NURSES' KNOWLEDGE OF GLASGOW COMA SCALE IN NEUROLOGICAL ASSESSMENT OF PATIENTS IN A SELECTED TERTIARY HOSPITAL IN EDO STATE, NIGERIA

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ABSTRACT

Glasgow Coma Scale (GCS) is a reliable and objective neurological assessment tool used for assessing and recording the level of a person's conscious state. An assessment of consciousness levels is considered a primary action of doctors and nurses who care for patients with neurological or neurosurgical problems. This study assessed the knowledge of Glasgow coma scale in neurological assessment of patients among nurses working in a tertiary hospital, in Edo state, Nigeria. A descriptive survey design was used. The respondents were all nurses (226) working in wards/units where unconscious patients are nursed. The instrument for data collection was the pre-tested and administered questionnaire developed by the researchers. Data collected were analysed in proportions and percentages and means; and inferential statistics were used for test of hypotheses at P ≤0.05 level of significance. Result showed that 41.7% of respondents had good, 25.2% moderate and 33.0% had poor knowledge of the GCS. Respondents scored highly (>75%) on knowledge questions eliciting purpose, components, and the behavioural rating scores of GCS domains, but

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poor (<36%) to moderate (<67%) on questions that concern clinical application of results and GCS use in special situations. Significant differences were found in the GCS knowledge of the nurses across the various wards/units (p= 0.000) with neurological ward nurses having the highest (31.8%) score. There were no significant associations (P> 0.05) between nurses' age, gender, educational level, years of experience, and GCS knowledge. Continuous professional development and update training for nurses on GCS were recommended.

Keywords: knowledge, nurses, Glasgow coma scale, unconscious patients

INTRODUCTION

Glasgow Coma Scale (GCS) is a reliable and objective neurological tool to elicit valuable information describing the conscious state of a person, at initial as well as subsequent assessment. Assessing and documenting the level of consciousness are considered primary actions of doctors and nurses who care for the patients with neurological or neurosurgical problems. The assessment helps to identify the patients' neurological problems and evaluate health interventions. Weir, Bradford and Lees assert that it can be an indicator for intervention or treatment in emergency conditions (cited in Nguyen, 2011: 54). The GCS, first presented by Teasdale and Jennet in 1974, is one of the most effective and reliable tools to assess the depth and duration of impaired consciousness, especially for patients with head injuries. The high level of validity and reliability of GCS ensures its assessment accuracy in comparison with other earlier scoring systems such as the anatomical, physiological scoring system and the revised trauma score (Fisher and Mathieson, 2009: 53). After GCS was developed, it has been used worldwide because it enhances communication among health care practitioners through a common reporting language. Over time, its use has been extended to assessment of consciousness in other clinical specialties and research projects. As far back as 2003, it has been validated and found reliable in grading severity, and in predicting outcomes in conditions such as acute stroke, subarachnoid haemorrhage, acute poisoning and other critical illnesses (Weir, Bradford and Lees, in Yusuf *et al*, 2013: 35).

There was an unsubstantiated assumption that the GCS was properly administered in the course of patient management but researchers have reported cases of inaccurate assessment and reporting of the GCS, which resulted in unnecessary treatment and diagnostic tests (Ronald *et al.,* 2005: 1238; Yusuf *et al*, 2013:35; Zuercher *et al.*, 2009: 37). Two studies on the knowledge of GCS among military physicians treating patients with Traumatic Brain Injury (TBI) revealed that only 15% of those who had completed Advanced Trauma Life Support training were able to correctly recall all aspects of the GCS (Ronald *et al.*, 2005: 1237; Catherine *et al.*, 2009: 18). A study that assessed nurses' knowledge of GCS in neuro-surgical wards in Baghdad reported

