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RESEARCH ARTICLE

IMPACT OF AN EDUCATIONAL PROGRAM FOR NURSES' KNOWLEDGE AND PRACTICE ABOUT GLASGOW COMA SCALE

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ABSTRACT

This study was carried out on 36 nurses working in an intensive care (ICU), an emergency care, male and female an internal medicine and surgery departments of general Port Said hospital. The aim of this study was to evaluate impact of an educational program for nurses' knowledge and practice about Glasgow coma scale (GCS). The data was collected using two tools; "Structured questionnaire sheet" which is consisted of 15 questions related to socio-demographic characteristics, and knowledge about GCS , "observation checklist" were related to practice about GCS . The results of this study indicated that there are statistically significant improvements immediately after program implementation regarding nurses' knowledge and practice about GCS. Moreover, it was also found that statistically significant relation between nurses' knowledge and practice, and there is no statistically significant association between the changes in the scores of either knowledge or practice and socio-demographic characteristics. Finally the program had succeeded in inducing statistically significant improvements of nurses' knowledge and practice about GCS. Therefore, it can be concluded from the results of the present study that this training program for nurses had a positive impact on their knowledge and practice.

INTRODUCTION

Glasgow Coma Scale (GCS) is a neurological scale which aims to give a reliable, objective way of recording the conscious state of a person, for initial as well as subsequent assessment. A patient is assessed against the criteria of the scale, and the resulting points give a patient score between 3 (indicating deep unconsciousness), score 7 indicates coma and either 14 or 15 indicating fully awareness.[1,2] The score can be assessed by Best Eye Response (4)- No eye opening (1) Eye opening to pain (2) Eye opening to verbal command (3) Eyes open spontaneously (4), Best Verbal Response (5)- No verbal response (1) Incomprehensible sounds (2) Inappropriate words (3) Confused(4) Orientated(5), Best Motor Response (6)- No motor response (1) Extension to pain (2) Flexion to pain (3) Withdrawal from pain (4) Localizing pain (5) Obeys Commands (6).[2,3,4,5]

The ultimate goal in the use of GCS is to identify those in need of acute intervention as early as possible and thus prevent secondary brain injuries, thereby reducing both mortality and morbidity among patients. From a clinical and educational point of view, all healthcare professionals working in emergency care should use assessment of conscious level as easily as other routine observations of vital signs [6,7].

However, several studies have reported an inconsistency in the use of GCS in the clinical setting, and it is recognized that education and training is required to ensure that the tool is used as a valid indicator of patient status. [8]Reports on interventions concerning continued education for nurses working in critical care areas show support for different implementation approaches, but they lack descriptions of theoretical and educational considerations. In the clinical setting the need for an educational intervention concerning the assessment of GCS has been expressed and the lack of studies of successful educational interventions for nursing in the critical care area shows the need for further studies. [9,11]

The challenge for the nurse includes the quick recognition of acute events, for example, head injury, infection, hemorrhage or post surgery complications and the monitoring and recording of neurological observations. It is therefore important that

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nursing staff, particularly those working in critical care setting should be competent to monitor and record neurological observations and be equipped with clinical skills required that ensure high levels of patient safety and quality care. There are several tools used for assessing and monitoring the neurological status of clients in critical units. One such widely and universally accepted tool is the Glasgow Coma Scale, an assessment tool designed to note trends in a client response to stimuli.[12]

Nurses have a unique opportunity to help clients examine their lifestyle, recognize risks and potential areas for change, advice on a focused individualized plan and facilitate the accomplishment of their goals [13]. That can't be done without a well-qualified thoroughly knowledgeable nurses, especially in critical care setting as in the sample of our study(neuroscience nurses),since they ought to have efficient assessment and evaluation skills to deal and manage their patient particularly those with disturbed level of consciousness through the application of GCS [4].

Therefore the need to develop training program for nurses about successful GCS will be suggested. Such programs are expected to improve nurses' knowledge and practice about GCS. So the aim of this study was to evaluate impact of an educational program for nurses' knowledge and practice about Glasgow coma scale (GCS) [13].

Problem Statement

There is an urgent need to evaluate impact of an educational program for nurses' knowledge and practice about Glasgow coma scale (GCS). Due to the importance of education on providing high quality GCS and thus improving survival from Head injury [14].

