Investigating Nurses' Level of Self-Confidence when Using the Glasgow Coma Scale to Assess Level of Consciousness and the Inter-rater Reliability of the Test

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Abstract

Background: Since its development more than 40 years ago, the Glasgow Coma Scale is the most commonly used instrument for assessing level of consciousness. However, this instrument has limitations, one being its potentially suboptimal inter-rater reliability among nurses.
Aims: The purpose of this study was to assess critical care nurses' self-confidence and the inter-rater reliability when performing the Glasgow Coma Scale for patients with altered levels of consciousness.
Materials and Methods: A non-experimental, prospective, observational design was used in the intensive care units, telemetry units, and emergency rooms of three hospitals (one governmental, one teaching, and one private) in Amman, Jordan. The sample of critical care nurses (N = 270) provided self-reported answers to a self-confidence questionnaire, and 135 pairs were formed to assess inter-rater reliability of the Glasgow Coma Scale.
Results: Overall, self-confidence was high (mean ± SD, 20.29±2.90). However, inter-rater reliability was intermediate (Kappa statistics (κ) =0.53, $p<0.001$). Nurses working in intensive care units had the highest level of agreement and self-confidence, followed by those in telemetry, then by those in the emergency room. Longer years of experience resulted in increased self-confidence ($r=0.38$, $p<0.05$) and improved agreement levels.
Conclusion: Health care providers should not rely on a single score to make clinical decisions regarding patient health.

Keywords: Inter-rater Reliability, Self-confidence, Glasgow Coma Scale, Critical Care, Nurses, and Jordan.

(J Med J 2018; Vol. 52 (I):1- 14)

Received	***Accepted***
Feb. 26, 2017	*July 18, 2017*

Introduction

Detecting changes in a patient's level of consciousness (LOC) depends on the accuracy of the nursing assessment. Based on this assessment, changes in interventions and clinical decisions for patients' treatment might evolve [1-3]. Quick and accurate evaluation of the LOC reduces neurological complications, avoids erroneous diagnostic procedures, and reduces morbidity and mortality rates. For any assessment to be efficient and successful,

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however, objective, a valid, reliable, and accurate tool needs to be accessible [1-3].

The Glasgow Coma Scale (GCS) was introduced in 1974 as the first neurological tool to assess patients' LOC [2]. The Glasgow Coma Scale is considered to be the gold standard, most universal and least subjective tool for assessing LOC [4-5]. The objective nature of GCS scores made communication between health care providers easier and faster [2, 4, 6-7]. The validity and objectivity of the GCS was the reason behind its wide range of uses for assessing patients' LOC worldwide [1]. Health care providers, including nurses, use the GCS in different clinical settings, such as intensive care units (ICUs), emergency rooms (ERs), telemetry units, and trauma centers [8].

However, the GCS has limitations [1]. These limitations include, but are not limited to, the following: a) taking the advantages of the GCS as granted affects its inter-rater reliability; b) the scoring system loses its value when nurses are unable to assess just one component of the GCS; c) difficulty in assessing certain cases, such as patients who are intubated, are heavily sedated, and/or have swollen eyes due to maxillofacial fractures; and d) the negative effects of raters' low self-confidence and lack of experience on their ability to perform the assessment[2, 7, 9-10].

The reliability of an instrument is simply defined as its stability over time. Reliability is the extent to which an instrument can yield the same result for different assessments of the same patient under the same conditions [7]. Different factors might alter the reliability of an instrument. The two most important factors are changes in the patient's condition and the use of the instrument by different examiners, the latter of which refers to inter-rater reliability [11].

Self-confidence in performing any skill means how much the health care provider feels that he/she is capable of performing a task correctly and efficiently. Self-confidence was found to be strongly correlated with skill and predicated its performance [5,12]. Different studies showed that higher levels of self-confidence promoted accuracy when performing the GCS assessment[7, 9].

Literature review

There are a number of studies[7,10,13-16] comparing the inter-rater reliability of the GCS among health care providers, and others [2, 5] describing nurses' self-confidence when using the GCS. An example of the former, was conducted by Gill et al.[16] (2004), is a prospective observational study at a university trauma center testing inter-rater reliability of the GCS in an emergency department. A convenience sample of 116 emergency department patients older than 17 years presenting with changes in their LOC were enrolled. Two emergency physicians were blinded and independently assessed the LOC of the patients by using the GCS within a five-minute time period. The agreement percentage for the exact total GCS score was 32%. The agreement percentage for the GCS score for the eye was 74%, verbal 55%, and motor 72%. Six to 17% of the scores were 2 or more points apart. The authors concluded that there was a moderate degree of inter-rater agreement for the GCS score and its components [16].

