

ORIGINAL ARTICLE

Knowledge of Nurses Regarding Glasgow Coma Scale in Tertiary Care Hospitals in Karachi

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ABSTRACT

Objective: To assess the knowledge of Glasgow Coma Scale (GCS) among nurses working in tertiary care hospitals, Karachi

Methodology: An observational cross-sectional study was carried out among 193 nurses from two public sector hospitals in Karachi, who had at least one year of nursing experience. Data was collected through a self-administered questionnaire by non-probability purposive sampling technique. To assess knowledge about GCS, a structured questionnaire was used. Pearson Chi-square test was used to identify association between knowledge of GCS and nursing demographic characteristics. P-value = 0.05 was considered significant.

Results: This study shows that 41.5% of study participants had adequate knowledge about GCS. Only 38.3% had good knowledge about functions, indicators, and monitoring skills, while 20.2% participants had poor knowledge. Female nurses scored slightly higher in good knowledge as compared to male nurses. There was no association of knowledge level with the nurses' professional education levels. Chi-square test confirmed that hospital was the only variable that showed significant association with GCS knowledge (p-value 0.008 <0.05).

Conclusion: The majority of participants had adequate level of knowledge regarding GCS. In terms of gender, slightly higher knowledge was found in female nurses who fell in the 'good' knowledge category, whereas male nurses falling in the 'adequate' level had higher knowledge. Graduate nurses had higher adequate and good levels of knowledge about GCS.

Key Words: Conscious level, Glasgow coma scale, knowledge, nurse

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INTRODUCTION

The Glasgow Coma Scale (GCS) was established decades ago and it is globally accepted for the assessment of the conscious level of a patient. Assessment of the neurological state of a patient is very important for early detection of patient's warning score. In an Emergency department, GCS influences medical intervention provided by health professionals. Initially, the GCS was developed for conscious level assessment tool as a standard in head trauma fatalities. At present, GCS is in practice widely as a basic tool to evaluate the level of consciousness in a patient whatever may be the main cause of disorientation¹. The GCS was introduced the very first time by Teasdale and Jennet in 1974. Before the introduction of the GCS

tool, terms like stupor, comatose, and decerebrate were used to explain a patient's level of consciousness. These terms were not well defined and not clear to healthcare providers².

The GCS is an essential assessment tool to monitor conscious level of patient across the world. It also has a facilitating role in assessing the level of consciousness after head trauma, severity, and prognosis. A number of tools have been developed for assessment of conscious level of a patient but GCS has been recognized as the gold standard over last 40 years.

The Glasgow Coma Scale (Figure 1) has three indicators: eye response (E), best verbal response (V) and best motor response (M). The intensity of responses in the indicator of the Glasgow Coma Scale are graded from 1 to 4 for the Eye-opening response, 1 to 5 for best Verbal response and 1 to 6 for best Motor response. The sum of all three parameters of Coma Score falls between 3 to 15, low score shows the worst and high score represents the best conscious level⁵⁻⁷.

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Skilled nurses can play an important role in improving the assessment and monitoring of the patient's level of consciousness. Knowledge regarding GCS tool can be improved with educational sessions⁸. Evaluation of conscious level is a vital and necessary part of neurological assessment in clinical settings.

A study conducted in Bulgaria in 2016 revealed that although the Glasgow Coma Scale is utilized across the world in the field of Nursing for neurological assessment of patients, however participants of the study who were nurses, did not have sufficient knowledge about it¹⁰. A study conducted in 2019 revealed that nurses have good knowledge about the purpose and significance of GCS but there is a difference between the skills and knowledge with regard to GCS application¹¹. Training sessions regarding assessment can effectively increase the knowledge and performance of nurses¹². Various studies have recommended educational sessions and instructions for enhancing knowledge regarding GCS and also for performing GCS accurately. Monitoring with GCS is a fundamental skill for nurses. Lacking in GCS knowledge leads to inappropriate diagnosis and also delay in treatment. There is no local study available which provides data about the GCS knowledge of nurses. This study was conducted to find out gaps in the concepts and knowledge of nurses regarding GCS in the local context. Therefore, the aim of this study was to assess the knowledge of the Glasgow Coma Scale among nurses working in two public sector hospitals in Karachi.

METHODOLOGY

This was an observational cross-sectional study conducted in two public sector tertiary care hospitals of Karachi, Pakistan. The duration of study was six months from July to December 2019. The study participants were registered nurses of different departments. All registered nurses were included without restriction of gender, age, and qualification. Nursing students and those nursing staff were excluded who were not willing to participate in the study.