that nurses were inadequate in knowledge and application of all the 25 items relating to the GCS instrument, with no significant association between the nurses knowledge and their gender and educational level (Batool *et al.*, 2013: 2). However, there is a significant relationship between nurses' knowledge and the number of training courses undertaken as well as the duration of the training (Batool *et al.*, 2013: 4). Nguyen and Sun-Mi (2011: 57) reported that the vast majority of Vietnamese nurses studied (>90%) responded correctly to questions regarding GCS basic knowledge; however, 52.1% of the nurses answered incorrectly questions related to clinical scenarios requiring the application of the basic knowledge. Lack of GCS education also emerged as a factor explaining low accuracy on the questions relating to clinical scenario (Nguyen and sun-Mi, 2011: 58). Similarly, Ihasan, Sok and Moon (2013: 272) explored nurses' knowledge in the use of the GCS in an acute care hospital in Singapore. Findings revealed that the type of clinical discipline (neuroscience, general medicine and neuro-intensive care unit) and length of experience in a neuroscience setting were significant in determining nurses' knowledge on GCS. They also reveal that nurses in intensive care unit scored the highest mean scores (12.7) compared with nurses in the general medicine wards, who scored the lowest (9.7). Gocan and Fisher (2005: 10) reported that nurses working in the neonatal intensive care unit had the highest knowledge of GCS compared with nurses working in general medical wards. They also reported that nurses who worked in a neuroscience setting for six years or more showed higher knowledge of GCS than nurses who worked in a neuroscience setting for less than a year. The time spent in a neuroscience ward and exposure to a wider variety of neurological patients requiring GCS assessment facilitates their learning of the GCS (Gladwell, 2008: 233).

GCS knowledge and use among health professionals in Nigeria and Africa have been understudied. Among the few published works was a study by Yusuf *et al.*, (2013: 36) assessing physicians' knowledge of GCS among 141 doctors at a teaching hospital in Ilorin Kwara State, Nigeria, using a questionnaire, reported that the majority of the respondents (97%) could state correctly what GCS represents. There was overall poor performance in scoring of the components of GCS by respondents, with only 53 (37%) scoring all the categories correctly. This performance, however, is better than what was found (15%) among military physicians in Bagdad (Ronald *et al.*, 2005: 1238). Yusuf *et al.*, (2013: 37) also reported that more of the physicians (41%) who had undergone training in these specialties were able to recall and score the categories of GCS correctly than those (31%) that had not.

Similarly, the only study accessed that evaluated clinical nurses' use of Glasgow coma scale in a selected teaching hospital in Osun State was undertaken by Ogunfowokan, Olaogun and Okorodudu (2010: 91) result revealed that although 83% of the nurses had a good knowledge on the reasons for neurological assessment, 97% knew the lowest and the highest scores, only 64% could identify the domains of behaviour on the GCS; while 67% did not know how to determine motor responses

on a patient. However, all the respondents were able to respond correctly to the parameters used in determining verbal responses.

STATEMENT OF PROBLEM

In Nigeria, there have been increasing cases of head injury and other neurological conditions that require the use of GCS in monitoring. For example, Emejulu, Ekweogwu and Nottidge (2009: 15) reported that a total of 1,055 neurosurgical cases were attended to in one Nigeria neurosurgery centre from 21st April, 2006 to 20th October 2008, out of which, 785 had trauma with 658 (88%) cases of head injury. Similarly Emejulu, Isiguzo, Agbasoga and Ogbuagu (2010: 30), reported a total of 9, 444 traumatic brain injury patients were attended to in 24 months,which translated to a presentation rate of 5.3 cases per week and an incidence rate of 2, 710 per 100, 000 per year. Despite the increasing level of incidence and prevalence of neurological and neurosurgical cases, there are few studies establishing the knowledge of GCS by nurses. From the researcher's experience and observations while on clinical teaching of student nurses in the neurological ward and other wards where unconscious patients are nursed, practices of nurses in assessing patients using the GCS seem incongruent, occasionally leading to an inaccurate assessment of the patient's condition. The question that stimulated the study was: to what extent are their practices informed by knowledge of GCS based on the assumption that knowledge is power? Hence, this study was carried out to evaluate nurses' knowledge of GCS in neurological assessment of patients in a teaching hospital, in Edo State, Nigeria.

SPECIFIC STUDY OBJECTIVES

The study sought to assess knowledge of Glasgow Coma Scale (GCS) among nurses working in selected units in the hospital; to determine the differences in nurses' knowledge of GCS among the various ward settings, and to determine the relationship between nurses' knowledge and their socio-demographic characteristics and ward/unit through testing the understated null hypotheses:

Ho 1: There is no significant association between nurses' knowledge of GCS and their socio-demographic variables.