To assess the inter-rater reliability of the GCS between nurses and senior doctors in the emergency department, Holdgate et al.[7] conducted a prospective observational study using a convenience sample of 108 patients aged at least18 years who presented to a tertiary care hospital emergency room with decreased

LOC. One senior doctor and one registered nurse scored each patient independently of each other in a blinded fashion15 minutes apart. Inter-rater agreement was excellent for verbal scores and total GCS scores, and intermediate for motor and eye scores. An interesting finding of this study was that the total GCS scores differed by more than two points in 9.3% of the sample. An explanation for this difference is that the two assessments were performed15 minutes apart. In reality, 15 minutes is a sufficient amount of time for a change in the LOC to occur, especially in critical cases such as hematomas. Another explanation is that the difference might be due to the varying methods used for painful stimulation. Based on the results of this study, clinical decisions should not be based solely on a single GCS score. On the contrary, the scores should be interpreted in conjunction with other clinical information and should act as a stimulus for further assessment by a senior clinician.

Heron et al.[15] used a convenience sample of 75 critical care nurses from different subspecialties. These nurses conducted video-recorded GCS assessments, and their scores were compared to expert scores. Nurses with baccalaureate and diploma degrees were better than did nurses with critical care qualifications. In this study, there were no clear explanations for why these results emerged. The only explanation for these results was the potential over confidence that nurses with special training might have; critical care nurses might have been less cautious when performing their assessments. However, limitations of this study included the fact that it was conducted on a convenience sample, with a small sample size and in only one hospital.

Interestingly, this study[15] also found that education qualifications and previous neurosurgical experience were significantly associated with the accuracy of the nurses' GCS assessments, with *p*-values of 0.004 and 0.043, respectively. Moreover, younger nurses were more accurate in their GCS scores. The authors considered that 'age' was a vague independent variable. The explanation was some nurses might join the profession at a later age, thus having less work experience than their younger counterparts, the authors recommended studying nurses' past work experience instead[15].

Fielding and Rowley[13] conducted a study to determine the effect of experience on inter-rater reliability of the GCS. A participant was considered "experienced" if he/she had a minimum of two years of nursing experience and at least one year of current neuroscience nursing practice. Six pairs of nurses assessed 25 patients each, and each observation was compared against that of the other participant in the pair. The level of agreement between participants was high, ranging from 0.855 to 0.974 as measured by classical reliability coefficients, supporting the idea that experience increased inter-rater reliability among examiners.

Fielding and Rowley [14] conducted another, follow-up study. Participants were classified into four groups. The first group consisted of five experienced nurses: three nurses had at least two years of post-registration experience and at least one year of current neuroscience nursing practice, and the other two nurses held certificates in neuroscience nursing. All five nurses had undertaken formal instruction in performing the GCS prior to the study. The second group consisted of seven newly graduated nurses who had received instruction on the use of the GCS. However, they had very

little experience with the GCS and had not previously worked in a neurosurgical ward. The third and fourth groups, each with 5 and 6 nurses, respectively, had not previously worked in a neurosurgical ward, nor had they received specific instruction on neurological assessment.

The nurses were asked to assess five patients on three to five occasions. Their assessments were compared to those made by an expert rater. The results showed that the level of agreement with the experts, in order from the highest to lowest, was the first group, followed by the second, third, and fourth groups. These results indicated that there was a high degree of reliability and accuracy of GCS scores by experienced nurses compared to those by nurses with lesser experience.

Using the same design, Ellis and Cavanagh[17] conducted a comparable study. A random sample of 27 Registered General Nurses and 16 Enrolled Nurses was taken, in addition to a convenience sample of 22 third-year nursing students. These students did not have any neuroscience experience. Participants assessed 12 videotaped patients with different levels of neurological alteration. These assessments were then compared with those by a panel of four experts. Registered General Nurses were more accurate in their GCS scores, making fewer errors in comparison with student nurses, especially in the area of motor response. These results supported Rowley and Fielding's study[14] regarding, experience and GCS scores.

