Neurological Assessment Skill Competency of Registered Nurses in Traumatic Brain Injury Patients: A One Group Pre-Post Design

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Abstract

Objectives

To assess the effect of educational pedagogy on the skill of nurses in neurological assessment of traumatic brain injury patients

Methods

This one group pre-post-test study investigated the effect an educational pedagogy on 36 registered nurses of trauma center, general surgery and neuro surgery department of a tertiary care hospital. A 20 items validated competency checklist was used to assess the skill of nurses before and after educational training regarding Neurological (Glasgow Coma Scale) assessment of TBI patients.

Results

Frequency and percentages of demographic and professional variables were checked. 36 (100%) of the nurses showed incompetent skills practice and having scores from 0 to 13. post test results of the study illustrated that 7 (19.4 %) nurses having score 0 to 13 and had incompetent skill practices. 29 (80.6 %) nurses having score from 14 to 20 and had competent skills practice. mean (of the posttest skills score was significantly higher than the mean (of the pre test skills score.

Conclusion

Before and after educational training there is significant paired mean difference in skill competency of nurses. Hence the educational intervention was effective in improving skills competency of registered nurses in neurological assessment.

Introduction

Traumatic Brain Injury (TBI) is the disruption of normal brain function due to external injuries caused by blunt head trauma, accident, suddenly bumps to the head, violent hitting of the head or other causes that damage the skull and injured the brain tissues (Bae & Roh, 2020). TBI is a leading cause of death and disability worldwide. Yearly, about 1.5 million people die from TBI and those several millions that survive receive emergency treatment (Hien & Chae, 2011). Neurological injuries affect 1.4 million people per year in Pakistan (Khan et al., 2020).

Road traffic accidents and sports are two basic factors 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 were due to the road traffic accidents (Cook, 2021). In contrast, the hospital based statistics estimated Sports related traumatic brain injuries ranging from 3.5 to 31.5 per 100,000. Besides, 170 per 100,000 Sports related traumatic brain injuries were reported on community level (Dubey & Kumar, 2019).

The common presentation to the emergency department (ED) is with an acutely altered level of consciousness that requires quick assessment, which is the crucial action of all health providers (Hien & Chae, 2011).

Glasgow coma scale (GCS) was first introduced by Bryan jennet and neurosurgery professors Graham Teasdale at the University of Glasgow. The Glasgow Coma Scale (GCS) provide objective assessment of level of consciousness in all types of medical and surgical patients during neurological assessment. Three type of behaviors are assessed for eye-opening, motor, and verbal responses (Teasdale & Jennett, 1974).

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 is 15 and lowest 3. (1–4) in eye opening, (1–5) in verbal response and (1–6) in motor response. GCS score ranges among the indicators of (13–15) mild brain injury, (9–12) moderate head injury and (3–8) severe injury. (Waterhouse et al., 2020).

Over the past forty years health care professionals are using the Glasgow coma scale (GCS) to examine the level of consciousness of patients. This scale is used to assess the neurological status of patients with different medical and surgical conditions like stroke or traumatic brain injuries or stroke. The GCS assessments also evaluate the progression of injury which is main point for decision making in neurosciences (Teasdale et al., 2014).GCS is also fundamental scale for research studies (Teasdale et al., 2014).

Nurses and doctors both perform neurological assessment for different purpose. Doctors, most probably perform neurological assessment to locate the affected cite of central nervous system, to make a diagnosis for best treatment options (Maher, 2016).

However, nurses perform neurological assessment to determine whether patients' neurological condition is intact or have some problem. Assess the changes in patient's neurological status in response to treatment. And to evaluate life threatening conditions (Solari et al., 2017).

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 (Maher, 2016). Sound knowledge and efficient skill performance of nurses may helpful to deal with complexities of neurological assessment of unconscious patients with traumatic brain injuries (TBI) (Greenshields, 2019).

Efficient nursing assessment found associated with early patients recovery in neuro and general surgery departments (Bae & Roh, 2020).

A study reported that nurses, working in neurosurgery department have poor knowledge and practices about Glasgow coma scale (GCS) assessment of unconscious patients There is a need to conduct

studies to explore the nurse's knowledge and skill about GCS assessment while working with patients in intensive care settings (Bae & Roh, 2020).

