A Comparison of the Online Distance Learning and Traditional Learning Methodsin Enhancing Nursing Students Knowledge and Skills in using Glasgow Coma Scale (GCS)

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ABSTRACT

Online education is currently one of the best practices for online distance learning students (e-PJJ) when combined with traditional learning. The evolution of advanced nursing education and practice has been influenced by changes in methods of teaching including online learning, blended learning and traditional learning. The Glasgow ComaScale (GCS)are knowledge and skill required by nursing students that are integral towards assessing the level of consciousness of patients with neurological injuries. This is because nurses play a vital role in minimizing the risk of deficiency and detecting early signs of Glasgow Coma Scale. The purpose of this study is to assess the knowledge and skills of nursing students in UniversitiTeknologi Mara (UiTM) PuncakAlam regarding Glasgow Coma Scale (GCS) and the differences between using online learning and traditional learning methods. A cross-sectional study using self-reported questionnaires was conducted among 125 undergraduate nursing students. The data were analyzed using SPSS version 21.0. On average, a full time undergraduate student has a higher level of knowledge compared to online distance-learning undergraduates ($t=3.932$, $df=123$,$p<0.05$). However, for the performance of the skill between fulltime nursing and online distance learning (e-PJJ), the latter students obtained a higher score for the correct item as compared

to fulltime nursing students at (t=3.782, df = 131, p<0.05). Online learning is useful for distance learning students because they have experience in daily nursing practices and skills of GCS. However, there needs to be improvements to their knowledge to maintain their competency in nursing practice. That being said, full-time students need traditional and blended learning to enhance their knowledge and skills on GCS.

Keywords: *Glasgow Coma Scale, Knowledge, Skills, Distance learning, Full-time students, Online learning*

INTRODUCTION

Undergraduate nursing students in universities specifically in UniversitiTeknologi MARA (UiTM) are usually split between full time students and onlinedistance learning (e-PJJ). Both groups of students are taught Glasgow Coma Scale (GCS) in theirsyllabus during year three. They also have to practice on a patient in a clinical setting.GCS is commonly used in the emergency department and critical care unit. Fulltimeundergraduate nursing student learn this topic in their syllabus using traditional learningwhere face-to-face teaching, lab sessions and blended learning are involved. Normally,the GCS topic has two hours allocated for face-to-face with a preparation time of fourhours. Lab sessions are allocated two hours for practice with a preparation time of twohours. Undergraduate students also learn this topic via blended learning. Blended learningis a combination of internet and digital media with established classroom, self-studymanuals, videos, and the web (Friesen, 2012).

Online distance learning (e-PJJ) undergraduate nursing students undergo a varietyof learning methods such as virtual classes, seminars, self-learning, and online forums viathe i-Class learning system platform. Teaching and learning for e-PJJ are carried outvirtually by using broadband internet. They are also being constantly updated with thelatest information on the course and syllabus. The questions, information and feedbackare relayed between students and lecturers on a real-time basis. They are able to accessand read, print and download updated notes from time to time. e-PJJ nursing students alsogo through the clinical area and have hands-on experience in their clinical expertise(Information system, Institute of Neo Education, 2016).

The Glasgow Coma Scale is a neurological instrument which measures theconsciousness level. This method is the most common scoring method for the level ofconsciousness in a person following a traumatic brain injury. It is used to sort out theseverity of an acute brain injury. The Glasgow Coma Scale is a reliable and objectiveway to measure an initial and subsequent level of consciousness in a person after a braininjury. This method has been used by trained medical staff in emergency and intensivecare units. A study by Waterhouse (2008) stated that the tool was designed as a clinicalscale for assessing the depth and consciousness of the duration impaired. The importanceof this assessment is to measure the consciousness level of the patient at an acute areawhich is the first assessment in the emergency area.

Nurses play a vital role to detect early signs of Glasgow Coma Scale syndrome sothat prompt treatment can be investigated. In addition, nurses who care for these patientsneed to have good knowledge and skills in performing Glasgow Coma Scale scoring todetect initial signs of complication (Nguyen & Sun-Mi, 2011).