Ho 2: There is no significant difference between nurses' knowledge of GCS among the various wards/units.

SIGNIFICANCE OF THE STUDY

Results from the study will reveal the level of knowledge nurses had on GCS, which will in turn inform policy makers, curriculum reviewers, hospital management, and unit heads on strategies to employ so as to remedy any deficiencies in knowledge and improve practice. In addition, the results will add to the existing body of knowledge in Nigeria and worldwide about nurses' level of knowledge of GCS. They will also serve as reference data for further studies in related area.

OPERATIONAL DEFINITIONS

Knowledge of GCS is defined in this study as ability to elicit correct responses to 12 questions on GCS knowledge as contained in the self-report study instrument. The knowledge maximum score is 12. A score range of 1–4 is rated poor knowledge, 5–8 average knowledge, and 9–12 good knowledge of GCS.

Nurses in this study are health professionals with a minimum of Registered Nurse (RN) certificate, with a current licence from Nursing and Midwifery Council of Nigeria (NMCN) to practise in Nigeria and are employed and working in the selected hospital and study wards/units.

Glasgow Conscious Scale (GCS) is an international standard scoring tool with components used in measuring the level of consciousness of a person.

RESEARCH METHODOLOGY

Design: A descriptive cross-sectional design survey

The study setting is a 700-bed teaching hospital that offers 24-hour specialist acute and chronic neurological and neurosurgical services to self and non-self referred patients. So, high volumes of clients are expected. The target population of the study were all nurses working in wards and units where unconscious patients are nursed in the hospital. These are accident and emergency unit, recovery room, intensive care unit, neurological, male and female medical, male and female surgical wards. These wards/units were chosen based on the fact that patients are either admitted into these wards/units unconscious or their medical and surgical condition worsened and the patients relapsed into unconscious state in the ward. There were 226 nurses working in these selected wards/units. It was a total population study of all eligible and available respondents of the nurses. Purposive sampling technique was used, and all the 226 nurses who have nursed unconscious patients in all the selected wards/units were recruited for the study.

The instrument for data collection was a 20-item questionnaire made up of closed ended questions, which are in two sections. Section A elicited the demographic data

of respondents. Section B had 12 questions on knowledge of GCS either as multiple choice questions or a Yes/No response. Each correct answer carries one (1) mark. The level of knowledge of GCS was graded based on correct responses as follows: poor knowledge (1–4), average knowledge (5–8), and good knowledge (9–12).

Content validity of the instrument was established by three experts. These were: two physician consultants in neurology from the hospital and a senior lecturer with specialty in Medical Surgical Nursing in a university. Reliability of the instrument was tested in a pilot study. Twenty (20) respondents with similar characteristics selected from similar wards/units in another teaching hospital were administered the questionnaire. Using split half technique, the data collected was analysed using IBM SPSS version 19. The Cronbachs-alpha coefficient of reliability was 0.892.

Ethical approval/clearance for the study (certificate no. ADM/E22/A/VOL. VII/1310) was obtained from the Research Ethics Committee of the hospital. An administrative permit was also obtained from the appropriate authorities of the hospital. The nature of the study was explained to each respondent and the questionnaire coded to de-identify respondents. Only those who gave their informed consent completed the questionnaire. Respondents were free not to fill any aspect of the questionnaire they did not want to answer. They were also assured of confidentiality of information given, which was stored as coded data in a pass-worded computer system, and used solely for this research and the publications thereof.

Three (3) registered nurses working in the hospital were recruited as research assistants and trained on how to administer the questionnaire. The principal researcher working closely with the research assistants visited the wards daily (9am–5pm) except on Sundays to recruit and administer the questionnaires to the respondents. The questionnaires were administered and completed during break time to avoid interrupting the routine work schedule and collected immediately from each respondent thereafter. Each questionnaire took about 15 minutes to complete. Data collection lasted for four weeks, from February to March 2016.

METHOD OF DATA ANALYSIS

Data generated was statistically analysed using proportions and percentages. Hypotheses were tested using analysis of variance (ANOVA) and Chi-square test at a 5% level of significance. Statistical Package of the Social Sciences (SPSS) version 19 software was employed in all the analyses.

