ORIGINAL ARTICLE

PHYSICAL THERAPISTS AND NURSES' KNOWLEDGE OF GLASGOW COMA SCALE WORKING IN HOSPITAL AND CLINICAL SETTINGS

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ABSTRACT

Introduction: The Glasgow Coma Scale (GCS) is a reproducible tool used to measure the depth and duration of the consciousness level of comatose patients, especially in emergency departments by healthcare professionals for neurological assessment. It is important for members of rehabilitation teams, specifically physical therapists (PTs) and nurses, to have knowledge of the GCS and the necessary skills to apply the scale and interpret the results. The present study is aimed to investigate and compare physiotherapist and nurses' knowledge in using the GCS in hospital and clinical settings.

Material & Methods: A cross-sectional study was conducted in which a convenience sample of 1,300 participants was chosen, considering nurses from government and private hospitals and PTs from hospitals and clinics in Faisalabad. SPSS Version 20 was used to enter and analyse the data. Pearson chi-square was used to find out association and Independent Samples t-test was used to compare the knowledge of PT and Nurses.

Results: The findings of study revealed that majority of the PTs (84.1%) had good knowledge of the GCS, yet only 2.9% of nurses had good knowledge. Most participants with good basic knowledge of the GCS lacked knowledge in the application and interpretation of GCS. Age, gender, educational level, and type of health facility were strongly associated with level of knowledge with significant p value<.001. The mean knowledge of nurses and physiotherapists was 59.84±14.65 and 89.81±8.45 respectively.

Conclusion: The physical therapists' knowledge of the GCS was good compared to the knowledge of the nurses

Key Words: Glasgow Coma Scale, knowledge, Nurses, Physical Therapist

INTRODUCTION

The Glasgow coma scale (GCS) was first introduced in 1974 to assess the severity of brain dysfunction or depth of coma in individuals. The scale has been proven to be beneficial for the rehabilitation community because of its high intra-ratter reliability.[1-3] Many studies have confirmed the reliability of the GCS for assessing the level of consciousness in patients with intracerebral haemorrhage.[4] The tool was revised in 1976, and an additional sixth point of assessment was added to the motor response sub-scale to assess withdrawal from painful stimulus. Currently, the GCS has three components that evaluate eye opening response, best verbal response, and best motor response, which are each individually examined. The resulting scores indicate the patient's condition. A score of three, for example, indicates that a patient is totally unconscious and 15 indicates that he or she is alert and conscious. Thus, the score provides insight into the status of a patient.[3,5,6] The level of awareness and prognosis of a patient with a non-traumatic cause can also be assessed with the GCS. Ultimately, the early detection of disease severity is helpful in obtaining better health outcomes.[7] However, a broad range of conditions are related to

comatose and changes in mental health presentation.[8,9] Besides acute brain trauma due to vascular or infective lesions, there are metabolic disorders that may lead to hepatic and renal failure, diabetic ketosis, and drug overdose. It is thus important to be able to assess and record dynamic states of altered mental state effectively.[10,11] GCS has increased communication among healthcare professionals worldwide because of its common reporting language.[12] Unfortunately, many practitioners working outside of hospitals have never learned to use or apply this life saving tool or have lost their ability to do so, negatively impacting overall health outcomes.[13]

In 2011, Hien and colleagues examined nurses' knowledge of the CGS and found that more than 90% responded correctly to basic questions, although 52.1% gave inaccurate responses to scenario-based questions.[14] The nurses answered the motor and verbal subscales of the GCS with high accuracy (77.9% and 74.5%, respectively) yet answered the eye-opening response subscale with moderate accuracy (67.4%). Overall, the nurses' answers (42.1% correct) reflected low knowledge of the GCS. The latter authors concluded

that nurses' knowledge was up to date but still deficient in the application of the scale.[14] Meanwhile, a descriptive study was conducted in 2013 by Batool et al. in three hospitals of Iraq over four months.[3] In this case, nurses' knowledge of GCS was inadequate, and the authors recommended the inclusion of skilled and knowledgeable nursing staff for the critical evaluation of patients in the ICU using the GCS.