Undergraduate full-time nursing students learn this neurological assessment intheir third year while online distance learning (e-PJJ) student nursing have alreadylearned this during their diploma years. Experience and education significantly enhancethe reliability of the assessment of the patient using the Glasgow Coma Scale (Jalali, R.,&Rezaei, M, 2014). In order to enter the online distance learning (e-PJJ) nursing course,students must be experienced nurses as stated in the UniversitiTeknologi MARA (UiTM)rules where only diploma holders with 3 years and above of working experience areoffered the Bachelor of Nursing course.

As concluded, experienced nurses use the Glasgow Coma Scale (GCS) with ahigh degree of reliability and accuracy while nurses of lesser experience and training(which in our study are referred to as full-time students) are able to use GCS with averagereliability and lower accuracy.

For this reason, this study is carried out to investigate the performance of bothmodes of learning for the GCS syllabus. The main objective is to assess the knowledgeand skills on using Glasgow Coma Scale among full-time undergraduates and onlinedistance learning undergraduates and compare the performance between both modes oflearning.

METHODOLOGY

Design

The study's design is cross sectional. A questionnaire is used in this study adopted fromMattar, Liaw and Chan M.F. (2013). In this present research, the researcher compared theknowledge and skills of the students from a different type of study.

Sample

The sample was selected from final year undergraduate nursing students fromUniversitiTeknologi Mara (UiTM) PuncakAlam with an estimate total population of164. By using the Raosoft software, the minimal sample size calculated is 116 with aconfidence interval of 5% and a confidence level of 95%. The purposive samplingmethod was used in order to recruit the participants for this study in which all theparticipants must fulfill specific criteria as follows; undergraduate year three full-timenursing students (final year) and undergraduate year three online distance learning (e-PJJ) nursing students (final year). The total participation of students who fulfilled allthe criteria is 125 from both undergraduate full-time nursing students and e-PJJ nursingstudents.

Ethical Consideration

All the respondents voluntarily participate in this study. Informed consent hasbeen taken from the respondents who are willing to take part in this study by filling upthe consent form as evidence for their permission to participate in the study. All ethicalrequirements including confidentiality of respondents and informed consent were strictlyensured for the study. The permission of this study was obtained from the ResearchEthical Committee, UiTM.

Data Collection

Self-administered questionnaires were distributed to all respondents. Two sets ofself-administered questionnaires were given to the respondents. Set A contains 15 multiple questions to test on knowledge GCS. The total score for Set A is 1 point for the correct answer and 0 points for the wrong

answer. This is based on a rule of thumb, Fink (1995) recommended using a neutral response only if it is a valid response. Set B contains one question that tests the respondents' skills. The score for Set B is categorized by scoring Level and Scoring Level 11 such as 12-15 (80-100%) for good, 9-11 (50-79%) for satisfactory and 0-8 (50%) for poor skill (Nahida&Taneepanichskul, 2008). Set B is used to evaluate the skills of the nursing students and attached inside the questionnaire was the Glasgow Coma Scale chart with a scenario. The scenarios with the accompanying chart are validated by the examination board of UniversitiTeknologi Mara (UiTM) PuncakAlam. The respondents need to pilot the GCS chart based on the scenario given. The respondents were given time to answer the skills questions.

RESULTS AND DISCUSSION

Demographic Data

Among the total respondents of this study, the mean age of the respondents was 28.42±7.23 with a minimum age of 21 years old and a maximum age of 47 years old. From 125 undergraduate nursing students who were involved in this study, 116 (92.8%) were female students while 9 (7.2%) of them were male students. Out of the 125 total respondents who took part in this study, 64 (51.2%) were undergraduate online distance learning (e-PJJ) nursing students while 61 (48.8%) were undergraduate full-time nursing students as shown in Table 1.