Aim of Study

To evaluate impact of an educational program for nurses' knowledge and practice about GCS.

SUBJECTS AND METHODS

Research Design

The design of this study was quasi –experimental design done to evaluate impact of an educational program for nurses' knowledge and practice about GCS.

Setting

The study was conducted in an intensive care units **(ICU)** , an emergency care, male and female an internal medicine departments of general Port Said hospital.

Subjects

The population of this study consisted of all nurses (36) providing direct care to patients in the above mentioned areas.

Inclusion and exclusion criteria

All nurses who were on duty during the study period were enrolled. The ones on leave were excluded from the study.
Tools: Two tools were used in this study.

Tools

Two tools were used in the study. Tool I "structured questionnaire sheet" It was developed and constructed by the researcher based on the review of related literature to evaluate nurses' knowledge about GCS (Pre and post knowledge questionnaire). It will comprise of two parts.

Part I

It will include items related to socio-demographic characteristics of the studied nurses as working area, age, professional qualification, years of experience, and attendance courses about GCS.

Part II

It will include questions related to nurses' knowledge regarding GCS (definition, indications, importance, components, and its scores).

Tool II"An observation checklist "was developed by researcher to evaluate nurses' practice related to GCS.

METHOD OF THE STUDY

Ethical Considerations

Permission to conduct the study was obtained from the responsible authorities after explanation its purpose. The tools were tested for disorders and appropriate modification was done accordingly. Informed consent was obtained from each nurses prior to their inclusion in the study after explaining the purpose and importance of the study. Confidentiality of the information was ascertained by the researcher.

Pilot study

A pilot study was carried out after the development of the tools. It was carried out not less than 10 nurses in working in an intensive care units (ICU), an emergency care, male and female an internal medicine departments to test the reliability and applicability of the tools of the study. The necessary modifications were done based on the results of the pilot study. Those nurses were excluded from the subject of research work to assure the stability of answers and performances.

Process of study

This study was conducted in ***four phases***

Phase I (Assessment phase): to assess nurses' knowledge about GCS. The researcher interviewed the nurses on individual bases the researcher introduced the sheet (Tool I) to each nurses and asked them to complete it and each nurse was observed by the researcher during the procedures. Their performance was evaluated by the using observational checklist (Tool II).

***Phase II (program planning)*:** The educational program was developed based on the identified needs and demands of nurses gathered in phase I, and in the light of the most recent pertinent literature.

***Phase III (program implementation)*:** The nurses were divided in 3groups according to their working areas in hospital. The educational program was implemented for each group of

nurses. The educational session was given for aduration of two hours using lecture, data show, discussion, video tapes, and handout which given to all nurses included in the study. The handout related to GCS was written in Arabic language to be easily understood by all nurses

Phase IV (Evaluation phase)

The program outcomes were evaluated by using tools I and II. Two time; first preprogram, second immediately after the implementation of program.

Scoring system

The total score of nurses' knowledge against the 6basic items was calculated to be 16.The respondent was given one point for each correct answer and zero for incorrect one. For each part, the scores of the items were summed up. These scores were converted into a percent score. Total score of 75%and more was considered satisfactory in knowledge while scores below 75% was considered unsatisfactory.

STATISTICAL ANALYSIS

After data were collected, they were coded and transformed into a specially designed format suitable for computer feeding. All entered data were verified for any errors. Data were analyzed using statistical package for social sciences (SPSS) windows 17.0 version and were presented in tables

RESULTS

Table (1) shows the socio-demographics characteristics of studied nurses. About one third of the nurses (37.5%) worked in an intensive care unit, 25.0%of them were in an emergency room, 19.4% of them were in male internal medicine and male internal medicine departments respectively. As regards age, about half of the nurses (50.0%) were 30 years and less than 40 years.

Table 1 Socio-demographic characteristics of nurses

Items	N n= (36)	%
Working areas:		
- Intensive care unit	13	36.1%
- Emergency room	9	25.0%
-Male internal medicine	7	19.4%
-Female internal medicine	7	19.4%
Age:		
<20 years	0	0.0%
20-<30 years	7	19.4%
30-<40 years	18	50.0%
40-<50 years	9	25.0%
50+ years	2	5.6%
Qualification:		
- Secondary nursing school	23	63.9%
- Nursing technical institute	13	36.1%
Years of Experience:		
<1 years	0	0.0%
1-<5 years	2	5.6%
5-<10 years	5	13.8%
10-<20 years	18	50.0%
20+ years	11	30.6%
Attendance course about GCS:		
Yes	36	100.0
No	0	0.0

As regards to their qualification about two third of studied nurses were graduated from secondary nursing school. About half of the studied nurses (50.0%) had 10 to less than 20 years an experience, and 30.6%of them had more than 20 years an experience. All of the studied nurses did not attend any course about GCS.

