

ORIGINAL ARTICLE

IMPACT OF EDUCATIONAL PEDAGOGY ON REGISTERED NURSES' KNOWLEDGE IN NEUROLOGICAL ASSESSMENT OF TRAUMATIC BRAIN INJURY PATIENTS

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Background: Nurses perform neurological assessment to determine whether patients' neurological condition is intact or there exists some problem. We aimed to assess the effect of educational pedagogy on the knowledge of nurses in neurological assessment of traumatic brain injury patients.

Methods: This quasi-experimental study investigated the effect of educational pedagogy on 70 registered nurses of a tertiary care hospital from April to June 2021. Diploma holder nurses aged 25–50 years working in the morning shift were included. Nurses who had specialization in neurosciences and had planned to go on leave during study period were excluded. A 20-items validated tool was used for assessment. Correct response was marked as '1' and wrong or missed as '0'. Knowledge was categorized as inadequate (1–6 score) <30%, moderate (7–13 scores) 35–65%, and adequate (14–20 scores) as 70–100%. **Results:** Frequency and percentages of demographic and professional variables were checked. Half of the registered nurses had inadequate knowledge (scores 1–6), while rest 50% had moderate knowledge (scores 7–13). No one had adequate knowledge during pre-assessment. The post-test results of the study illustrated that 34 (48.6%) nurses had moderate knowledge. Thirty-two (45.7%) nurses having adequate knowledge (score 14–20). Only 4 (5.7%) nurses had inadequate knowledge. Mean (\bar{x} =13) of the post-test knowledge score was significantly higher than the mean (\bar{x} =7.611) of the pre-test knowledge score. **Conclusion:** Educational intervention was effective in improving knowledge and skills competency of registered nurses in neurological assessment.

Keywords: Knowledge, Traumatic Brain Injury, TBI, Glasgow Coma Scale, GCS, Nursing, Assessment

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INTRODUCTION

Traumatic Brain Injury (TBI) is the disruption of normal brain function due to external injuries caused by blunt head trauma, accident, sudden bumps to the head, violent hitting of the head, or other causes that damage the skull and injure the brain tissues. TBI is a leading cause of death and disability worldwide. Yearly, about 1.5 million people die from TBI and several millions that survive receive emergency treatment.¹ Neurological injuries affect 1.4 million people per year in Pakistan.² Road traffic accidents and sports are two basic factors which lead to traumatic brain injuries. Traumatic brain injuries due to road traffic injuries are reported more as compared to other cases. Majority (60%) of the cases reported are due to the road traffic accidents. In contrast, the hospital-based statistics estimated sports related traumatic brain injuries ranging from 3.5 to 31.5 per 100,000. On the other hand, 170 per 100,000 sports related traumatic brain injuries were reported on community level.³

Usually patients with TBI are received to the emergency department (ED) with altered level of consciousness that needs urgent and efficient assessment. Glasgow coma scale (GCS) is an

assessment tool and was first introduced by Bryan Jennet and neurosurgery professor Graham Teasdale at the University of Glasgow. It provides objective assessment of level of consciousness in all types of medical and surgical patients during neurological assessment. The GCS has 3 main domains of assessment of level of consciousness, namely eye opening (E), verbal response (V), and motor response (M). The highest score of GCS is 15 while lowest scores is 3.⁴ In the extent of critical care, regardless of advancement in technology, neurological assessment plays a crucial part in the diagnosis and management of TBI patients.⁵ Sound knowledge and efficient skill performance of nurses may be helpful to deal with complexities of neurological assessment in such patients.⁶

Nurses and doctors both perform neurological assessment for different purpose. Doctors perform to locate the affected cite of central nervous system, to make a diagnosis for best treatment options. Nurses perform neurological assessment to determine whether patient's neurological condition is intact or there is some problem. They assess the changes in patient's neurological status in response to treatment, and to evaluate life threatening conditions.⁷ Neurological

assessment is performed at the time of admission of patient and then in each shift of duty to assess the effectiveness of treatment and for need of medication. In the extent of critical care, regardless of advancement in technology, neurological assessment plays a crucial part in the diagnosis and management of unconscious patients. Sound knowledge and efficient skill performance of nurses may be helpful to deal with complexities of neurological assessment of unconscious patients with TBI.⁸

Efficient nursing assessment is found to be associated with early recovery of the patients in neuro and general surgery departments. Nurses, working in neurosurgery department have poor knowledge and practices about GCS assessment of unconscious patients. Assessment of the nurses' knowledge and skill about GCS assessment, working with patients in intensive care is needed.⁹ About 40% of all patients admitted in hospitals with traumatic brain injuries, rather to recover, their conditions worsen due to improper assessment and poor management.¹⁰ Moreover, poor knowledge and inefficient skill performance of nurses was found associated with prolong hospital stay of patients in emergency department and intensive care units.¹¹

There is need of changing the learning pedagogies to enhance the knowledge and skill for ultimately best patients' outcome that is the utmost objective of nursing practices. The current study aimed to assess the effectiveness educational pedagogy on knowledge of registered nurses in neurological assessment of patients with TBI.