Mattar et al. (2015) [5]examined nurses' self-confidence and attitudes towards the GCS. A descriptive correlational design was used on 114 nurses who answered a three-part questionnaire. The type of clinical discipline, seniority in nursing, and higher attitude scores towards the GCS were significant factors in determining nurses' confidence in using the GCS. A longer length of time working in a neuroscience setting and higher self-confidence scores were significant factors in determining nurses' attitude towards the GCS.

Chan and Matter (2012)[2] used a descriptive correlational survey in an acute care hospital in Singapore. Using a convenience sampling method, 114 nurses were recruited, and they each completed a self-reported questionnaire. A cluster analysis divided the sample into two clusters. Cluster A was labeled as having "average self-confidence" and cluster B was labeled as having" positive self-confidence". Nurses in cluster B had higher levels of self-confidence and more positive correlation between self-confidence and attitude toward the use of GCS compared to cluster A.

O'Farrell and Zou (2008) [18] evaluated the effect of a workshop on self-confidence levels among 66 acute care neuroscience nurses. The survey was given three times: before, immediately after, and three months after the workshop. Overall confidence before the workshop was moderate. Immediately after the workshop, there was a significant increase in confidence. In three months, there was no significant changein confidence from that immediately after the workshop.

Another study by Shoqirat(2006) [19] explored 65 third-year nursing students' understanding of the GCS, selected from a university in Scotland. Thirty-nine students returned the questionnaire. Sixty-two percent were not confident in their practical use of the GCS. However, they wanted to improve their theoretical knowledge as well as their practical skills. Therefore, a training course was needed to ensure that students were able to use the GCS effectively.

In summary, most of the previous studies

showed that nurses have intermediate agreement when performing the GCS. Self-confidence plays an important role in this issue. Moreover, experience is a significant factor in determining nurses' performance of the GCS. Some studies [13-14, 17] showed that experience had a positive effect on inter-rater reliability of the GCS. However, Heron et al.[15] concluded that nurses with *lesser* experience were more skilled in performing GCS.[15] These contradicting results gave further support for conducting this study.

Materials and Methods

Objectives

The overall purpose of this study was to assess critical care nurses' self-confidence when performing the GCS for patients with altered LOC in Jordan, and the inter-rater reliability of the assessment. Specifically, the study aimed to meet the following objectives:1) to assess nurses' self-confidence in performing the GCS; 2) to determine if the hospital unit affected the level of self-confidence among nurses; 3) to determine if there was a relationship between level of experience and level of self-confidence; 4) to determine the inter-rater reliability of the GCS between nurses; 5) to determine if the hospital unit affected the level of agreement between nurses, and 6) determine if there is a relationship between level of experience and the level the agreement rates between nurses when performing GCS.

Research design

A non-experimental, prospective, observational, correlational design was used to meet the objectives of this study.

Sample, site and setting

A convenience sample of nurses who met certain inclusion criteria was included in the study. Registered nurses were included if they had more than three months of experience in any of the following critical care units: ICU, ER, or telemetry. Patients were included in the study if they had a GCS score of ≤14 as assessed by the Principal Investigator (PI) or by one of the specialized neurologists in the unit. Patients were excluded if they were heavily sedated, on paralyzing agents, or had a severe maxillofacial injury causing eye edema.

The study was conducted in three tertiary care hospitals in Amman, Jordan. One hospital is the largest governmental hospital in Jordan with a capacity of 1,000 beds, and has a very active ICU, ER, and telemetry unit with approximately100% occupancy rates at any time. Another hospital is a teaching hospital, also very active in these three units. The third hospital is a private hospital with a neurology center in addition to all other specialties, also with an active ICU, ER, and telemetry unit.

Sample size calculation

Studies about self-confidence when using the GCS [5] found the effect size to be medium (0.25). Based on Cohen power analysis tables, and using descriptive statistics of mean ±SD for Objective 1, ANOVA with three groups for Objective 2, and a correlation coefficient for Objective 3, a sample size of 156 was needed to achieve 80% power with an alpha level of 0.05.

Measurement of variables

Data collection consisted of three parts: sociodemographic data, self-confidence, and the GCS. The first part involved collection of sociodemographic data: age, gender, educational level, hospital site, hospital unit, level of experience, and past GCS training. The second part was designed to determine nurses' perceived self-confidence in using the GCS.