Table (2): Shows differences in nurses' knowledge regarding GCS throughout the program intervention. The results indicated statistical significant improvements of nurses' knowledge in various areas of definition, indications, importance, components, and scores of GCS (p<0.001).The most prominent improvement was in the knowledge scores about components, and definition for GCS reaching 100.0%, 97.2%respectively in the immediate posttest. Their levels were significantly higher than the pre-program levels.

Table 2 Differences in nurses' knowledge regarding GCS throughout the program intervention.

Nurses' knowledge about GCS	Time: Pre test N	Pre test %	Immediate post test N	Immediate post test %	Z	P-value
- Definition	4	1.4%	35	97.2%	9.866	0.001
- Indications	2	0.7%	33	91.7%	10.057	0.001
-Importance	1	0.36%	34	94.4%	10.294	0.001
-Components	8	2.9%	36	100.0%	10.149	0.001
-Scores of GCS	6	2.2%	33	91.7%	10.002	0.001

Table (3): Demonstrates the differences in nurses' practice regarding GCS throughout the program intervention. The results indicated improvements of nurses' practice in various areas of GCS. These improvements were statistically significant (p<0.001).

The most prominent improvements were in the scores of practice about (observe if patient opens eye spontaneously , calls and commands patient and observes if patient opens the eyes, and apply pressure on the limb and observe patient response to pain). They reached 100.0% in the immediate posttest. The nurses' practice levels were significantly higher than the preprogram level (pretest).

Table (4): shows comparison of mean nurses' knowledge total score regarding GCS throughout the program intervention. The highest percentages of improvement were in nurses' knowledge between the immediate posttest and the pre-program level (56.94±±11.79) where t=39.094at p – value (0.001).

Table (5): shows comparison of mean nurses' practice total score regarding GCS throughout the program intervention. The highest percentages of improvement were in nurses' practice between the immediate posttest and the pre-program level (98.41±7.76) where t=70.145at p – value (0.001).

Table (6): shows comparison between nurses' knowledge & practice total score regarding GCS throughout the program intervention. There is no statistically significant correlation Between nurses' knowledge & practice total score regarding GCS throughout the program intervention.

Table (7): shows correlation between nurses' knowledge and practice regarding GCS and their sociodemographic throughout the program intervention.

Table 3 Differences in nurses' practice regarding GCS throughout the program intervention

Nurses' practice about		Time: Pre test N	Pre test %	Immediate post test N	Immediate post test %	Z	P-value
Eye opening	-Observe if patient opens eye spontaneously	20	55.6%	36	100.0%	9.487	0.001*
	-Calls and commands patient and observes if patient opens the eyes	12	33.3%	36	100.0%	10.100	0.001*
	-Apply pressure on the limb and observe patient response to pain	9	25%	36	100.0%	10.000	0.001*
	-apply pressure on the supraorbital area and observe patient response	2	5.6%	35	97.2%	10.198	0.001*
Verbal response	-talk with patient and observe if the patient is oriented or not	11	30.5%	34	94.4%	9.652	0.001*
	-observe if patient is not oriented and Confused and talks inappropriate and understandable words.	11	30.5%	34	94.4%	9.652	0.001*
	-observe if patient talks incomprehensible sounds	0	0.0%	34	94.4%	10.440	0.001*
	-observe if there is no verbalization of any type	10	27.7%	35	97.2%	9.655	0.001*
	-gives patient simple command and observes if patient responds.	12	33.3%	34	94.4%	9.600	0.001*
Motor response	-gives painful stimuli and observes if patient uses arm and attempt to attempt to removes stimuli / pressure.	8	22.2%	34	94.4%	10.050	0.001*
	-observes if patient's arm withdraws to pain	7	19.4%	32	88.9%	10.002	0.001*
	-observes if there is flexion of arm to the body in response to pain	1	2.7%	34	94.4%	10.294	0.001*
	- observes if there is flexion of arm away from body in response to pain	0	0.0%	25	70.3%	7.926	0.001*
	- observes that patient is flaccid and no response to pain flexion of arm to the body in response to pain	0	0.0%	21	60.4%	6.932	0.001*

Table 4 Comparisons of mean nurses' knowledge total score regarding GCS throughout the program intervention.