About 40% of all patients who admit in hospitals with traumatic brain injuries, rather to recover, their conditions get more worsen due to improper assessment and poor management (Arsh et al., 2017). Moreover, poor knowledge and inefficient skill performance of nurses was found associated with prolong hospital stay of patients in emergency departments and intensive care units (Yang et al., 2020). Another study found that lack of knowledge and inefficient skill regarding the GCS assessment was related to late recovery of patients in intensive care units (Gage et al., 2012).

Thus, to improve the ongoing traditional practices, there is huge 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.

Regarding the significance of GCS as a reliable clinical tool for neurological assessment of patients, and the demand of attentive and uniform practices, evaluation of competences is needed to ensure the standardized implication.

Objective

To assess the effect of educational pedagogy on the skill of nurses in neurological assessment of traumatic brain injury patients

Methods

This quantitative approach with one group pre-test post-test design included 36 registered nurses. Study subjects were selected from trauma center, general surgery and neuro surgery department of a tertiary care hospital Lahore Pakistan. Ethical and research committee approval was taken from University of Lahore, Lahore Pakistan. Signed consent was taken from all participants. And information taken from them kept confidential. Diploma holder Nurses aged 25–50 who work in morning shift were included in this study. We excluded the nurses who had specialization in neurosciences and had plan to go for leave during study period.

Study was conducted from April to June 2021. In pre assessment clinical assessor assessed the Participants for skill competences at their original working place by maintaining anonymity.

One week educational training regarding neurological assessment of traumatic brain injury (TBI) patients by using Glasgow Coma Scale (GCS) was given. This training program was validated and given by the expert of relevant field. In training session participants were taught for skill competence via simulated live adult standardized patient. Four weeks were given for improving skill competence. Then participants were reassessed for skill changes.

Age and marital status were included as demographic variable. Professional variables in this study were total year of job experience, number of years working in recent department and department name. For neurological assessment (GCS) skill observation, a 20 items GCS competency checklist was used. Correctly performed skill step was marked under the category of “achieved” and score was 1 and wrong or missed one step as “0” under column of “Not achieved”. Skill competency was categorized as competent practices if score is 70–100% (14–20 points) and incompetent practices if score are 0–65% (0–13 points) (Cook, 2021). The Cronbach’s alpha 0.723 and intra-rater reliability of tool was reported as 0.86 (Kotfis et al., 2018). SPSS version 20 was used for statistical analysis. Frequency and percentage was checked for demographic and professional variables. Data about skill competence was obtained twice, before and after educational training session from one group. The collected data was in form of whole numbers to check the pre- and post-mean difference by applying paired T test. Pre was coded as 1 and post as 2. Level of significance was set as < = 0.05.

Results

As a sample population, 36 individuals were chosen for the study from the Lahore General Hospital. 18 (50%) of nurses were single (unmarried), 14 (39%) nurses were married, 2 (5 %) of nurses were divorced and 2 (6 %) of nurses were widow. 13(36%) of the Nurses are 25 to 30 years old. Age of the 9 (25%) nurses is 31 to 35 years. Age of the 8 (22%) nurses is 36 to 40 years. Only 6 (17 %) nurses are above 40 years. The most 17 (47.2%) of the nurses have 2 to 5 years, 13(36.1%) of the nurses have 6 to 10 years, 4 (11.1%) of nurses have less than 2 years and 2 (5.6%) of the nurses have more than 10 years of job experience. 8(22.2%) nurses have less than 1 year, more than half 20 (55.6%) of nurses have 1 to 3 years, 7(19.4%) nurses have 4 to 5 years and only 1 nurse has more than 5 years working experience in recent department. More than half 20 (55%) nurses were working in Neuro Surgery ICU, 10 (28%) of nurses were working in Surgical Unit, and 6 (17 %) nurses were working in Trauma center.

Table 1 is about the pre and post skill competency scores of nurses regarding GCS assessment. In this table frequency and percentage of pre correct skill score has been given.