Table 1: Demographic Data

Characteristics	Percentage n (%)	Mean Score
Age	7.23(124)	28.42
Gender		
Male	7.2 (9)	9
Female	92.8 (116)	116
Mode of study		
Fulltime	51.2(64)	64
Distant-learning (e-PJJ)	48.8 (61)	61

LEVEL OF KNOWLEDGE FULL-TIME AND DISTANCE LEARNING STUDENTS (E-PJJ) IN PERFORMANCE GCS

Comparison of Level on Knowledge among Full-Time and Online Distance Learning (E-PJJ) Students Undergraduate Nursing Students in Performance GCS

Data shows that the full-time nursing students had better knowledge on GCS (mean score=10.67 as compared to distance-learning undergraduates' mean score=9.34). Refer to Table 2. However, Table 3 shows that the t-test results are significant ($t=3.932$, $df=123$, $p<0.05$). There is a significant difference between full-time undergraduate nursing students and online distance learning. On average, full-time undergraduate nursing students have better knowledge on GCS as compared to distance learning undergraduates nursing students.

Table 2: Level of Knowledge among Full-Time and Online Distance Learning (e-PJJ) Students Undergraduate Nursing Students in Performance GCS

Mode of learning	N	Mean
Full time nursing students	64	10.67
Online distance learning	61	9.34

Table 3: Independent Samples Test for Knowledge in Performance GCS

Mode of study	Levene's Test for Equality of Variances		t-test for Equality of Means		
	F	Sig.	t	df	Sig. (2-tailed)
Fulltime knowledge	*11.203*	*.001*	*3.932*	*123*	.000
Online Distance-learning (e-PJJ) knowledge			3.895	102.780	.000

Table 4 illustrates that the t-test result is significant (t=3.782, df = 131, p<0.05). There is a difference in the mode of study between full-time undergraduate nursing students level of skill on GCS as compared to distance-learning undergraduate nursing students.

Table 4: Independent Samples Test for Skills

Mode of study	Levene's Test for Equality of Variances		t-test for Equality of Means		
	F	Sig.	t	df	Sig. (2-tailed)
Fulltime skills	*10.218*	*.001*	*3.782*	*131*	.000
Distant-learning skills			3.817	103.029	.000

Table 5 shows that 31.25% or 20 respondents of the full-time students have scored good knowledge while 37 respondents or 57.81% scored satisfactory knowledge. Only 5 respondents achieved poor knowledge (0-8) which is 7.81% of all full-time student's. The table also presents the performance for online distance-learning (e-PJJ) students. Only 11 out of 61 students (18.03%) achieved good knowledge. Nearly half of the students which is 30 gained satisfactory level (49.18%) and almost one third (about 23 respondents or 37.70%) of the distant-learning group had poor knowledge in answering items in the questionnaire given.

The results show that knowledge scores for full-time respondents are better than online distance learning respondents (e-PJJ). A higher percentage of full-time respondents achieved good knowledge scores. Normally, full-time nursing students are allocated two hours of lecture for the GCS topic in the class and lab session.

The online distance learning (e-PJJ) group's low level of knowledge might be due to the short learning time on the theoretical aspects of the syllabus. Basically, the e-PJJ students are only allocated a 30-minute session in the classroom for the GCS topic while the rest is relegated to discussions in the virtual class. Few respondents from the distant-learning

(e-PJJ) group achieved good knowledge scores which is only 11 from a total of 61 respondents.

The researcher had found that most of the respondents informed that it was hard to understand the instrument properly. Other than that, most of the respondents had been working for quite a long time and might not remember the theoretical side of the Glasgow Coma Scale. Besides that, the online distance students (e-PJJ) undergo five seminars and virtual class for their online learning. The benefits of active participation of the students while engaging in the virtual class is required from the facilitator to increase their level of knowledge and skills on GCS. At the same time, the facilitators need to integrate methods a variety of teaching styles such as problem-solving learning (PBL) and traditional methods. This is supported by a previous study which states that the instructors' scaffolding for interaction is significant for the students' self- regulation for interaction in the virtual class together with individual knowledge and attitude such as their perceived importance of mastering the content (Cho & Kim, 2013).