METHODOLOGY

This study was conducted following guidelines of declaration of Helsinki. Written informed consent was obtained from all participants. Ethical and Research Committee approval (IRB-UOL-FAHS/830-III/2021) was granted by University of Lahore.

In this single group quasi experimental study conducted from April to June 2021, 70 registered nurses were selected from Trauma Centre, General Surgery and Neurosurgery Department of a tertiary care hospital in Lahore Pakistan using purposive sampling technique. Diploma holder nurses aged 25–50 and working in the morning shift were included in this study. Nurses who had specialization in neurosciences or had planned to go on leave during the study period were excluded. The sample size was calculated using mean and standard deviation from previously published studies.¹² After adding up 20% dropout rate and 80% power sample size was calculated as 70.

In pre- assessment knowledge of participants was assessed on a questionnaire at their original job place. This followed a 1-week educational training (PowerPoint lecture cum audio-visual demonstration)

regarding anatomy and physiology of nervous system and neurological assessment of traumatic brain injury (TBI) patients on Glasgow Coma Scale (GCS) was given. This training program was conducted and validated by experts of relevant field. Four weeks were given for implication of knowledge. The participants were reassessed for changes in knowledge using a 20-items multiple choice questionnaire, GCS knowledge assessment too, adopted from published work with permission. Correct response was marked as '1' and wrong or missed as '0'.¹³ Knowledge was categorized as inadequate (1–6 score) <30%, moderate (7–13 scores) 35–65%, and adequate (14–20 scores) as 70–100%.¹⁴ The Cronbach's alpha 0.723 and intra-rater reliability of tool was reported as 0.86.¹⁵

SPSS-20 was used for statistical analysis. Frequency and percentage was checked for demographic and professional variables. Data about knowledge was obtained twice, i.e., before and after educational training. The collected data was in form of whole numbers to check the pre- and post- mean difference applying paired *t*-test, and $p \leq 0.05$ was considered statistically significant.

RESULTS

Total 70 individuals were chosen from Lahore General Hospital. Thirty-six (51.4%) of nurses were single (unmarried), 27 (38.6%) were married, 3 (4.3%) were divorced, and 4 (5.7%) were widows. Twenty-six (37.1%) of the nurses were 25–30 years old, 18 (25.7%) were 31–35 years old, 16 (22.9%) nurses were 36–40 years, and only 10 (14.3%) nurses were above 40 years of age. Most (33, 47.1%) of the nurses had 2–5 years job experience, 25 (35.7%) had 6–10 years, 8 (11.4%) had less than 2 years, and 4 (5.7%) of the nurses had more than 10 years job experience. Regarding work experience in the current department 16 (22.9%) nurses had less than 1 year, 39 (55.7%) of nurses had 1–3 years, 13 (18.6%) had 4–5 years, and only 2 nurse had more than 5 years working experience in the current department. More than half (38, 54.3%) nurses were working in Neuro-Surgery ICU, 20 (28.6%) in Surgical Unit, and 12 (17.1%) nurses were working in Trauma Centre.

Table-1 depicts the frequency and percentage of registered nurses who responded correctly for GCS knowledge questions, before and after educational intervention. Table-2 is showing the comparison of categories of knowledge of nurses (inadequate, moderate and adequate) before and after training session. Paired mean difference for pre- and post-educational effect is presented in Table-3. The mean (\bar{X} =13) of the post-test knowledge score was significantly higher than the mean (\bar{X} =7.611) of the pre-test knowledge score.