RESULTS

Out of the 226 questionnaires distributed, 218 were returned duly completed, giving a return rate of 96.5%. Results reported are based on this number.

Respondents' socio-demographic characteristics

As shown on Table 1, the majority (67.8%) of the respondents were females, with a diploma certificate (66.9%) as their highest educational attainment. The age range was 21–50 years with a mean age of 33.9 years ±6.41. SNOs were highest (40.4%) in number. Over 90% of the respondents worked for more than 2 years in the hospital but none received further training on GCS.

Table 1: Socio demographic characteristics of the respondents (n=218)

Socio demographic variables		Frequency	Percent
Sex	Female	148	67.8
	Male	70	32.1
Age range category	21-25yrs	18	8.2
	26-30yrs	26	11.9
	31-35yrs	87	39.9
	36-40yrs	54	24.7
	41yrs and above	31	14.2
	Mean ± SD(std deviation)	39.9± 6.41	
Highest Academic Qualification	Diploma	146	66.9
	First degree	52	23.8
	Higher degree	20	9.2
Job status	Nursing Officer II (NOII)	33	15.1
	Nursing Officer I (NO 1)	68	31.2
	Senior Nursing Officer(SNO)	88	40.4
	Principal Nursing Officer(PNO)	17	8.7
	Assistant Chief Nursing Officer (ACNO)	3	1.4
	Chief Nursing Officer (CNO)	9	4.2
		142	65.1
Years of experience	1-5years	54	24.8
	6-10years	22	10.0
	10 years and above		
Received Additional training on GCS		nil	nil

Objective 1: To assess knowledge of Glasgow coma scale among nurses working in selected wards/units in the Hospital.

The 12 knowledge questions were analysed to achieve this objective. As presented on Table 2, item overall correct responses ranged from 20.2% to 97.2%. In six items

>75% of the respondents had correct responses, in four items <36%, and in two items <67% respondents had the correct answers. The results showed that correct responses were very high (>75%) for knowledge questions eliciting recall of purpose, components, and the behavioural rating scores of GCS, but poor (<36%) to moderate (<67%) on higher cognitive questions of GCS that concern clinical application of results and limitations/challenges of GCS use in special situations. Based on the operational definition of knowledge in this study, 72(33.0%) had poor knowledge of the GCS, 55(25.2%) had moderate knowledge and 91(41.7%) had good knowledge of the GCS.

Table 2: Knowledge of Glasgow coma scale among the nurses working in selected wards/units

S/N	Wards	n	Range of correct scores	Poor Knowledge (1-4) FREQ/%	Moderate Knowledge (5-8) FREQ/%	Good Knowledge (9-12 FREQ/%	Mean of correct scores
1	Neurological ward	41	7.0	0 (0)	6 (3.3)	35 (31.8)	10.26
2	Accident & Emergency	27	8.0	10 (7.2)	6 (3.3)	11 (10.0)	6.92
3	I.C.U	25	7.0	9 (6.5)	7 (3.8)	9 (8.2)	6.60
4	Male medical	20	8.0	10 (7.2)	5 (2.8)	5 (4.5)	5,40
5	Female medical	18	8.0	5 (3.6)	4 (2.2)	9 (8.2)	6.22
6	Male surgical	13	9.0	8 (5.7)	3 (1.6)	2 (1.8)	4.38
7	Female surgical	35	9.0	15 (10.8)	7 (3.9)	13 (11.8)	5.97
8	Theatre	39	9.0	15 (10.8)	17 (9.4)	7 (6.4)	5.48
	TOTAL	**218**	**65.0**	**72 (33.0)**	**55 (25.3)**	**91 (41.7)**	**51.23**

Objective 2: Differences in nurses' knowledge of GCS across the various wards/ units

Table 2 also showed the distribution of the respondents' knowledge of GCS across the wards/units. Neurological ward nurses had the highest score with 31.8% among those with good knowledge, followed by A&E (10%) and ICU (8.2%). The lowest three scores were among respondents from theatre (6.4%), male medical (4.5%) and male surgical (1.8%) wards. The table also showed the mean of correct scores across the wards/units, with the neurological ward having the highest mean correct scores of (10.26) followed by A&E (6.92) and I.C.U(6.60)

Hypotheses 1: There will be no significant association between nurses' knowledge and their demographic characteristics

Hypotheses 2: There are no significant differences in the knowledge of the respondents across the various ward/units.