To assess knowledge about GCS, a validated structured questionnaire was used. The study instrument consisted of two parts: 1) Demographic data and 2) Structured questionnaire about GCS knowledge. The questionnaire used in present study has 12 multiple-choice questions. These questions are related to functions, purposes, and indications of GCS. In questions, best response for eye-opening, verbal command, and motor response of patient is assessed. This questionnaire also asked for the assessing method, the worst, and the best possible score on GCS. Each correct answer carried one mark.

Total score less than 4 was considered poor knowledge while 5 to 8 was adequate and more than 9 score was considered to be good knowledge.

Sample size calculation was performed through WHO online software Open Epi. By using the percentage of satisfactory knowledge of GCS as 41.4%, confidence interval as 95% and 5% level of significance, the calculated sample size was 193. Sampling technique for this research study was non-probability purposive. For ethical considerations, permission was taken from the Institutional Review Board (IRB-DUHS). In addition, institutional permissions from the hospitals were also obtained and consent was taken from the participants. Data was collected by primary investigator only. Collected data was entered and analyzed through SPSS v.21.0. Descriptive statistics such as frequencies and percentages were obtained for categorical variables. Pearson Chi-square test was used to identify association between knowledge of GCS and nursing demographic characteristics. P-value = 0.05 was considered as significant.

RESULTS

The mean age of the study participants was 32.82 with SD of 7.01, whereas mean total nursing experience in the year and total experience in current unit were 10.19 and 6.08, respectively. Two-thirds (66.8%) of study participants were Nursing graduates, either Post RN BSN or generic BSN while one-third (33.2%) were Nursing diploma holders. In terms of academic levels, 25.4% of participants had done Matriculation, 55.4% had Intermediate level education, and 19.2% were graduates.

Figure 2 shows the distribution of study participants in different departments. The most prominent was ER followed by medical and surgery departments, whereas nearly 36% participants were from other departments.

Table 1 depicts the percentages of correct and wrong answers to each question asked about GCS. More than 80% participants correctly answered the questions regarding the functions of GCS and the best score of the scale. A total of 63.2% participants correctly answered the questions about the indicators of GCS and most sufficient response of patient while using conscious level assessment tool.

Approximately three-fourths of participants replied correctly while answering the question about the worst score of the scale and the best verbal response health professionals are supposed to initiate with. When study participants were inquired about GCS grading which points out critical status for the patient and is necessary

Table 1: Item-wise Distribution of the Answers of GCS

		Frequency (%)	
		Correct Answer	Wrong Answer
1	What is the function of GCS?	169 (87.6)	24 (12.4)
2	Three indicators of GCS are:	122 (63.2)	71 (36.8)
3	Best score for the Scale is:	167 (86.5)	26 (13.5)
4	Worst score for the Scale is:	138 (71.5)	55 (28.5)
5	GCS score that indicates critical situation and that examiner should be alert to:	127 (65.8)	66 (34.2)
6	To obtain accurate GCS results, the following criteria should be observed, expected:	129 (66.8)	64 (33.2)
7	GCS interval that indicates moderate severity is between:	96 (49.7)	97 (50.3)
8	During the use of GCS, the most adequate response for score is:	122 (63.2)	71 (36.8)
9	To assess eye opening, examiner should begin with:	6 (3.1)	187 (96.9)
10	To assess best verbal response, examiner should begin with:	142 (73.6)	51 (26.4)
11	To assess best motor response, examiner should begin with:	87 (45.1)	106 (54.9)
12	In GCS, take notes for:	83 (43)	110 (57)

Glasgow Coma Scale

BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
Best motor response	No response	1
	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
Total score:	Best response	15
	Comatose client	8 or less
	Totally unresponsive	3

Figure 1: Glasgow Coma Scale

Table 2: Association of Nurses' Characteristics with the Knowledge of GCS

		Poor (<=4)	Adequate (5--8)	Good (>=9)	P-values (chi-square)
Gender	Male	18 (18.9)	41 (43.2)	36 (37.9)	0.866
	Female	21 (21.4)	39 (39.8)	38 (38.8)	
Hospital	Hospital 1	12 (12.2)	49 (50)	37 (37.8)	0.008*
	Hospital 2	27 (28.4)	31 (32.6)	37 (38.9)	
Nursing education	Graduation	27 (20.9)	51 (39.5)	51 (39.5)	0.745
	Diploma	12 (18.8)	29 (45.3)	23 (35.9)	

p-value = 0.05 was considered significant

to be considered as a frightening signal for the examiner, 65.8% correctly replied and that grading was =8. It was observed that 66.8% of the study participants recognized respiratory and haemodynamic stability as the correct answer for the aspect that influenced GCS and must be considered at the time of consciousness level assessment.