The scale was adopted from a study by Grundy (1993). It comprises five items on a five-point Likert scale ranging from 1 (not at all certain/have much hesitation) to 5 (absolutely certain/have absolutely no hesitation). Total scores range from 5 to 25. A higher score indicates higher perceived self-confidence in using the GCS.[20] Previous studies [2, 20] have described values around 17 indicating an average level of self-confidence, and values ≥ 20 indicating high self-confidence.

The internal consistency of this confidence scale was assessed by Grundy, in the Confidence Scale: Development and Psychometric Characteristics study[20] where Cronbach's alpha ranged from 0.84 to 0.93. A study done later by Chan and Matter (2013) also assessed the reliability of this scale, and found that Cronbach's alpha was 0.94.[2] These results indicated the reliability of this confidence scale.

The construct validity of the confidence scale was assessed by Grundy, where [20]. The confidence scale was correlated with two other measures of confidence: a) the confidence visual analogue (C-VAS) and the confidence verbal descriptor scale (C-VDS). The correlation coefficient between the confidence scale and the C-VAS and the C-VDS were 0.80 and 0.77, respectively. These results supported the validity of the instrument for assessing confidence.[20]

Ethical considerations

Institutional Review Board (IRB) approval was obtained from the Applied Science Private University Ethical and Research Committee (IRB#: Faculty 006). The PI explained the purpose of the study to hospital managers, and approval was obtained prior to data collection. To assess self-confidence, the PI explained the purpose of the study to potential participating nurses, and they signed a written informed consent form if they agreed to participate.

Data collection

Nurses were asked to answer questions about their sociodemographic background, respond to a self-confidence questionnaire, and later perform the GCS on a patient. In order to assess inter-rater reliability of the GCS, nurses were divided into pairs. Each pair contained two nurses from the same unit with similar levels of experience (1 to 5 years, 6 to 10 years, or more than 10 years). Each nurse in the pair assessed the same patient directly in-person and independently after each other. This method helped to avoid the error that might have occurred due to a change in the patient's LOC over time.

The total and three individual component scores of the GCS were recorded for the purposes of comparisons. To avoid inconsistencies in scoring, nurses were instructed to score intubated patients with a score of one, and to use trapezius muscle benching as the painful stimuli. Because the GCS is a routine nursing procedure for patients with suspected reductions in LOC, an informed consent form was not obtained.

Data analysis

All data were coded and entered into the software Statistical Package for the Social Sciences 21 (IBM SPSS Statistics V21.0). Then, data cleaning was performed by the following procedure. First, data were checked for outliers by examining the frequency distribution for each question, so incorrectly coded data were identified and corrected by going back to the records. After that, a check for internal data consistency was performed to the confidence scale.

Objective 1(to assess Jordanian nurses' self-

confidence in performing the GCS) was assessed by descriptive statistics (mean ± SD).Objective 2 (to determine if the hospital unit affected the level of self-confidence among nurses) was tested by ANOVA with post hoc analysis. Objective 3 (to determine if there was a relationship between level of experience and the level of self-confidence) was analyzed by performing a bivariate correlation coefficient. Objective 4 (to determine the inter-rater reliability of the GCS between nurses) was calculated first by agreement percentages, then by the kappa(κ) statistic; where 1 indicated complete agreement, > 0.75 excellent agreement, 0.40 to 0.75 intermediate agreement, and < 0.40 poor agreement[7]. Objective 5 (to determine if the hospital unit affected the level of agreement between nurses, was checked by comparing Kappa (κ) statistics among the units. Objective 6 (to determine if there was a relationship between level of experience and the level of agreement rates between nurses when performing GCS, was checked by comparing Kappa statistics among the three levels of experience.

Results

Sample characteristics

A total of 270 nurses (135 nurse pairs) and 135 patients were enrolled between March and August 2016. The sample consisted of young nurses with a mean age of 25.86 years. The mean years of nursing experience and specialty did not exceed 5 years. Over half of the sample was male. GCS scores ranged from 3 to 14. Characteristics of the participants are presented in Table 1.

