, then asks the patient to name all three of them.	3	0
Attention/ calculation: I would like you to count backward from 100 by sevens. (93, 86, 79, 72, 65 ...) Stop after five answers. or Spell WORLD backwards. (D-L-R-O-W)	5	0
Recall: Ask the patient to repeat three objects mentioned earlier	3	0
Language: Naming: Show the patient two simple objects, such as a wristwatch and a pencil, and ask the patient to name them.	2	0
Repeating: Repeat the phrase: "No ifs, ands, or buts"		
Following a three stage command: "Take the paper in your right hand, fold it in half, and put it on the floor." (The examiner gives the patient a piece of blank paper.)	1	0
Writing: Make up and write a sentence about anything. (This sentence must contain a noun and a verb.)	3	0
Readying: Read and obey the following: "Close your eyes"	1	0
Copying: Please copy this picture. (The examiner gives the patient a blank piece of paper and asks him/her to draw the symbol below)	1	0
 All 10 angles must be present and two must intersect.	1	0

CONCLUSION

The study entitled "A study to assess the posttraumatic behavioral and cognitive alterations among patients with head injury was conducted with 30 samples at KMCH Coimbatore". The behavioral alterations were assessed with NOSIE-30 and MMSE was used to assess the cognitive alterations after head trauma. These tools helped to understand the behavioral and cognitive alteration of patients with TBI.

REFERENCES

- [1] N. Burns. *The Practice of Nursing Research*. Philadelphia: WB Saunders company; 2001.
- [2] M. Campell. *Rehabilitation for Traumatic Brain Injury: Physical Therapy Practice in Context*. Churchill Livingstone, Edinburgh, 2000.
- [3] E.M. Chipps, N.J. Clanin, V.G. Campell. *Neurological Disorders*. Mosby, Baltimore, 1992.
- [4] K.K. Chitty. *Professional Nursing Concepts and Challenges*. Philadelphia: WB Saunders company; 2000.
- [5] B.M. Dossey, C.E. Guzzetta, C.V. Kenner. *Critical Care Nursing: Body-Mind-Spirit*. Philadelphia: Mosby; 1992.

- [6] M.A. Finlayson, S.H. Garner. *Brain Injury Rehabilitation: Clinical Consideration*. London: William & Wilkins; 1994.
- [7] A. Grenvik. *Text Book of Critical Care*. Noida: Harcourt Asia Pvt Ltd; 2000.
- [8] J.V. Hickey. *The Clinical Practice of Neurological and Neurosurgical Nursing*. Philadelphia: Lippincott; 1997.
- [9] C.M. Hudak, B.M. Gallo, P.G. Mortan. *Critical Care Nursing: A Holistic Approach*. Philadelphia: Lippincott; 1998.
- [10] S.L. Lewis, M.M. Heitkemper, S.L. Dirksen. *Medical Surgical Nursing. Assessment and Management of Clinical Problems*. Philadelphia: Mosby; 2000.
- [11] D.F. Polit, B.P. Hungler. *Nursing Research, Principles and Methods*. Philadelphia: Lippincott Publishers; 1999.
- [12] C. Smeltzer, S. Brunner, Suddhar. *Text Book of Medical Surgical Nursing*. Philadelphia: Lippincott William & Wilkins; 2004.
- [13] J.I. Algozzine, W.K. Konard, E.I. Test. Direct behavioral observation, *J Neurotr*. 2005; 14p.
- [14] C.T. Beck. The Anniversary of Birth Trauma – Failure to Rescue Nursing Research. 2006, 55p.
- [15] T. Bushnik. Traumatic brain injury model systems of care, *J Neurotr*. 2008, 89p.
- [16] S.V. Eisen. Global assessment of functioning of traumatic brain injury, *J Neurotr*. 2007, 30p.
- [17] T.D. Hernandez. Post-traumatic neural depression and neurobehavioral recovery after brain injury, *J Neurotr*. 2006, 23p.
- [18] M. Martelli. Habit retraining model: promoting rehabilitation through progressive goal achievement, *J Neurorehabil*. 2000, 33p.
- [19] L. Serber. Cognitive test performance and brain pathology, *Nurs Res*. 2008, 57p.