Present assessment tool has been categorized as per severity, 49.7% of nurses had the right answer that this interval lies between 12 and 9 for moderate severity. When asked about assessment of eye opening, 97% of participants answered incorrectly. When nurses were asked for how health professionals start to assess the best verbal response of a patient, 73.6% checked the

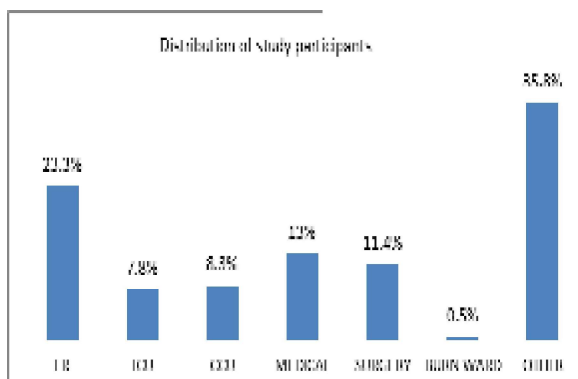


Figure 2: Distribution of study participants

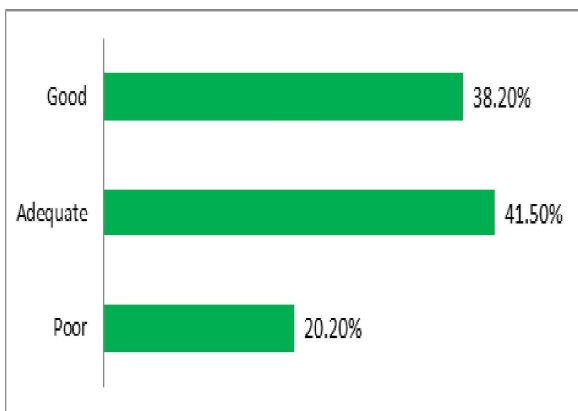


Figure 3: Over all Knowledge of GCS

right option which was, asking simple questions about self-awareness, time, and space. Furthermore, 45.1% of nurses responded correctly that verbal command is the best way to start assessing best motor response. Less than half of the participants (43%) checked the correct option that each component of GCS should be monitored separately and also assessed the sum of all the three components when documenting notes for GCS.

Figure 3 shows that 41.5% of study participants had adequate knowledge about GCS and only 38.3% had good knowledge and 20.2% had poor knowledge about functions, indicators, and monitoring skills of GCS.

Table 2 reveals association of nurses' characteristics with GCS knowledge. Results showed that 18.9% male nurses had poor GCS knowledge, whereas 43.2% and 37.9% male nurses had adequate and good GCS knowledge. Female nurses had slightly higher GCS good knowledge as compared to males. Chi-square test confirmed that the variable 'hospital' showed significant association with GCS knowledge (p -value $0.008 < 0.05$).

DISCUSSION

Current study revealed no association between knowledge and academic levels of the participants. This may be attributed to the fact that the concept of neurological assessment is not taught on graduate level and students are not familiar with any neurological assessment tool. The results of this study agree with another study that also shows the same association between knowledge regarding GCS and education levels¹⁶.

The gender of healthcare providers does not appear to matter in utilization of neurological assessment tool as in the present study, female nurses had slightly higher (38.8%) good knowledge as compared to the males' knowledge of GCS but this finding of current study is contradicted by a study which showed no significant relationship between the knowledge of nurses and their genders¹⁷.

GCS tool is one of the basic skills which must be learnt by every nurse to assess patient's conscious level effectively. More than 80% of current study participants correctly answered the questions regarding the function of GCS. This finding is in agreement with a recently conducted study which showed that 75% of study participants checked the right answer for the function of the GCS¹⁷.

When study participants were asked about how to start the measurement of score for best verbal response,

73.6 % of participants chose the right answer. As far as the inquired question is concerned, staff nurses are used to ask this question from every patient while doing head to toe physical assessment. Therefore, it may be slightly easier for nurses to answer this question correctly. Similarly, a study has shown that 89% participants had replied correctly¹¹.

In this study, approximately three-fourths (71.5%) of participants replied correctly while answering the question about the worst score of the Scale, because nurses know theoretically more about GCS tool, so they can give the right answer for worst score of GCS whereas 79.2% were aware of the least point that can be measured for a patient in critical condition¹⁹.

When present study participants were inquired about assessing the best motor response of the patient that the examiner should begin with, only 45.1% of study participants replied correctly. As GCS is a skill-based tool so this finding revealed that nurse need more expertise in assessing motor response. Another study also supported the present result by reporting 21.5% of their participants had selected the right answer for the same question¹⁵.

The majority of current study participants (86.5%) responded correctly to questions regarding the best possible score for GCS. This may be because theoretically nurses are taught about the maximum score. Almost all participants (97.9%) of another study had mentioned the right answer when they were asked the same question¹⁹.