Table 3a: Relationship between respondents' gender, age, educational level, years of experience and knowledge of GCS (n=218)

	Knowledge category			**X^2**	**df**	**P- value**
	Poor	Moderate	Good			
Sex						
Female	36(48.8)	44(37.3)	68(61.7)	**2.281**	2	5.991
Male	36(23.1)	11(17.6)	23(29.2)			
Academic qualification						
Diploma	48(48.2)	39(36.8)	59(60.9)	**0.686**	4	9.488
First degree	12(17.1)	11(13.1)	29(21.7)			
Higher degree	12(6.6)	5(5.0)	3(8.3)			
Age category						
21-25	12(5.9)	4(4.5)	2(7.5)	**3.462**	8	15.507
26-30	0(8.5)	6(6.5)	20(10.8)			
31-35	36(28.7)	22(21.9)	29(11.5)			
36-40	12(18.4)	15(14.1)	29(23.3)			
41 and above	12(10.2)	8(7.8)	11(12.9)			
Years of experience						
1-5	36(46.8)	40(35.8)	66(59.2)	**1.439**	4	9.488
6-10	24(17.8)	8(6.2)	22(22.5)			
10 and above	12(7.2)	7(5.5)	3(9.1)			

Table 3b: Significant differences in the knowledge of the nurses across the various wards/units using Analysis of variance (ANOVA) (n=218)

		Sum of Squares	df	Mean Square	F	Sig
Knowledge of nurses	**Between groups**	6.526	7	.932	4.295	.000
	Within groups	45.588	210	.217		
	Total	52.115	217			

Table 3a showed that there were no significant association (X^2> P0.05) between socio-demographic data and knowledge of the respondents.

Table 3b showed that there were significant (p< 0.05) mean differences in variables across the various wards. With the neuro ward having the highest mean score of correct answers on knowledge of GCS followed by A&E and ICU as shown in table 2 above, therefore the researcher rejected the null hypothesis and accepted the alternative.

DISCUSSION OF FINDINGS

The result showed that (41.7%) of the respondents had good knowledge, 25% moderate knowledge and 33.3% had poor knowledge of the GCS. They responded correctly (>75%) to general questions on GCS purpose, components, and the behavioural rating scores, but poor (<36%) to moderate (<67%) on higher cognitive questions of GCS that concerns clinical application of results and limitations/ challenges of GCS use in special situations. The inadequate knowledge in these areas possibly will limit their capacity for clinical judgement and decision making in managing unconscious patients. This study's findings are similar to those of Nguyen and Sun-Mi's (2011: 56-57) study among Vietnamese nurses who reported that the vast majority of the nurses (>90%) responded correctly to questions regarding their GCS basic knowledge; however, 52.1% of the nurses answered incorrectly questions related to clinical scenarios requiring the application of the basic knowledge, which means that the knowledge could not be translated into practice. Also, it is far less than the results of Marian *et al.*, (2013: 101), who revealed that, during the pre-test 41 (74.55%) of the staff nurses had average knowledge and 14 (25.45%) had poor knowledge, however, after the administration of the self-instructional module the post-test result shows that 38 (69.09%) of the nurses had good knowledge and 17 (30.91%) had average knowledge. Collaborating further with the findings of this study, Ogunfowokan *et al.*, (2010: 90) reported that 83% of the nurses had good knowledge on the reasons for neurological assessment, 97% knew the lowest and the highest scores, and only 64% could identify the domains of behaviour on the GCS. Yusuf *et al.*, (2013: 36) also reported that nearly all their respondents (97%) could indicate correctly what GCS stands for and identify each category correctly, which implies a good knowledge of the general questions on GCS by the physicians.