Table 1. Sociodemographic characteristics of the sample, N=270

Characteristics	Mean± SD, or n (%)
Age	25.84±2.83
Years of experience in nursing	3.67±1.6
Years of experience in specialty	2.53±1.9
Gender	
Male	144 (53.3)
Female	126 (46.7)
Hospital unit	
Intensive care unit	100 (37.0)
Telemetry unit	90 (33.3)
Emergency room	80 (29.7)

Objective 1: assessing nurses' self-confidence in performing the GCS

The mean ± SD of the confidence scale was 20.29±2.90, where the confidence scale may range from 5 to 25. The minimum level of confidence for the nurse population was 14, and the maximum was 25.The mean score indicated a high level of self-confidence as reported by other studies using the same instrument[2].

Objective 2: determining if the hospital unit affected the level of self-confidence

An ANOVA with post hoc test was performed to compare the means of self-confidence among nurses of different hospital units. As seen in Table 2, there was a significant difference in the total self-confidence levels among nurses of different hospital units ($F_{(2,267)}$= 62.97, p< 0.001). Post hoc analysis showed that ICU nurses had the highest level of self-confidence (21.75±2.27), followed by telemetry unit nurses (19.42±2.55), and finally ER nurses (17.97±2.52).

Objective 3: to determine if there was a relationship between level of experience and level of self-confidence

The Pearson correlation coefficient (r) between these two variables was 0.38, with p < 0.05, indicating that the level of self-confidence increased with level of experience.

Objectives 4 and 5: to determine the inter-rater reliability of the GCS between nurses; and to determine if the hospital unit affected the level of agreement between nurses

To analyze these two objectives, two steps were performed. First, the agreement rates (absolute differences) in scores for the total GCS and for the three GCS components (eye, verbal, and motor) between the two nurses in each pair were reported as numbers and frequencies (Table 3). Secondly, kappa (κ) statistics were performed for the three GCS component scores (eye, verbal, and motor) and for the total scores of the GCS for each hospital unit (Table 4). The whole sample had excellent agreement for the eye score; intermediate agreement for the verbal and total scores; and poor agreement for the motor score. Regarding the specific hospital units, all units had excellent agreement for the eye score, and intermediate agreement for the verbal, motor, and total scores (Table 4).

Table 2. Results for the post hoc least significant difference (LSD) test for the mean differences in self-confidence among nurses of different hospital unit

Hospital unit	Hospital unit for comparison	Mean difference	*p*-value
ICU	Telemetry	2.32	<0.001
	ER	3.38	<0.001
Telemetry	ER	1.46	<0.001

ER: emergency room; ICU: intensive care unit; telemetry: telemetry unit.

Table 3. Absolute difference of nurse one minus nurse two scores for 135 patients

	Size of absolute difference					
GCS subscale	0	1	2	3	4	5
Eye	113(83.7%)	16 (11.8)	6 (4.5)			
Verbal	100 (74.1)	25 (18.5)	10 (7.4)			
Motor	95 (70.4)	32(23.7)	8(5.9)			
Total scale	80 (59.3)	36(26.7)	10 (7.4)	4 (2.9)	3(2.2)	2 (1.5)

Table 4. Kappa statistics for GCS components and total score for each unit and the whole sample

	GSC Components			
Area	Eye	Verbal	Motor	Total
ICU	0.93	0.73	0.69	0.54
Telemetry	0.86	0.71	0.49	0.52
ER	0.86	0.70	0.48	0.50
Whole sample	0.81	0.65	0.31	0.53

All values were statistically significant at $p<0.001$

Table 5. Kappa statistics for GCS components and total score based on experience levels

	GCS Components			
Years of experience	Eye	Verbal	Motor	Total
More than 10	0.90	0.71	0.69	0.56
6-10	0.82	0.68	0.51	0.53
1-5	0.80	0.62	0.45	0.50
Whole sample	0.81	0.65	0.31	0.53

All values were statistically significant at $p<0.001$

Objective 6: to *determine if there was a relationship between level of experience and the level the agreement among nurses when performing GCS* was assessed by calculating kappa (κ) statistics across the three levels of experience (Table 5). As shown in the table, the level of agreement significantly increased with levelof experience.