Table 1: Neurological Assessment (GCS) Competency Response

Table 2: Pre and Post- Educational Intervention Skills Competency about GCS Assessment of TBI Patients by Registered Nurses (n = 36)

Pretest results of the study shows that 36 (100%) of the nurses show incompetent skills practice and having scores from 1 to 13. No one have scores from 7 to 13. No one had competent practice on neurological assessment. The results show the poor skill practices of nurses about GCS Scale. The above table shows the post test results of the study and illustrated that 7 (19.4 %) nurses having score 0 to 13 and had incompetent skill practices. 29 (80.6 %) nurses having score from 14 to 20 and had competent skills practice. The results show the good skills practices of nurses on neurological assessment.

(P Value < = 0.05)

Table 3: Paired t- Test between pre and post Skill score about GCS assessment (n = 36)

Table 3 shows the mean $(\bar{X}_1 = 16.916)$ of the post test skills score is significantly higher than the mean $(\bar{X}_2 = 12.583)$ of the pre test skills score. There is significant (0 < 0.05) difference between means $(\bar{X}_1 - \bar{X}_2 = 4.333)$. Hence the educational intervention was effective in improving skills practices of registered nurses.

Discussion

Healthcare providers who serve care for patients with different kinds of neurological traumas and pathologies may need an easy to use tool of assessment that should have validity and reliability of quick identification of such disorders. For this purpose neurological or GCS assessment of such patients is an essential tool for routine clinical practices in ICUs and emergency units.

Current study revealed the same results as previous studies (Devi & Rana, 2018), and (Enriquez et al., 2019), showed the effectiveness of teaching Programme regarding GCS for the assessment of neurological injuries. The study revealed that the posttest mean score among staff nurses skills regarding use of Glasgow coma scale was higher than pretest mean score among staff nurses. Which indicate nurses have improved their skill competence after teaching session and also revealed the importance of continue nursing education.

Nurses working in neurosciences required evidence based guidelines for assessment of neurological injuries. The findings of this study were evident by previous study, which was conducted by (Cook, 2021), that nurses of neurological department have inconsistency and confusion when using the Glasgow Coma Scale in practice, this has the potential to compromise care. Clarity around the issues highlighted is necessary. Proper education to use GCS is important that is evident in current study that after education scores on skill competency were increased.

The results of this study showed the same results as previous study (Kebapçı, Dikeç, & Topçu, 2020), revealed that eye opening, motor response, verbal response, and sum of GCS scores were based on evaluation of patients' clinical manifestations. These factors can be evaluated by proper knowledge about current theory and practice interaction. If the nurse have the proper knowledge about appropriate sites for pain stimulation, use of the proper amount of time to accurately evaluate the GCS, an understanding of the importance of GCS assessment, and previous experience in using the GCS for patients with altered levels of consciousness. Then they can perform assessment efficiently and can save the life of patient who is totally dependent on nursing care.

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. (Jones, 2018), this study have same results as previous study

reported in their study that There was a significant increase in overall post-survey scores (88.6+/-13.3) vs. pre-survey scores (77.2+/-16.7) (p = 0.001) After the education. There was significant increase in the ability to identify neurological assessment components and a significant increase in the ability to identify normal vs. abnormal neurological findings. A large percentage (90%) of the nurses perceived the education as beneficial. As this study showed higher score in skill competency after educational session.

Neurological assessment is part of the daily routine for most nurses working in neurology departments. This study confirm the results of previous study (Vink et al., 2018), that nurses with specialist education and training in neuroscience nursing have higher competence in consciousness assessment than nurses who only have basic education. It was evident in this study that most of participants have been using a standardized instrument and report the outcome of the assessment with both total scores and sub scores.

Conclusion

This study was conducted to assess the skill competency of registered nurses in neurological assessment of traumatic brain injury patients. It was concluded that education play vital role to improve practice. This study revealed that before educational pedagogy, nurses have poor practice that prolong the patient stay in hospital and increase burden on hospital as well as society. After educational intervention skill scores of nurses increased that ultimately improved the best patient's outcomes

Declarations

Authors' contributions

NY conceive the idea, designed, collect the data, and wrote the paper. MH assisted in designing and gave critical inputs to the manuscript. KP critically evaluated the article and redrafted the manuscript. MAF and SAG assisted in the final draft of the study and made a substantial contribution. All authors read and approved the final manuscript.

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Ethics approval and consent to participate

Ethical approval from University of Lahore was taken IRB-UOL-FAHS/830-III/2021 and consent from participants was taken.
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Tables 1-3

Tables 1-3 were not provided with this version of the manuscript.