Table 5: Scoring for the Level of Knowledge between Fulltime and Distant-Learning (e-PJJ) Students in Performance GCS

Performance / Mode of study	Good knowledge Score (12-15)	Satisfactory Score (9-11)	Poor knowledge Score (0-8)	Total
Fulltime students	20 (31.25%)	37 (57.81%)	5 (7.81%)	64
Distant-learning (e-PJJ) students	11 (18.03%)	30 (49.18%)	23 (37.70%)	61

Skills Performance on GCS for Full-Time and Distance Learning (E-PJJ) Nursing Students

Table 6 presents the skill level of the full-time undergraduate Bachelor of Nursing respondents in using the Glasgow Coma Scale. The findings show that of the 64 full-time undergraduate Bachelor of nursing students, 54 (84.3%) had correctly performed the Glasgow Coma Scale components of eye opening while 10 (15.6%) performed incorrectly. For the second component of the Glasgow Coma Scale, verbal response, 53 (82.8%)

portrayed correct performance while 11 (17.2%) portrayed incorrect performance. In the third component of the Glasgow Coma Scale which is motor response, only 35(54.7%) respondents performed correctly while 29 (45.3%) respondents performed incorrectly. For all the three components, there were 35 (54.7%) respondents with correct performance and 29 (45.3%) respondents with incorrect performance.

The result shows that only a few full-time undergraduate respondents achieved a good score in skill while nearly half of the group scored incorrectly. This might be due to a lack of clinical practice for these respondents. Skills are improved with more practice and experience in a clinical setting.

Online distance learning (e-PJJ) respondents' skills show good score which was expected by the researcher. This might be due to the abundance of previous experience of these respondents. Only a few of the respondents portrayed poor skills. This might due to a lack of experience in their current working areas. These results are supported by another study that found that the type of clinical discipline is significant in determining a nurses' knowledge of GCS. In the same study, it was found that nurses with experience in a neuroscience setting for 6 years or more scored higher mean scores (11.9) on the knowledge scale, whereas those who worked less than a year scored lower mean scores (10.0) (Mattar, Liaw, & Chan, 2013).

Table 6: Skills Fulltime Students in Performance GCS

GCS components	Fullmark scoring	Correct (n %)	Wrong (n %)
Eye opening	4	54 (84.3%)	10 (15.6%)
Verbal response	5	53 (82.8%)	11 (17.2%)
Motor response	6	35 (54.7%)	29 (45.3%)
All three components	15	35 (54.7%)	29 (45.3%)

Table 7 shows the skill levels among online distance learning (e-PJJ) undergraduate Bachelor of Nursing students in performing GCS. The findings show that from the 64 online distances learning (e-PJJ) undergraduate Bachelor of Nursing students, 49 (80.3%) had performed GCS components

of eye opening correctly while 12 (19.6%) performed incorrectly. For the second GCS component of verbal response, 49 (80.3%) showed correct performance and 12 (19.6%) showed incorrect performance. Lastly, in the third component of the Glasgow Coma Scale of motor response, only 37 (60.6%) respondents performed correctly while 24 (39.3%) performed incorrectly. For all three components, 36 (59.0%) respondents performed correctly while the remaining 25 (41.0%) performed incorrectly.

Table 7: Skills Distant-learning Student (e-PJJ) in Performance GCS

GCS components	Fullmark scoring	Correct (n %)	Wrong (n %)
Eye opening	4	49 (80.3%)	12 (19.6%)
Verbal response	5	49 (80.3%)	12 (19.6%)
Motor response	6	37 (60.6%)	24 (39.3%)
All three components		36 (59.0%)	25 (41.0%)

Table 8 below shows the correct item for assessing performance on skill between full-time nursing students and online distance learning (e-PJJ) (e-PJJ) students. The results show the differences among these two groups. As for full-time students, 35 respondents (54.7%) achieved all correct items while the other 29 (45.3%) had incorrect answers. The incorrect answers column consists of one, two or three incorrect answers. In the skill performance, distant-learning (e-PJJ) students showed a higher score for correct items. About 36 respondents (59.0%) achieved correct answers for all three items while 25 respondents (41.0%) answered incorrectly. On the other hand, it was found that more online distance learning (e-PJJ) students had correct answers than full-time students. Comparison of incorrect answers in the table shows that more full-time students answered incorrectly than online distance learning (e-PJJ) students.