A total of 63.2% of participants responded correctly to the question about the most sufficient response for grading while using GCS, whereas the majority of another study's participants (92.9%) had replied correctly to the same question¹¹. This difference of responses by nurses showed that in local government hospitals, healthcare providers do not use GCS in practice regularly. They must be persuaded to keep GCS assessment tool in practice and also need to attain training sessions in this regard.

Learning of neurological assessment tool is the one of primary responsibilities of nurses, therefore, most nurses have knowledge about specific indicators of GCS assessment tool. Approximately two-thirds (63.2%) of the present study participants checked correctly for three specific indicators of GCS that are eye-opening, best verbal response, and best motor response. This result shows that the nurses' knowledge of GCS assessment tool must improve, which is in disagreement with a study that showed that almost all participants had replied correctly²⁰.

In the present study, 66.8% of study participants also replied correctly to the question that to attain the correct score of the Scale, all criteria ought to be monitored. The percentage of right answer revealed that nurses must enhance their critical thinking ability and technical skills for the utilization of GCS. Strengthening the current results, a study showed approximately the same percentage (66.1%) of participants replying correctly to the same question¹¹.

Concerning severity, approximately half (49.7%) of the study participants chose the correct answer selecting the option for moderate severity interval which indicates improper supervision and lack of evaluation from nursing management. Determining neurological severity level of patients is the primary part of knowing their current health status and also a key part of treatment in the right direction. In contrast, 63% participants of a study conducted in 2019 had chosen the right option for the same question²¹.

The least (3.1%) correctly answered question by this study's participants was how examiner should begin an assessment of eye-opening. In contradiction to this result, another study showed 39.4% of study participants choosing the correct answer¹¹. As an important part of patient's neurological assessment, the result revealed an area of high improvement for nurses and needs proper training.

For an important part of GCS monitoring i.e. taking notes, less than half (43%) of the study participants replied correctly that the score of each component would be monitored. Work overload in medical field is a worldwide problem. In developed countries, nurse-patient ratio is acceptable, but in developing countries, nurses still face work overload so they may be unable to follow every single rule of the system. Similarly, to focus on every single component of an assessment tool may be difficult for nurses in this scenario. The hospital management must make sure that the nurse-patient ratio stays up to universal standard. In favour of the current results, a study carried out in 2016 revealed that only 46% participants of a study reported all three parameters for scoring the consciousness level of patient²².

The over all result of this study is not as good as it should be. Less than half (41.5%) of the study participants had adequate knowledge about GCS. Only 38.3% had good knowledge about functions, indicators, and monitoring skills of GCS. Nursing colleges and hospital managements must arrange proper training sessions and classes for students and nursing staff. The current study contradicts the findings of another study which showed that (60%) participants had good

knowledge of GCS²³. A study conducted in Ghana revealed results that a bit more than half (50.4%) of the participants of study had low knowledge of GCS¹⁹. A study completed in 2108 revealed that 63% of participants had moderate knowledge, 36% had adequate while 1% had inadequate knowledge²⁴.

According to the present study results, there was no association of knowledge levels with nurses' professional education levels, i.e. graduation and diploma in nursing. One of the reasons behind this scenario may be that graduate nurses mostly prefer managerial posts to bedside nursing. Another reason may be that every nurse does not get the same opportunity to work in critical care departments like emergency, ICU, and CCU. Therefore, it is the responsibility of hospital management to train their staff and also provide equal opportunity to every staff to get experience of critical care departments. A similar result was shown in a study conducted in Malaysia that level of education does not affect the level of GCS knowledge while another study conducted in 2019 revealed that Nursing degree holders had more knowledge about GCS than Nursing diploma holders^{15,25}.

Recommendations:

GCS must be focused on as a basic nursing skill and made a part of training. Regular educational and hands-on sessions are recommended to enhance the skills for neurological assessment. It is recommended that in-service educational sessions will help nurses in enhancing their knowledge of GCS. Training of nurses for neurological assessment must be done in a standardized way to avoid variation in using GCS. A booklet about GCS should be developed and distributed to all nurses working in hospitals.

Limitation:

This study was carried out in two public sector hospitals only so results of this study cannot be generalized. For more generalized result, future studies may also be conducted.

Strength:

This was the first study conducted for nurses locally.

CONCLUSION

Our study concluded that the majority of participants possessed adequate level of GCS knowledge followed by good and poor levels of GCS knowledge. As per gender comparison, female nurses had a little higher good level of GCS knowledge while adequate level of knowledge was observed in the majority of male nurses.

As per education, graduate nurses showed higher adequate and good levels of knowledge in relation to GCS.

Authors' contribution: AH worked on introduction, literature review, Methodology, data collection, discussion, limitations, strength, and recommendations. AR worked on statistical analysis and proofreading.

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