Variables	Mean	±SD	t	p
Knowledge pre educational program	4.07	± .923	----------	
Knowledge immediately post educational program	56.94	±11.79	39.094	0.001

Table 5 Comparison of meannurses' practice total score regarding GCS throughout the program intervention.

Variables	Mean	±SD	t	p
Practice pre training program	7.09	±8.43	----------	---------
Practice immediately post training program	98.41	±7.76	70.145	0.001

Table 6 correlation between nurses' knowledge &practice total score regarding GCS throughout the program intervention

Total practice score	Total knowledge score r	p
Practice pre training program	0.111	0.245
Practice immediately post training program	-0.028	-0.770

Table 7 Correlation between nurses' knowledge and practice regarding GCS and their socio demographic throughout the program intervention.

Variables	Age rho	Age p	Educational level rho	Educational level p	Year of experiences rho	Year of experiences p
Knowledge pre educational program	0.203	0.033	-0.233	0.014	-0.219	0.021
Knowledge immediately post educational program	-0.224	0.018	-0.108	0.261	-0.68	0.480
Practice pre training program	0.181	0.057	0.005	0.960	-0.005	0.959
Practice immediately post training program	0.007	0.939	-0.167	0.079	-0.080	0.407

There are statistically insignificant relationship between knowledge and practice regarding GCS and their sociodemographic throughout the program intervention where p- value p>0.05.

Table (8): demonstrates Correlation between nurses' and practice in relation to GCS throughout the program intervention according to their working area. There are statistically insignificant relationship between knowledge and practice regarding GCS and their working area throughout the program intervention where p>0.05.

DISCUSSION

GCS is a reliable and valid tool to measure the level of consciousness. Nursing professionals are responsible for ongoing monitoring and identification of altered consciousness level in patients. Hence it is vital for nurses to acquire accurate knowledge and skills in using GCS [15]. Results of the several studies indicated that all items related nurses' knowledge and practice concerning Glasgow coma scale were inadequate and the authors Of those studies recommended that it is crucial need to education the nurse and to employ more qualified and knowledgeable and skillful nurses with high standards oriented competencies to apply through neurological assessment particularly Glasgow coma scale in neurosurgical wards. So the aim of the study was to evaluate impact of an educational program for nurses' knowledge and practice about GCS [15,16].

The results of the present study revealed that the majority of studied nurses were at the age group 30 years and less than 40 years, and The results of the present study revealed that most of them graduated from secondary nursing schools all studied nurses were secondary nursing schools graduates, had an

experience from 10 to less than 20 years, and all studied nurse didn't attend any course about GCS. This results was agreeing with Nihmatolla, *et al*. [17] who reported that (95%) of the nurses staff had no training session after graduation about GCS.

Table 8 Correlation between nurses' and practice in relation to GCS throughout the program intervention according to their working area.

Variables	Working areas				ANOVA (F)	P-value
	Intensive care MEAN±SD	Emergency Room MEAN±SD	Male Internal medicine MEAN±SD	Female Internal medicine MEAN±SD		
Knowledge pre educational program	11.7+58.7	12.8+61.4	10.7+53.6	11.7+56.0	1.235	0.294
Knowledge immediately post educational program	9.7+80.2	8.2+81.3	15.7+70.1	11.6+78.9	2.447	0.068
Practice pre training program	11.5+8.0	6.2+5.7	5.5+6.4	8.3+7.2	0.229	0.876
Practice immediately post training program	1.0+99.7	8.9+97.6	1.0+99.7	9.2+98.08	0.386	0.764

While this result was disagreed with result obtain from study done by *Batool, et. al.* [16] who found that most of the nurses (19.0%) were of age group (28-32) years old, 44.0% of them graduated from Nursing Institute, 34.0% of them had experiences from 1 to less than 5 years, and 27.0% of them had one trained.

The assessment of the nurses' knowledge and practice regarding GCS before program implementation, in the current study, has shown that almost all of studied nurses had statistically significant lacking in the basic knowledge and practice about GCS.