Another study conducted in 2016 focused on lack of standardization in the application of GCS. A total of 616 participants were recruited from 48 countries and different settings, including nurses and clinicians. The authors proposed continuous education to improve the performance and reliability of the scale through using standardized methods and better documentation.[15] In 2016, a quantitative, descriptive cross-sectional study published in Malaysia revealed that 55.56% of nurses had poor knowledge of GCS and 41.48% had satisfactory knowledge. The authors recommended that further skills and knowledge be acquired to ensure better GCS scoring.[16]

Another cross-sectional analytical study conducted with 127 nurses from the critical care unit of a university hospital found that the setting in which nurses works greatly impacts the scoring and outcome of patients on the GCS, highlighting the need for setting-specific training.[17] Meanwhile, in pre- and post-test study by Teles, 74.55% of staff nurses had average knowledge and 25.45% had poor knowledge.[18] After the application of a self-instructional module in post-test readings, 69.09% of staff nurses had good knowledge and 30.91% had average knowledge, confirming that nurses' skills can be improved after modular intervention. In a systematic review, Gocan and colleagues stated that assessment skill, which involves collecting clinical data and making a firm decision, is one of the most essential for nursing staff.[20] Previously conducted studies showed the assessment of nurses' knowledge of GCS though very limited studies have been found in Pakistan, but no study found to assess the physical therapists' knowledge of GCS in Pakistan as per author's knowledge to date and no study is available that compares the knowledge of nurses with PTs. Therefore, this study was aimed to investigate and compare PTs and nurses' knowledge in using the GCS in hospital and clinical settings.

MATERIAL AND METHODS

From April to September 2019, a cross-sectional survey was conducted among physiotherapists and nurses working in government and private hospitals and clinical facilities in Faisalabad using the non-probability convenience sampling method. PTs and nurses of both genders were included after obtaining written informed consent. Based on the inclusion criteria, 1,300 participants were chosen. All nurses and Physical therapist working in hospitals and clinical setting during the data collection period and have completed their relevant degree were included. PTs and nurses willing to take part in this study were included in this study. Therapists and nurses who were on vacations during the data collection period, therapists and nurses who were doing observer ship and physical therapy students who were in final year of degree were excluded.

A questionnaire was used to collect data based on a previous study on nurses and PTs.[16] Questionnaire was consisted of two parts: section A and section B. In section A, demographic information was recorded. Section B consisted in 15 questions to assess nurses' and physical therapists' knowledge of the GCS. Data were also collected by sending e-mails containing questionnaires to PTs who were registered through the Pakistan Physical Therapy Association. A total of 340 questionnaires were emailed to the physical therapists, and 321 were received back. Eighteen questionnaires were not filled out properly, so they were excluded from further data analysis. SPSS version 20 was used for data entry and analysis of results. Pearson chi-square test was used to find out the association between different variables and knowledge of participants.

RESULTS

A total of 942 (72.5%) were nurses and 358 (27.5%) were PTs and out of them 147 (11.3%) were males and 1153 (88.7%) were females. 434 (33.4%) participants were holding undergraduate and 866 (66.6%) were postgraduates. 321(24.7%) participants were less than 2 year of experience, and 389 (29.9%) participants were under 2-4 year of experience, 310 (23.8%) participants were having 5-7 year of experience. 280 (21.5%) participants had more than 7 years of experience. 669 (51.5%) participants were working in Govt. hospitals, 467 (35.9%) were working in private hospitals and 164 (12.6%) subjects were from clinics (table I).

Table 2 reveals that the Glasgow coma scale is initially devised to n=1075 (82.7%) participants were having good knowledge related to the question. A total of 875 (67.3%) subjects knew about which part of the brain is being assessed when you are assessing eye opening. 66.8% candidates had good knowledge about verbal response. 80.5% participants had good knowledge about motor response; "Which are the specific sections that comprise the Glasgow come scale" 84.6% subjects gave correct answers. 77% participants knew that vital signs are not a component of Glasgow coma scale. Only 27.6% participants knew that when testing the best motor response, you record the response in best arm. To test motor response in a tetraplegia patient (paralyzed in all four limbs) half of the participants gave correct answers. A total of 73.2 % participants had correctly answered about the lowest score of Glasgow Coma Scale. Only 70.4% participants had correctly answered "patient with a Glasgow Coma Scale score of _ below are considered comatose". Only 41.8% participants responded correctly to the question "in nursing practice, a reduction of the Glasgow Coma Scale of _is seen as a deterioration in conscious level and requires informing the medical team". A total of 43% subjects knew that Glasgow Coma Scale cannot assess intubated patients. A total of 79.4% candidates had knowledge about the confused state of patient. You inflict a pain stimulus, and he pulls his arm away only 3.8% participants knew about the correct answer but majority of the participants 96.2% did not answered correctly. The question "You are assessing an RTA (road traffic accident), who has swollen eyes. You instruct him to open his eyes, but he is unable to give eye response", only 42.1% participants correctly answered the question.

