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Knowledge on Glasgow Coma Scale Scoring Among Nurses in Intensive Care and Emergency Department: A Descriptive Cross-Sectional Study

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Abstract

Background

Knowledge on the assessment of patients' conscious level by using the Glasgow Coma Scale (GCS) among nurses working in the Intensive Care Unit (ICU) and Emergency Medicine Department (EMD) remains a major challenge. Lack of knowledge and expert skills on assessment of conscious level among nurses has been associated with outcomes such as mortality, prolonged hospitalization, and development of complications associated with the primary conditions and hospitalization. This study aimed at assessing the knowledge on GCS scoring among nurses working in EMD and ICU for possible interventions to improve the quality of nursing care to patients in need of close monitoring.

Methods

The study used a cross-sectional descriptive approach. Data were obtained from 76 nurses working in EMD and ICU recruited by simple random sampling technique. Data were collected by using a self-administered English structured questionnaire after obtaining informed consent from the study participants. Data were then cleaned for missing information analyzed using SPSS computer software version 21. Descriptive and inferential statistics were used to analyze the demographic and knowledge responses. Fisher's exact test was used to determine the association between socio-demographic characteristics and knowledge level; $p<0.05$ was considered statistically significant.

Results

This study included 76 nurses; the majority 42(55.3%) working at the ICU. In general, none of the nurses had attended any formal training on GCS Scoring. Majority of the nurses had moderate level of knowledge 51(67.1%) and none had poor knowledge. Although there was no statistically significant difference in knowledge level among the study nurses based on the socio-demographic characteristics, nurses with age 21-30years, working experience 1-3years, and working in ICU, had good knowledge compared to other subgroups.

Conclusion and Recommendations

The study found that the majority of the nurses had moderate level of knowledge. Since none of them had attended any formal training hence the level of knowledge demonstrated might be from experience sharing and bedside training. The findings suggest the need for post-basic education training for nurses on GCS scoring. In addition, continual profession training focusing at improving nurses' skills on GCS scoring should be strengthened.

Keywords: *Glasgow Coma Scale, GCS, Knowledge, Nurses, Tanzania.*

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Introduction

For many years, knowledge of nurses on the assessment of conscious level using Glasgow Coma Scale (GCS) among patients in need for close care and monitoring has been a global challenge (1). The GCS provides the baseline information in the assessment, diagnosis, and monitoring of patients with altered levels of consciousness caused by traumatic brain injuries or other illnesses that interfere with the patient's consciousness (2–4). The GCS is the cornerstone of the neurological assessment of patients used by both nursing and medical staff (5,6). Available evidence show that the majority of nurses lack knowledge on using GCS (3,7,8). The knowledge of nurses on using GCS is either on identifying the components of the scale, its use, or interpretation of the information collected by the scale (8). A study done in Malaysia in the Emergency and outpatient department revealed that about 3% of nurses had good knowledge, 41.48% had average knowledge and 55.56% had poor knowledge (9). In most clinical settings, nurses in ICU and EMD spend more of their daily time at work with patients more than other professionals hence evidence-based practice proposes that nurses should have the necessary knowledge and skills on GCS. This will help them to monitor a patient's condition and identify signs of deterioration in a patient before major physiological changes occur for possible nursing interventions and on-time consultation (7).

In clinical settings where GCS was appropriately used by knowledgeable nursing staff, saved patients' lives especially those who suffered severe neurological problems by detecting early deterioration of patients and increase survival chances of patients in the EMD and the ICU (3,9). In Tanzania, available evidence report that trauma results in a large number of patients who require stabilization at the EMD and close care monitoring in ICU (10). In addition, care and management of patients in settings with scarce resources and by a medical team lacking the necessary knowledge and skills on diagnosis, communication, and monitoring have been associated with prolonged hospitalization, mortality, and severe complications related to trauma and other serious primary conditions that compromise the neurological system (10–12).

Few studies have been done to assess nurses' knowledge on the assessment of conscious level by GCS. The study that was done among nursing students found that majority had a moderate level of knowledge and this was associated with environmental and educational curriculum factors (13). Little information is available especially on clinical nurses'

knowledge; hence this study was aimed at assessing nurses' knowledge on GCS scoring among nurses working in ICU and EMD for possible interventions from educational and health institutions, nursing boards, and other responsible stakeholders.

Methods

Study Design

This study used a quantitative descriptive cross-sectional design to collect the information from the study participants.