Table 6. Glasgow Coma Scale and score

Feature	Response	Score
Eye opening	Spontaneous (when approached)	4
	To speech (normal or loud voice)	3
	To pain (Touch or gently shake patient, or painful stimuli)	2
	No response	1
Best verbal response	Oriented (time, place and person)	5
	Confused (some incorrect answers, still able to talk in sentences	4
	Inappropriate words (no complete sentences, repeat words only)	3
	Incomprehensible sounds (no clear words, only moans or groans)	2
	No response	1
Best motor response	Obeys commands (follows simple commands)	6
	Localizes to pain (tries to locate towards the stimulus in an attempt	5
	Withdrawal from pain/normal flexion (arm withdraws to pain,	4
	Abnormal flexion (flexes the arm and rotates the wrist)	3
	Extension (shoulder adducted and forearm internally rotated)	2
	No response	1

Discussion

The results of this study showed that critical care nurses had intermediate agreement in total GCS scores (indicating intermediate inter-rater reliability of the GCS), and that they also had high levels of self-confidence when performing the GCS for patients with altered LOC. Regarding inter-rater reliability, the results of this study are congruent with previous studies about the same topic [10, 15-16].

It is worth noting that agreement rates for the GCS total and component scores, regardless of hospital unit, in order from highest to lowest, were eye, verbal, motor, then total. The same results were found in the study by Heron (2001),[15], where eye and verbal responses had the highest levels of agreement compared to motor and total responses. An explanation for these results may be related to the number of the items in each subscale in the GCS (Table 6). The eye subscale has consists of 4 items, the verbal subscale 5 items, and the motor sub scalehas6 items. As the number of items increases, inter-rater reliability decreases.

Another potential explanation for that order of agreement rates is that perhaps performing the motor response part of the GCS is difficult. In some studies exploring nurses' knowledge and understanding of the GCS,[8, 19] more than 90% of the nurses reported that the GCS is a complex tool, and that the motor assessment was the most complex component.

Contrary to the results of the current study, Holdgate et al. (2006) [7] found that the level of agreement was high. However, they have found that there was a significant number of GCS score pairings that were different by two or more points. However, these differences may be due to the fact that the Holdgate et al. study[7] measured agreement between nurses and physicians, whereas the current study measured agreement between nurses only. Another potential reason for these differencesmight be that, in the Holdgate et al. study, only ER nurses were included,[7] whereas the current study included nurses from different units of critical care. In addition, the nurses in the current study were generally less experienced than those of the previous study[7]. Experience plays an important role in levels of agreement.

The results of the current study also showed that experience played an important role in the level of agreement among critical care nurses. Nurses with more years of experience had a higher level of agreement than less experienced nurses. This finding is supported by previous studies[13-14, 17]. Some differing studies included Holdgate et al. (2006)[7], who found that experience did not affect the level of agreement, except for the eye component scores. Heron (2001)[15] showed that general and younger nurses were more skilled in performing the GCS. However, that study might not have truly reflected years of experience, since some of the older nurses may have joined the career later in life, and therefore have less experience than some of the younger nurses which make this a significant confounding variable for the results.

One interesting finding of the current study was the order of the inter-rater reliability among hospital units. Nurses in the ICU had the highest agreement rates, followed by the telemetry unit, then the ER. These results are compatible with the study done by Heron (2001)[15]. Usually, nurses in the ICU in Jordan perform hourly GCS assessments for all of their patients. Furthermore, these nurses encounter neuro-patients on a regular basis. On the other hand, nurses in telemetry units and ERs usually perform GCS assessments only when

necessary, and for a limited number of patients. The frequent use of the GCS likely increased the ICU nurses' ability to use of this instrument, resulting in higher rates of agreement in their scores.

Nurses in the current study showed high levels of self-confidence when performing the GCS for patients with altered LOC. The ICU nurses had the highest level of self-confidence, followed by the telemetry unit nurses, and finally the ER nurses. These match the results of previous studies [5, 15] who found that nurses who were working in the neurology ICU had the highest levels of self-confidence. An explanation for these results is the same as that for the levels of agreement regarding experience and area of practice[13-14, 17].

However, since the overall level of agreement among all nurses was intermediate, the level of experience and level of self-confidence were likely not the only determinants for the accuracy of nurses' performance of the GCS. For example, the negative effect of overconfidence has been reported in some studies about self-confidence[5, 15].