Table 8: Correct Item for Assessing Skill of GCS between Fulltime and Distant-learning (e-PJJ) Students Performance

Performance / Mode of study	Correct (All three item)	Incorrect	Total
Fulltime students	35 (54.7%)	29 (45.3%)	64
Distant-learning (e-PJJ) students	36 (59.0%)	25 (41.0%)	61

CONCLUSION

Research on Glasgow Coma Scale for student nurses in UniversitiTeknologiMARA (UiTM) has been investigated before. Therefore, the researcher found this opportunity to do research on these topics. The importance of investigating the Glasgow Coma Scale comes from its role in treating patients and the need for confidence when the undergraduate student nurses use Glasgow Coma Scale to assess the levels of consciousness of patients. In a study by Shoqirat N. (2006) for a third-year nursing student, only 64% of the students felt it was a very important scale in the neurological field and an extremely low amount (15%) felt very confident in the Glasgow Coma Scale practice. These results imply that more experiences in clinical settings will likely lead to higher confidence and belief in the Glasgow Coma Scale scoring.

Both knowledge and skill play major roles in making sure the correct interpretation of the Glasgow Coma Scale which guarantees the high value and quality of the nurses produced in the general health sector. Based on the analysis, we have found that different modes of study affected the results. Full-time nursing students are better in answering the questionnaire because they have just learnt their syllabus while online distance learning (e-PJJ) learned the Glasgow Coma Scale but are not well practiced in them due to their working environment and roles for example some of them are working in the Health Clinic, some work as administrators while others work in the pediatric area.

Although most of the undergraduate full-time nursing student have better knowledge than online distance learning (e-PJJ), they had lower skills in performing GCS. This is supported by Nguyen, Shin-Mi (2011) who found that although most Vietnamese nurses had suitable theoretical knowledge and skills on the Glasgow Coma Scale, they were not able to apply it to analyze a clinical situation. Furthermore, their basic knowledge of Glasgow Coma Scale was not enough to ensure accurate performance of the Glasgow Coma Scale scoring. The undergraduate full-time students also have more time to spend for their study and are also more focused to enhance their knowledge on the GCS topic.

As stated in the results previously, the online distance learning (e-PJJ) students consists of experienced nurses who have better results in skill performance. This is supported by Mattar I., Liaw S.Y. and Chan M.F. (2013) in their study which concludes that staff nurses were more accurate in the use of the Glasgow Coma Scale and had fewer errors compared to student nurses particularly in the area of skills response. Teasdale,Brennan, McElhinney andMckinnon (2014) also emphasized the continued education of using the Glasgow Coma Scale. They found that the more education the medical staff received regarding the Glasgow Coma Scale, the more accurately they would perform.

However, there are those who have a low knowledge on GCS due to not being able to focus on their studies as a result of spending more time on work. Experience by itself is not enough without knowledge and skills. This research's results have confirmed that more accurate knowledge can contribute to the correct performance of the Glasgow Coma Scale. Safe care for a patient requires a skilled nurse who can perform their role to guarantee patient recovery. Pereira, Valle and Fernandes(2011) proved that care delivery by nurses requires various knowledge and understanding related to the leadership process of the team, with special emphasis on interpersonal relationship and decision making.

As a conclusion, the enhancement from a facilitator is important especially to utilize the virtual medium for online distance learning as part of students' education and guidance. Thus, the Glasgow Coma Scale (GCS) assessment is a vital part of the nursing procedure to maintain the accuracy of nursing record as well as to improve knowledge and competency level

in performing Glasgow Coma Scale (GCS) in a clinical setting among undergraduate nursing students. The online distance learning undergraduates also need to be exposed more to the required involvement in the virtual class before they enter the course.

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