However, findings from this study are far better than those of Batool *et al.*, (2013: 3). They reported that nurses were inadequate in knowledge in all the 25 items relating to Glasgow coma scale in their study. The differences in this study may be as a result of the differences in the tools used to measure knowledge and in the type of training the respondents of Batool *et al.*, (2013) received, hence Batool *et al.*, (2013: 2) suggest that the nursing curriculum in their country might be deficient in so many aspects including GCS education and as such needed a review. Similar action is also needed in the institution of study as respondents did not do well in clinical application and GCS use in specific situations. Yusuf *et al*, (2013: 36), found a significant relationship between time of physicians' GCS training, level of training and GCS scoring recall as more than half (53%) of the respondents who had training in neurosurgery, neurology, emergency and critical care within six months to the time of their study could remember GCS components more accurately. Ihasan *et al.*, (2013: 277) therefore suggest that educational intervention and improved guidelines in performing GCS assessment are ways to maintain confidence and improve knowledge in performing GCS.

Results from the study revealed that respondents from the neurological ward were highest in number (31.8%) among those with good knowledge score, followed by A&E (10%) and ICU (8.2%). Similar results were also documented by Nguyen *et al.*, (2011:59), who reported that nurses working in neurosurgical intensive care unit recorded higher scores for knowledge than others. This is so because patients with neurological conditions that needed to be monitored using the GCS were always admitted in these wards This frequent encounter with neurological patients made them familiar with the GCS. Gladwell (2008: 35) opined that the more time spent in the ward and exposure to a wider variety of neurological patients requiring GCS assessment facilitates the learning of the GCS among the nurses. This is also in accordance with Shoqirats (2006: 42) study, which found that those student nurses who worked in neuroscience wards had a better understanding of the GCS as compared with peers who did not undertake such attachment. Ihasan *et al.*, (2013: 278) found that clinical discipline ($p < 0.001$) and length of time (years of experience) ($p = 0.004$) were significant factors determining nurses' knowledge of GCS. However, all the respondents in our study indicated they did not receive any formal additional professional development/education on GCS over the years of working experience. Furthermore, the study did not include use of GCS to assess patients. These may explain why the years of experience were not a significant factor as a co-determinant of nurses' knowledge of GCS in this study. Batool *et al.*, (2013: 3) reported that there was no significant increase in knowledge among nurses in neurological ward when compared with other wards ($\leq p=0.25$). This implies that there were no significant differences in the knowledge of the nurses in neurological wards when compared with other wards/units. However, significant differences were found in this present study between the knowledge of nurses in the neurological wards when compared with other ward/units as neuro wards recorded the highest percentage (31.8%) of respondents who had good knowledge of the GCS and also the highest mean correct score of 10.26. In this study there was no significant association between the nurses gender, age, level of education and years of experience and their level of knowledge ($P >0.05$). Batool *et al.*, (2013: 6–8; Pawl, 2007: 69) documented similar results.

CONCLUSION

Glasgow coma scale is a standardised clinical tool used by nurses and doctors in the assessment of consciousness of patients. The level of knowledge of GCS recorded among nurses in this study as good knowledge (41.7%) is inadequate especially as respondents answered correctly mainly general questions on GCS, but showed less understanding of the neurological bases, and clinical application of the GCS, with lack of continuing educational update on GCS. The inadequate knowledge possibly will limit their capacity for clinical judgement and decision making in managing unconscious patients.

RECOMMENDATIONS

Assessment of the nurses' use of GCS in neurological patient assessment is necessary to appreciate the magnitude of deficiencies/problems. Hospital managements should organise training and update courses for nurses on the GCS. The Nursing and Midwifery Council of Nigeria (NMCN) through its mandatory continuing professional development programme (MCPDP) should incorporate neurological assessment as one of its core courses to be taught to all nurses. Basic and post-basic educational programmes for nursing students should ensure that GCS is adequately taught in-depth and demonstrated in classrooms, simulation laboratories and during clinical experiences.

LIMITATIONS OF THE STUDY

There was a lack of empirical studies on nurses' knowledge of Glasgow coma scale for comparison of data. The study was limited to only one health facility where unconscious patients are nursed. A larger population of nurses from other tertiary institutions should have been included for a wider generalisation of findings. The instrument used to assess knowledge was not standardised. There would be variations in structuring the questions and in distribution, which could have influenced the performance of the respondents and limit the generalisation of the results to this group. A major strength of the study was that it was done in a tertiary health facility where the highest volume of clients are expected and professional experts are trained and offer services, so the best experts in knowledge should be found.

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