Due to thel imitations of the GCS, health care providers in critical care have searched for alternatives to replace the GCS. One of the most common alternatives is the FOUR (Full Outline of Unresponsiveness). This instrument is a scale consisting of four items (eye response, motor response, brain stem reflexes, and respiration pattern), and was recommended by researchers from the Mayo Clinic [10, 21]. FOUR has been validated in neurology intensive care units[21-22]. Contrary to the GCS, this instrument does not depend on verbal response, which might be difficult to assess in the ICU due to clinical situations such as intubation, sedation, and delirium.

The FOUR predicted mortality as GCS, but the FOUR showed better inter-rater reliability[10, 21-23]. However, the FOUR required more time to perform than the GCS, and it was more difficult to remember in acute situations because it included more items. Moreover, the brain stem category relies on three different reflexes (pupil, corneal and cough)[10]. The authors concluded that the advantages of the FOUR were not sufficient to replace the GCS[10, 21-23].

Conclusion

Since its development more than 40 years ago, the GCS is still the most commonly used instrument for assessing the LOC of patients in the critical care setting. The GCS has many advantages contributing to its significant use worldwide. However, the GCS has its own threats to validity, including the effect of inter-rater reliability, and the effect of self-confidence on the level of agreement in nurses. The current study showed that, for this sample, nurses working in different critical care setting had an intermediate level of inter-rater reliability. In addition, these nurses had high levels of self-confidence when using the GCS to assess LOC. The results indicate that health care providers should not rely on a single score to make treatment decisions regarding patients' health.

Acknowledgement

The author is grateful to the Applied Science Private University, Amman, Jordan, for the partial financial support granted to this research project and the financial support granted to cover the publication fees of this research article.

References

1. Hien NT. The accuracy of Glasgow Coma Scale knowledge and performance among Vietnamese nurses. Perspectives in Nursing Science. 2011; 8 (1): 54-61.
2. Chan MF, Matter I. Investigating nurses' knowledge, attitudes and self-confidence patterns to performthe conscious level assessment: a cluster analysis. Int J Nurs Pract. 2013 Aug; 19 (4): 351-9.
3. Waterhouse C. The Glasgow Coma Scale and other neurological observations. Nurs Stand. 2005 Apr 27-May 3; 19 (33): 55-64; quiz 6-7.
4. Emejulu J, Nkwerem S, Ekweogwu OC. Assessment of physicians' knowledge of Glasgow coma score. Niger J Clin Pract. 2014 Nov-Dec; 17 (6): 729-34.
5. Mattar I, Liaw SY, Chan MF. Nurses' self-confidence and attitudes in using the Glasgow Coma Scale: a primary study. Nurs Crit Care. 2015 Mar; 20 (2): 98-107.
6. Fischer J, Mathieson C. The history of the Glasgow Coma Scale: implications for Practice. Crit Care Nurs Q. 2001 Feb; 23 (4): 52-8.
7. Holdgate A, Ching N, Angonese L. Variability in agreement between physicians and nurses when measuring the Glasgow Coma Scale in the emergency department limits its clinical usefulness. Emerg Med Australas. 2006 Aug; 18 (4): 379-84.
8. Mattar I, Liaw SY, Chan MF. A study to explore nurses' knowledge in using the Glasgow Coma Scale in an acute care hospital. JNeurosci Nurs. 2013 Oct; 45 (5): 272-80.
9. Iacono LA, Lyons KA. Making GCS as easy as 1, 2, 3, 4, 5, 6. J Trauma Nurs. 2005 Jul-Sep; 12 (3): 77-81.
10. Fischer M, Ruegg S, Czaplinski A, Strohmeier M, Lehmann A, Tschan F, et al. Inter-rater reliability of the Full Outline of unresponsiveness score and the Glasgow Coma Scale in critically ill patients: a prospective observational study. Crit Care. 2010; 14 (2): R64.
11. Easdale G, Maas A, Lecky F, Manley G, Stocchetti N, Murray G. The Glasgow Coma Scale at 40 years: standing the test of time. Lancet Neurol. 2014 Aug; 13 (8): 844-54.
12. Trevor T Moores JC-JC. Self-efficacy, overconfidence and the negative effect on Subsequent performance: a field study. Information Management;. 2009; 44 (2): 69-76.
13. Fielding K, Rowley G. Reliability of assessments by skilled observers using the Glasgow Coma Scale. Aust J Adv Nurs. 1990 Jun-Aug; 7 (4): 13-7.
14. Rowley G, Fielding K. Reliability and accuracy of the Glasgow Coma Scale with Experienced and inexperienced users. Lancet. 1991, Mar 02; 337 (8740): 535-8.
15. 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 Aug; 14 (3): 100-5.
16. Gill MR, Reiley DG, Green SM. Interrater reliability of Glasgow Coma Scale Scores in the emergency department. Ann Emerg Med. 2004 Feb; 43 (2): 215-23.
17. Ellis A, Cavanagh SJ. Aspects of neurosurgical assessment using the Glasgow Coma Scale. Intensive Crit Care Nurs. 1992 Jun; 8 (2): 94-9.
18. O'Farrell B, Zou GY. Implementation of the Canadian Neurological Scale on an Acute care neuroscience unit: a program evaluation. J Neurosci Nurs. 2008 ;40 (4): 201-11.
19. Shoqirat N. Nursing students' understanding of the Glasgow Coma Scale. Nurs Stand. 2006Apr 5-11; 20 (30): 41-7.
20. Grundy SE. The confidence scale: development and psychometric characteristics. Nurse Educ. 1993 Jan-Feb; 18 (1): 6-9.
21. Wijdicks EF, Bamlet WR, Maramattom BV, Manno EM, mcclelland RL. Validation of a new coma scale: The FOUR score. Ann Neurol. 2005 Oct; 58 (4): 585-93.
22. Wolf CA, Wijdicks EF, Bamlet WR, mcclelland RL. Further validation of the FOUR score coma scale by intensive care nurses. Mayo Clin Proc. 2007 Apr; 82 (4): 435-8.
23. Iyer VN, Mandrekar JN, Danielson RD, ZubkovAY, Elmer JL, Wijdicks EF. Validity of the FOUR score coma scale in the medical intensive care unit. Mayo Clin Proc. 2009 Aug; 84 (8): 694-701.