The results shows that there was significant difference in knowledge for the nurses and PTs (P<0.001). The average scores of PTs' knowledge (89.81±8.45) was higher than the nurses' knowledge (59.84±14.65) (Table 2). The results shows that there was significant difference in knowledge for graduates and post-graduates (P<.001). The mean score of the participants with postgraduate degrees after completing their studies (70.50 ± 18.46) was higher than that of the graduates (63.30 ± 18.64). Thirty percent males have good knowledge while 14% Females have good knowledge. No male demonstrated poor knowledge while 38% females had poor knowledge about GCS.

DISCUSSION

Glasgow Coma Scale is a reproducible tool used by health professionals, including nurses, in almost every healthcare facility to determine the level of conscientiousness in patients with neurological disorders. It is important to have the skills and knowledge to assess and apply critical thinking to interpret the results. Majority of the participants were males, and this study found a significant association between gender and knowledge of Glasgow Coma Scale. These results are corroborated by previous studies,[18,19] although some additional studies did not report any association between gender and level of knowledge.[3,12,20] Majority of the participants (62.6%) were in the 20–29-year age group and had good knowledge of the Glasgow Coma Scale. These results were statistically significant at a p-value < 0.001. These findings are similar to the results of Singh et al.[16,21] and comparable results were also reported by other studies.[3,12] A total of 14.5% of the postgraduates had good Glasgow Coma Scale knowledge. Education level and Glasgow Coma Scale knowledge were significantly linked (p <0.001), which was confirmed by a previous study.[3] In the meantime, Ehwarieme et al. found that professionals who received additional training related to GCS were more knowledgeable.[12]

The results of the current study showed that there was a strong association between years of experience of both PT and nurses and Glasgow Coma Scale knowledge. Previously, freshly graduated individuals were found to be more knowledgeable, possibly because their knowledge was acquired more recently.[12] The results are comparable to those of Hien et al. and Santos et al. wherein the authors concluded that experience is linked with better knowledge outcomes.[14,17,19]

The knowledge of the PTs was good (39.9%) when compared to the nurses (only 2.9%). Previous knowledge assessment studies have been conducted mostly among nurses and physicians and PTs have been neglected in this regard despites forming an important part of the healthcare community and working as rehabilitation team members in intensive care units. Most of the participants (84.6%) had a good knowledge of the basic question, such as: a lower Glasgow Coma Scale value, which shows a deterioration in consciousness in the patient. Similar results from Singh et al. reported that less than half of participants (41.8%) responded correctly to the following statement: In nursing practice, a decrease in the coma scale of __ in Glasgow is viewed as a deterioration in the level of consciousness and requires notification of the medical
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team.[16] In regard to the eye-opening response, 67.3% candidates responded with the right answer. Correlated findings were reported by Singh et al. and Sedain et al.[16,19]

Fewer participants selected the correct answers to the questions relevant to the verbal response, in contrast to the findings of Singh and Fellows who found a higher number of healthcare providers with knowledge of this component.[16] Two additional studies reported similar findings and a very high level of knowledge in this domain.[19,23] In a recent study, 80.5% subjects had good knowledge of the motor component of the Glasgow Coma Scale. Several other studies corroborated these findings.[16,19]

Our study reported that 84.6% subjects were having good knowledge related to basic question "Which are the specific sections that comprise the Glasgow Coma Scale" while a study conducted in 2016 showed that 85.9% nurses were having good knowledge related to basic component of Glasgow Coma Scale. A total of 41.8% participants were having poor knowledge of "In nursing practice, a reduction of the Glasgow Coma Scale of___ is seen as a deterioration in conscious level and requires informing the medical team" Only 11.9% subjects correctly answered in a previous study.[24]