Table-1: Pre- and post-educational intervention knowledge about neurological assessment of TBI patients [n=70, n (%)]

Tool Items	Pre intervention correct response rate	Post intervention correct response rate
Pupil reaction is part of the neurological nursing assessment. Which cranial nerve assesses pupil reaction?	42 (60.0)	64 (91.4)
When eye opening is assessed, Which part of the brain is being tested?	22 (31.4)	61 (87.1)
When verbal response is assessed, Which part of the brain is being tested?	15 (21.4)	46 (65.7)
When motor response is tested, Which part of the brain is being assessed?	19 (27.1)	28 (40.0)
Abnormal motor movement would be observed by a positive drift.	20 (28.6)	27 (38.6)
Three indicators of GCS are: Eye opening, best verbal response, and best motor response.	35 (50.0)	33 (47.2)
Which one is the most adequate response when GCS is used? Best response presented by the patient.	22 (31.4)	42 (60.0)
When assessing for eye opening, examiner should start with: Stand next to the patient's bed.	25 (35.7)	47 (67.1)
What is level of consciousness?	22 (34.3)	45 (64.3)
Neurological assessment components for conscious patients, you would include in your assessment, all of the following except: Pulse rate	23 (32.9)	49 (70.0)
A normal neurological finding includes: Oriented to person, place, time, and event	29 (41.4)	46 (65.7)
When testing the best motor response: Record the response in all four limbs	23 (32.9)	40 (57.1)
To test motor response in a tetraplegia patients	18 (25.7)	42 (60.0)
Glasgow Coma Scale lowest score is: 3	22 (34.3)	41 (58.67)
While testing motor response, if patient is unable to comply. You inflict a pain stimulus, and patient pulls his arm away: He has abnormal flexion.	23 (32.9)	44 (62.9)
While asking a patient, 'Where are you now?' patient says he is at his daughter's condominium. He is: Confused.	22 (31.4)	54 (77.1)
Decrease in Glasgow Coma Scale score of '—' is seen as deterioration in conscious level and needs to alert medical team.	41 (58.6)	52 (74.3)
Initially Glasgow Coma Scale was devised to: assess the depth of coma	43 (61.4)	53 (75.7)
Patients are considered comatose, if GCS score is below 8	34 (48.6)	48 (68.6)
In GCS take notes for: Scoring each indicator, total score, and describe when necessary	28 (40.0)	51 (72.9)

Table-2: Comparison of pre- and post-educational intervention knowledge among registered nurses about GCS assessment of TBI patients [n=70, n (%)]

Knowledge category	Knowledge score	Pre knowledge score	Post knowledge score
Inadequate	1-6	35 (50)	4 (5.7)
Moderate	7-13	35 (50)	34 (48.6)
Adequate	14-20	0 (0)	32 (45.7)

Table-3: Paired t-test between pre- and post-knowledge score about GCS assessment (n=70)

	Mean±SD	Mean difference	Paired t-test	p
Pre-test knowledge score	7.611±2.643	5.389	11.146	0.00
Post-test knowledge score	13.000±3.295			

DISCUSSION

Neurological assessment in emergency and intensive care units is a basic skill for nurses. It is recommended that effectiveness of practices could be enhanced through evidence based practices. The findings of present study are contradictory to a previous study¹⁶ that nurses had good knowledge (75%) regarding neurological assessment of traumatic brain injury patients. It was revealed in the present study that 50% nurses had inadequate knowledge and 50% had moderate level of knowledge. The inadequate knowledge in these areas possibly limits their capacity for clinical judgment and decision making in managing unconscious patients.

Current study revealed the same results as previous studies¹⁷ regarding the effectiveness of teaching programs related to GCS for assessment of neurological injuries. This study revealed that the post-

test mean score among staff nurses and knowledge and skills regarding use of GCS was higher than pre-test mean score among staff nurses. This indicates that nurses improved their skill competence after teaching session and also revealed the importance of continuing nursing education.

Nurses working in neurosciences required evidence-based guidelines for assessment of neurological injuries. The findings of this study are supported by previous work conducted by Cook NF.¹⁸

The findings of current study support the need for ongoing education of nurses for neurological assessments to increase skill and confidence in assessment of neurological injuries which ultimately could increase the patient survival rate.¹⁹ This study had similar results as a previous study reporting that there was a significant increase in overall post-survey scores vs pre-survey scores. This study confirms the results of that study²⁰ that neurological assessment is a part of the daily routine for most nurses working in neurology departments, and that nurses with special education and training in Neuroscience nursing have higher competence in consciousness assessment than nurses who only have basic education.

CONCLUSION

Current study disclosed the effectiveness of educational intervention in the enhancement of knowledge and refining the skill competency of registered nurses regarding neurological assessment of TBI patients. A remarkably positive impact of educational pedagogy was demonstrated.

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NY: Conceive the idea, design, data collection and manuscript writing

AKO: Overall supervision of the study

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KP: Data analysis, critical evaluation and redrafting the manuscript

MA: Final draft and made substantial contribution

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