Sampling and study sample

The study included nurses from the intensive care unit and emergency department recruited by simple random sampling technique. Nurses with different backgrounds such as education level, years of experience who provide care to patients in need of close monitoring and evaluation using GCS. Nurses who consented to the study and registered by the nursing board were included in the study; those who were sick or on leave during the study period were excluded.

Sample size

This study included 76 participants, a sample calculated using Cochran formula $n= Z^2 p (1-p)/ d^2$ where, n=sample size, Z=the value of the 95% spread limit was =1.96, d=marginal error=0.05 and p=5.2% adopted from for this study conducted in the tertiary hospital in Ghana that found 5.2% (0.052) of the nurses had knowledge regarding GCS by (3).

$n= Z^2 p (1-p)/ d^2$

$n= (1.96^2 X 0.052 (1-0.052))/0.05^2$

n=76 participants.

Therefore 76 nurses were recruited in this study.

Study Sites and Setting

This study was conducted in the ICU and EMD at the Muhimbili National Hospital (MNH) located in Dar es Salaam city, Tanzania.

Data collection instrument

The data collection used a structured English questionnaire that comprised of questions adopted from a validated tool with a correlation coefficient of 0.71 (14). Minor editing was done to fit the study after consulting the author. Before actual data collection, the tool was pretested to determine its usability; no concerns were presented, participants reported that all questions were clear and the tool was user-friendly. The tool consisted of two parts. Part one; socio-demographic characteristics (age, gender, type of qualification, duration in the unit, type of unit) and part two; 12 multiple-choice knowledge questions on assessment of GCS where the participant had to choose a single correct response.

Knowledge scoring

The knowledge of the nurses was rated in three levels based on the score out of 12 knowledge assessment questions; good knowledge (score of 9-12), moderate knowledge (score: 6-8), and insufficient knowledge (score: below 6) a scale adopted from a study by Kaur et al, (9).

Ethical considerations

Ethical clearance for the study was obtained from the Senate Research and Publications Committee of the Muhimbili University of Health and Allied Sciences (MUHAS) with reference number, Ref.No.DA.25/111/01/. In addition, permission to conduct the study was obtained from the Executive Director of the MNH with reference number, MNH/TRCU/Permission/2020/016. Moreover, participation in this study was voluntary and participants were free to withdraw at any time of the study. Participants were informed about the study and their rights to participate and two consent forms with the researcher's information were signed before actual data collection. Serial numbers were used instead of participant's names or license numbers. Most importantly, the collected information was used with a high level of confidentiality and only the research team could access it; the filled questionnaires were kept on a locked shelf, and data in a computer was accessed through a secret password.

Data analysis

Data collected were entered into the computer and subsequently analyzed using Statistical Package for Social Sciences (SPSS) version 21 software. Descriptive statistics were used to determine the frequency, percentages of the sociodemographic characteristics, and

knowledge responses. Fisher's exact test was used to determine the association between the sociodemographic characteristics and knowledge level of the study participants. The findings were summarized by text tables and figures.

Results

A total of 76 questionnaires were distributed to nurses and all were returned making 100% response rate and all were included in the final analysis. The results are described according to the objectives and are divided into two parts, socio-demographic characteristics of the nurses and nurse's knowledge on the Glasgow Coma Scale.

Socio-demographic characteristics of the nurses

A total of 76 nurses participated in the study; the majority (58%) were females; 38(50%) age above 30 years old. The majority of the participants 57(75%) had a diploma level of education and most of the nurses in this study 69(91%), had working experience between 1-3 years (Table 1).

Table 1: Socio-demographic of nurses (N = 76)

Variable	**Unit frequency (%)**	
	ICU	**EMD**
Age group (years)		
21-25	8(10)	12(16)
26-30	9(12)	9(12)
≥30	27(36)	11(14)
Gender		
Male	20(26)	12(16)
Female	32(42)	12(16)
Type of qualification		
Diploma	41(54)	16(21)
Bachelor degree	14(18)	5(7)
Work experience		
1-3 years	35(46)	34(45)
4-6 years	4(5)	0(0)
7 years and above.	3(4)	0(0)

Nurses' response to the GCS knowledge-testing questionnaire

As it appears in table 2, the majority of the participants in this study 48(63.2%) were able to identify the main components of GCS, 75(98.7%) knew the total score of each GCS component. Also, more than 50% of the study participants demonstrated good knowledge use of GCS to identify deterioration, detect coma, and examine tetraplegic patients, orientation, and the functions of GCS. Surprisingly, the majority 60(79%) failed to identify GCS scores for un-intubated patients (Table 2).