This study revealed that 6.8% participants were having good knowledge related to verbal response. While in Singh et al. study only 31.1% participants correctly responded.[24] Another study was conducted by Buechler and C. Michael MD which showed that questions related to verbal response score were correctly answered by only 18%.[25]

In recent study 80.5% subjects were having good knowledge related to "Which part of the brain is being assessed when you are assessing motor response". While in Singh et al. study 40.7% nurses were having knowledge related to that question. A total of 3.0% participants were having poor knowledge related to "On assessing a patients' motor response, he is unable to comply. You inflict a pain stimulus, and he pulls his arm away".[24]

CONCLUSION

PT's knowledge of the GCS is good compared to nurses. Most of the nurses had a satisfactory level of knowledge, whereas most PTs had a good level of knowledge.

REFERENCES

1. Fischer J, Mathieson C. The history of the Glasgow Coma Scale: implications for practice. Crit Care Nurs Q 2001;23(4):52-8.

2. Matis G, Birbilis T. The Glasgow Coma Scale–a brief review Past, present, future. Acta Neurol Belg. 2008;108(3):75-89.

3. Jaddoua BA, Mohammed WK, Abbas AD. Assessment of nurse's knowledge concerning glasgow coma scale in neuro surgical wards. kufa J Nurs Sci. 2013;3(2):133-42.

4. Mushtaq M, Khan Z, Afridi NM, Shah AW. Predictive Value of Glasgow Coma Scale (GCS) Scores in Patients Presenting with Spontaneous Intracerebral Hemorrhage. Med Forum. 2017;28(10):48-50.

5. Teasdale G, Murray G, Parker L, Jennett B, editors. Adding up the Glasgow coma score. Proceedings of the

6th European Congress of Neurosurgery; 1979: Springer.

6. Teasdale G, Jennett B. Assessment of coma and impaired consciousness: a practical scale. The Lancet. 1974;304(7872):81-4.

7. Deshpande A, Gaikwad N, Deshpande S. study of Glasgow coma scale score and QTc Interval in prognosis of Organophosphate compound poisoning. Int J Clin Med. 2012;3:IJCM. S9807.

8. Basso A, Ignacio Previgliano M, Jm Duarte M, N Ferrari M. Advances in management of neurosurgical trauma in different continents. World J Surg. 2001;25(9):1174-8.

9. Gururaj G. Epidemiology of traumatic brain injuries: Indian scenario. J Neurol Res. 2002;24(1):24-8.

10. Rush C. The history of the glasgow coma scale: An interview with professor Bryan Jennett. Int J Trauma Nurs. 1997;3(4):114-8.

11. Weir C, Bradford A, Lees K. The prognostic value of the components of the Glasgow Coma Scale following acute stroke. Qjm. 2003;96(1):67-74.

12. Ehwarieme TA, Anarado A. Nurses' knowledge of Glasgow coma scale in neurological assessment of patients in a selected tertiary hospital in Edo State, Nigeria. Afr J Midwifery Womens Health. 2016;18(2):74-86.

13. Emejulu J, Nkwerem S, Ekweogwu O. Assessment of physicians' knowledge of glasgow coma score. Niger J Clin Pract. 2014;17(6):729-34.

14. Hien NT. The accuracy of Glasgow coma scale knowledge and performance among Vietnamese nurses 2011.

15. Reith FC, Brennan PM, Maas AI, Teasdale GM. Lack of standardization in the use of the glasgow coma scale: results of international surveys. J Neurotrauma. 2016;33(1):89-94.

16. Singh B, Chong MC, Zakaria MIb, Cheng ST, Tang LY, Azahar NH. Assessing nurses knowledge of glasgow coma scale in emergency and outpatient department. Nurs Res Pract. 2016;2016:1-5.

17. Santos WC, Vancini-Campanharo CR, Lopes MCBT, Okuno MFP, Batista REA. Assessment of nurse's knowledge about Glasgow coma scale at a university hospital. Einstein (Sao Paulo). 2016;14(2):213-8.

18. Teles M, Bhupali P, Madhale M. Effectiveness of self instructional module on knowledge and skills regarding use of Glasgow coma scale in neurological assessment of patients among nurses working in critical care units of KLE Dr. Prabhakar Kore hospital and medical research centre, Belgaum. Journal of Krishna Institute of Medical Sciences University. 2013;2(1):98-104.