التحقق من مدى الموثوقية والثقة بالنفس لدى الممرضين والممرضات عند استخدام مقياس غلاسكو للغيبوبة لتقييم مستوى الوعي

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الملخص

خلفيه الدراسة: منذ أكثر من أربعين سنة حيث أنشئ مقياس غلاسكو لقياس الغيبوبة وهو لا يزال الأكثر استخداما في قياس مستوى الوعي. ومع ذلك، فانه يوجد لهذا المقياس نقاط ضعف. من أهم هذه النقاط مدى الموثوقية ما بين الممرضين والممرضات عند استخدام هذه الاداة لقياس مستوى الوعي.

الهدف: تهدف هذه الدراسة إلى تقييم مدى الموثوقية والثقة بالنفس لدى الممرضين والممرضات عند استخدام مقياس غلاسكو للغيبوبة لتقييم مستوى الوعي عند المرضى الذين يعانون من تغيير في مستوى الوعي.

منهجيه البحث: استخدمت هذه الدراسة التصميم غير التجريبي لعينة مكونة من 270 ممرضاً وممرضة من أقسام العناية الحثيثة والمتوسطة والطوارئ بثلاثة مستشفيات (حكومي وخاص وتعليمي) في العاصمة الأردنية– عمان. قامت العينة بالإجابة عن استبانة لقياس الثقة بالنفس وقد تم تقسيمهم الى 135 زوج لقياس مدى الموثوقية.

النتائج: اظهرت النتائج ان مستوى الثقة بالنفس لدى الممرضين والممرضات كان عالياً (Mean±SD); 20.29±2.90). على الرغم من ذلك كان مدى الموثوقية متوسطاً Kappa statistics=0.53, p<0.001. كان لدى العاملين في اقسام العناية الحثيثة أعلى مستوى من الموثوقية والثقة بالنفس ومن ثم العناية المتوسطة وأخيراً الطوارئ. عملت زياده عدد سنوات الخبرة على تحسين مستوى الموثوقية (r=0.38, p<0.05) ومدى الثقة بالنفس.

الاستنتاج: يجب على العاملين في الحقل الصحي عدم الاعتماد على نتيجة واحدة فقط عند اتخاذ الاجراءات الطبية المتعلقة بالحالة الصحية للمريض.

الكلمات الدالة: مدى الموثوقية، الثقة بالنفس، مقياس غلاسكو للغيبوبة، العناية الحثيثة، الممرضون، الأردن.