Table 2: Nurses' response to the GCS knowledge-testing questionnaire

Variable	Response(N=76)	
	Correct	Incorrect
Knowledge of main components of GCS	48 (63.2%)	28 (36.8%)
Knowledge of maximum score of each GCS component	75 (98.7%)	1 (2.3%)
Knowledge of lowest score of GCS for un-intubated	16 (21%)	60 (79%)
Knowledge of the deterioration of the patient.	52 (68.4%)	24 (31.6%)
Knowledge on detecting coma	62 (81.6%)	34 (18.4%)
Knowledge on testing motor response in a tetraplegic patient	47 (61.8%)	29 (38.2%)
Knowledge on assessing orientation	74 (97.4%)	2 (2.6%)
Knowledge of the functions of GCS	65 (85.5%)	11 (14.5%)

Overall knowledge of the Nurses about the GCS

The overall knowledge of the study participants of GCS was computed out of 12 scores, the percentage was calculated out of 100% where the majority 67.1% of the nurses had a moderate level of knowledge and none had poor knowledge (Figure 1).

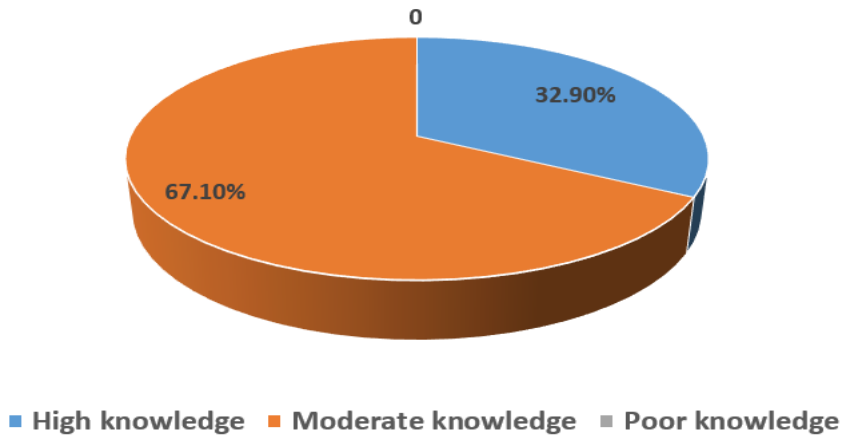

Figure 1: Overall knowledge of the nurses about the GCS

Association between socio-demographics and knowledge level

In this study, different variables were analyzed to determine association with knowledge, however, none w as found to have statistical significance. In addition although out of the analyzed demographic information had association, based on the frequencies female nurses, from ICU, age 26-30 and working experience of 1-3 years had better knowledge compared to the respective subgroups (Table 3).

Table 3: The association between socio-demographics and knowledge of GCS

Variable	**Knowledge level**			
	High	Moderate	Poor	**P-Value**
Gender				0.229
Male	8	24	0	
Female	17	27	0	
Type Of unit				0.332
ICU	16	26	0	
EMD	9	25	0	
Age group				0.091
21-25	6	13	0	
26-30	11	32	0	
31+	8	6	0	
Years of experience				0.188
1-3yrs	21	48	0	
4-6yrs	3	1	0	
7+ yrs.	1	2	0	

Discussion

This study found that most of the participants had an average level of knowledge of GCS and none had poor knowledge. Although there was no statistical significance on the association between sociodemographic characteristics and level of knowledge, junior nurses, working in ICU and those with short time working experience had better knowledge based on the frequencies compared to the respective subgroups. Surprisingly, the majority of the participants failed to identify the correct GCS score for the un-intubated patient. Discussion of the findings is based on the result section.

Socio-demographic characteristics of the study participants

The study revealed that the majority of the participants were females, junior, and with working experience of fewer than 3 years. Similarly, a study by Rosalia in Tanzania and Braine found that about 54% and 84% of the participants respectively were females (1,13). In addition, another study done in Saudi Arabia reported a similar finding in which the majority of the participants were females and junior cadres although the majority had a bachelor's degree in nursing (15). Furthermore, another study revealed a different finding in which the majority of the participants had ages above 30 and 50 years (1). This may be explained by the reason that in the nursing profession the number of females registering to nurse education and also registered to the nursing council is more compared to males. In addition, junior nursing cadres might have more interest to engage in research activities and also the nature of the ICU and EMD department activities requires staff who are strong, and smart.