19. Sedain P, Bhusal MK. Knowledge Regarding Glasgow Coma Scale (GCS) among Nurses. J C of Med Sci-Nepal. 2019;15(4):276-81.

20. Morris K. Assessment and communication of conscious level: an audit of neurosurgical referrals. Injury. 1993;24(6):369-72.

21. Heron R, Davie A, Gillies R, Courtney M. Interrater reliability of the Glasgow Coma Scale scoring among nurses in sub-specialties of critical care. Aust Crit Care. 2001;14(3):100-5.

22. Mattar I, Liaw SY, Chan MF. A study to explore nurses' knowledge in using the Glasgow Coma Scale in an acute care hospital. J Neurosci Nurs. 2013;45(5):272-80.

23. Buechler CM, Blostein PA, Koestner A, Hurt K, Schaars M, McKernan J. Variation among trauma centers' calculation of Glasgow Coma Scale score: results of a national survey. J Trauma Acute Care Surg. 1998;45(3):429-32.

24. Singh B, Chong MC, Zakaria MIb, Cheng ST, Tang LY, Azahar NH. Assessing nurses knowledge of Glasgow Coma Scale in emergency and outpatient department. Nursing research and practice. 2016;2016.

25. Buechler CM, Blostein PA, Koestner A, Hurt K, Schaars M, McKernan J. Variation among trauma centers' calculation of Glasgow Coma Scale score: results of a national survey. J Trauma Acute Care Surg. 1998;45(3):429-32.

Table 1: Demographic Information of Participants

Variables	Frequency	Percentage
Gender		
Male	147	11
Female	1153	89
Marital status		
Single	711	55
Married	589	45
Age(years)		
20-29	742	57
30-39	321	25
40-49	186	14
> 50	51	3.9
Job title		
Nurse	942	73
Physical therapist	358	28
Level of education		
Under-Graduation	434	33
Post-Graduation	866	67

Year of experience		
> 2	321	25
02-03	389	30
05-07	310	24
<7	280	22
Nature of job		
Part time	199	15
Full time	1101	85
Type of Institution		
Government	669	52
Private	467	36
Clinics	164	13

Table 2: Response of the Participants on individual questions on knowledge of Glasgow Coma Scale

Questions	False		Correct	
	n	%	n	%
Question No: 1	225	17	1075	83
Question No: 2	425	33	875	67
Question No: 3	432	33	868	67
Question No: 4	253	20	1047	81
Question No: 5	200	15	1100	85
Question No: 6	299	23	1001	77
Question No: 7	941	72	359	28
Question No: 8	640	49	660	51
Question No: 9	349	27	951	73
Question No: 10	385	30	915	70
Question No: 11	757	58	543	42
Question No: 12	741	57	559	43
Question No: 13	268	21	1032	79
Question No: 14	1250	96	50	3.8
Question No: 15	753	58	547	42

Table 3. Difference in Knowledge for Nurses and Physical Therapists

	Good		Satisfactory		Poor		Total		Pearson chi-square		
	n	%	n	%	n	%	N	%	X^2	df	Sig(p)
Gender											
Male	243	56	30	5	2	0.9	275	100	481	2	<.001
Female	188	44	612	95	225	99	1025	100			
Profession											
Nurse	90	21	233	54	111	48.9	434	100	715.3	2	<.001***
Physical therapist	341	79	409	95	116	51.1	866	100			
Experience											
< 2	126	25	262	51	122	24	510	100	85.3	6	<.001***
02-04	102	19	288	52	161	29	551	100			
05-07	10	3	189	54	150	43	349	100			
> 7	60	17	182	52	109	31	351	100			

Table 4. Difference in Knowledge for Nurses and Physical Therapists

Profession GCS Knowledge	Nurses (n=942) $M \pm SD$	Physical Therapists (n=358) $M \pm SD$	Independent Samples t-test		
			t-test	df	p-value
	59.84±14.65	89.81±8.45	-45.86	1096	<.001
		Education Level			
Education Level GCS Knowledge	Graduation (n=434) 63.30±18.64	Post-Graduation (n=866) 70.50±18.46	-6.59	860	<.001