This result may be due to that most of the studied nurses were diploma graduates, working since 10 years ago, poor theoretical knowledge and demonstrated willingness and motivation for courses on GCS, and their knowledge during school study years might be insufficient for such a specialized service or for gotten. In addition to, there is a lack of supervision and evaluation system for nurses during their working. These points to an area of deficient continuing nursing education.

These results were supported by *Nguyen* [15] who found that findings of Vietnamese study point out the gap between the theoretical knowledge and performance of GCS in the Vietnamese nurses. Although most Vietnamese nurses had suitable theoretical knowledge of the GCS, they were not able to apply it to analyze a clinical situation. Furthermore their basic knowledge of GCS was not enough to ensure accurate performance of GCS scoring. Therefore the study suggested that a well-developed GCS training program should be delivered to the nurses to contain accuracy of assessment of the consciousness level using GCS, which ultimately results in improving the quality of nursing care. In additional to *Ahamed, and Dutta* [11] who found thatout of 60 participants, 44 (55%) staff nurses had unsatisfactory knowledge level.

Concerning the effect of the intervention program, the findings of the present study have shown statistically significant improvements in nurses' knowledge and practice regarding GCS. This was noticed immediately after program implementation in comparison to pre-test. This improvement may be due to the in-service training program which did not only stress the acquisition of knowledge of GCS but also stresses on practical training to gain information and change work practices using adequate courses or sessions, increased motivation which is needed for achievement of the desired objectives, availability of sources of information as booklet, pamphlets as well as provision of sufficient materials and supplies needed for achievement of the work.

For the training program, all nurses participated have taken booklet, pamphlets and handouts for the program objectives and content as well as sufficient materials and supplies were provided for the training and not provided at the actual work situation.

These results are congruent with *Ahamed, and Dutta*[11] who reported that knowledge and practice level of nurses significantly improved after the teaching program as evident from the obtained 't' value (knowledge $p<0.20$, practice $p<0.001$). Thus it can be depicted that there is an obvious role of continuing professional development of nurses which have ultimate reflection in better client care outcome. To produce competent and knowledgeable nurse, emphasis should be made on in-service education program and frequent evaluation of nurse's performances which will help in proper assessment and management of clients through monitoring and formulating early diagnosis. Nursing supervisors and in-charges should take the initiation to continue staff development program in the unit. *Nguyen* [15] also ensured the importance of effective education or training for nurses about GCS. Continuing education for using GCS was emphasized in the study of *Watson, et. al*.[18], they found that the more education the medical staff received regarding GCS knowledge, the more accurately they would perform. Practice training sessions by experts are highly effective because they provide standardized methods for measuring GCS to improve accuracy in using it. Evident that knowledge and practice level of nurses significantly improved after the teaching program as evident from the obtained't' value (knowledge $p<0.20$, practice $p<0.001$).

Thus it can be depicted that there is an obvious role of continuing professional development of nurses which have ultimate reflection in better client care outcome. To produce competent and knowledgeable nurse, emphasis should be made on in-service education program and frequent evaluation of nurse's performances which will help in proper assessment and management of clients through monitoring and formulating

As for the comparison between nurses' knowledge & practice total score regarding GCS throughout the program intervention. There is no statistically significant correlation between nurses' knowledge & practice total score regarding GCS throughout the program intervention. This result was supported by *Ahamed and Dutta*[11] who stated that there was no significant relationship between pretest knowledge and practice of staff nurses regarding monitoring Glasgow Coma Scale ('t' 0.03, p>

0.05). The results of the present study revealed that there are statistically insignificant relationship between knowledge and practice regarding GCS and their socio demographic throughout the program intervention where p- value p>0.05.This finding points to the successful effect of the training program about GCS to all nurses, irrespective of their age, experiences, level of education, and work areas. This result is supported by *Batool, et. al* .[16]who reported that there was non-significant relationship at p-value (0.515) level between nurses' knowledge and their socio demographic data .

CONCLUSION

The results of the present study revealed that there are statistically significant improvements immediately after program implementation and regarding nurses' knowledge and practice about GCS. Moreover, it was also found that statistically significant relation between nurses' knowledge and practice, and there is no statistically significant associations between the changes in the scores of either knowledge and practice and socio-demographic characteristics.

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