Nurses' response to the GCS knowledge-testing questionnaire

The majority of the participants in this study were able to correctly identify the appropriate statements on GCS including its components, use in scoring, total scores, and when to detect abnormalities and deteriorations. It was surprising to find that majority of the participants failed to identify the correct score for un-intubated patients. Similarly, other previous studies on the same topic also reported that almost 80% and 84%of the participants were knowledgeable on the theoretical concepts of GCS but not its application to patients (2,16). In addition, another study also revealed that more than 84% of the participants knew the components of GCS, and only 12% correctly identified a score for deterioration (9). Findings in the current study may be because nurses in ICU and EMD participate in close care and timely monitoring and GCS is a commonly used tool.

Knowledge on the Glasgow coma scale.

In this study, the majority of the participants were found to have a moderate level of knowledge, few with high, and none had a poor level of knowledge. This finding is similar to another study conducted among nursing students which found that most of the participants had a moderate level of knowledge (13). Additionally, another study done in Belgium on the same topic revealed that about 75% of the staff nurses had an average level of knowledge (17). Contrarily a study done in Malaysia on the same topic in the Malaya Medical Centre found that very few participants, about 3% had good knowledge, 41.5% had average

knowledge and the majority 55.5% had poor knowledge (15). Other different studies also reported that about 50% and 26% of the participants had poor knowledge of GCS (16,17). The findings in the present study may be explained by the reason that majority of the participants are juniors hence knowledge about GCS obtained during their basic education is still retained. In addition, the institution receives many serious patients at EMD and ICU and provides many consultations and expert services hence nurses have more chances to practice the use of GCS.

Furthermore, in this study, although there were no socio-demographic characteristics significantly associated with knowledge level, based on the number of nurses with a high and moderate level of knowledge, nurses from ICU, junior, and experience less than 3 years were in large number compared to the respective subgroups. These findings were in line with a previous study which found that there was no significant knowledge difference on knowledge among nurses based on their units, educational background, and positions (18). Similarly, a study done in Malaysia found that nurses with no previous training on GCS than with exposure to training and also ICU nurses had better knowledge than from EMD (15). Also, other previous studies done in Jordan found that about 46.7% of the ICU nurses had good knowledge as compared to the 25% of the EMD nurses (7,14). This was different from a study that reported that nurses with postgraduate education and bachelor's degree, and those with expertise in ICU had better knowledge than other groups (15).

Findings from the present study may be because, nurses in ICU play a time to time monitoring and evaluation of patients conditions, and documentation is mainly done of special chats that have GCS assessment as one of information. This is different from EMD nurses who might be more equipped with quick assessment skills due to the nature of their working environment that focuses on stabilization. Additionally, because the nurses did not attend any formal training, their knowledge on GCS might be commonly based on their basic education.

Study limitation

The sample size for this study was small and also the study was based on one hospital. Although the findings provide evidence of the nurses' knowledge of GCS, the results may not be generalizable. Future studies might include more participants and involve multiple centers to get findings that might be more representative. Also, more studies may be done at

the lower level of health facilities to know the real situations; possibly nurses' knowledge of GCS might be poor than the higher-level health institutions. Furthermore, the study used a simple random sampling technique due to time constrain and lack of resources, this might be a source of sampling bias and miss of participants with important information about the study.

Conclusion and Recommendations

This study was aimed at exploring nurses' knowledge on GCS scoring among nurses working in ICU and EMD. In general, most of the participants had a moderate level of knowledge of GCS. Although there was no significant association between the sociodemographic characteristics and knowledge level, nurses from EMD had lower knowledge compared to ICU nurses. Also, knowledge gaps were identified for the participants' responses on GCS scoring. This calls for intervention from the key stakeholders such as hospitals, education institutions, and nursing boards. To improve nurses' knowledge on GCS assessment and interpretation health institutions may consider conducting in-service training and initiating forums that will give chances for nurses to present research updates and scenarios. Moreover, training institutions may initiate short courses focused on the theory and skills of GCS for nurses. The Nursing board in the country may also consider advocating for specialized training in intensive and emergency care where nurses will learn detailed knowledge and skills of GCS.

Competing Interests

Authors declare to have no competing interests on the manuscript.

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Authors' contribution

LR contributed to the conception and design of the study, acquired, analysed and interpreted the data, and drafted and revised the manuscript. EIS contributed to the design of the study, data interpretation and critically revised the manuscript. DAM contributed to the design of the study, data interpretation and critically revised the manuscript. All authors read and approved the final manuscript.

Abbreviations

EMD	Emergency Medicine Department
GCS	Glasgow Coma Scale
ICU	Intensive Care Unit
MNH	Muhimbili National Hospital
MUHAS	Muhimbili University of Health and Allied Sciences
SPSS	Statistical Package for the Social Sciences

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