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Intensive Care Unit Nurses' Performance Regarding Caring Patients With Head Injury: An Educational Intervention

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Abstract

Head injury (HI) is one of the major causes of disability, death and health related costs. The primary goal of nursing management in head injury is to maintain adequate cerebral tissue perfusion. This study aimed to evaluate the intensive care unit nurses' performance regarding caring patients with head injury: Setting at Zagazig University Hospitals. Material and methods: a quasi-experimental (pre/post and follow up-test design) research design was utilized. A convenient sample of (45) nurses who provide direct care for head injury patients in neurological and stroke Intensive care Unit. Data was obtained using two main tools; head injury care knowledge assessment questionnaire with the socio-demographic data sheet, and head injury care practice observational checklists. The instructional intervention was designed based on an extensive revision of the related, recent literature. The intervention was delivered throughout ten weeks. Each week involved three sessions. Every session lasts about forty to sixty minutes. Nurses were divided into 9 groups, 5 nurses each. Results revealed that the mean knowledge and practice scores of nurses are increased immediately after implementation of the program with a significant statistical difference. This increased level slightly decreased following two months of program implementation. In addition, a positive correlation was found between knowledge and practice scores of the study subjects. Therefore, the two stated research hypothesis were supported. Conclusion educational intervention has a positive effect in developing critical care nursing performance regarding caring patient with head injury.

Keywords: intensive care, performance, head injury, educational, intervention

1. Introduction

Head injury (HI) is one of the most common cause of death and disability worldwide .Every year, millions of people succumb to traumatic brain injuries most of them products of car crashes. It is unfortunate that Egypt occupies first place worldwide in the incidence of road accidents at a rate of 60 victims per day and that based on latest statistics carried out by the Egyptian Central Agency for Mobilization and Statistic Egyptian Central Agency 2016. However, it is the leading cause of mortality and disability among young individuals in high-income countries, and globally the incidence of head injury is rising sharply, mainly due to increasing motor-vehicle use in low-income and middle-income countries. WHO has projected that, by 2020, traffic accidents will be the third greatest cause of the global burden of disease and injury (Shehab, et al, 2018).

Head injury is injury of the scalp, skull, or brain. These injuries can range from a minor bump on the skull to serious brain injury. Injury, including traumatic brain injury (HI), it has been major cause of morbidity and mortality worldwide, especially in children and young adults. It has been continuing a difficult problem in intensive care units (Sole et al., 2013). Each year, 1.1 million traumatic brain injury occur, resulting in 50,000 immediate deaths and hospitalization of 235,000 individuals. Males are 1.5 times as likely as females to sustain traumatic brain injury (Seliman, et al., 2014).

Intensive care unit (ICU) nurses are responsible for the continuous monitoring and maintenance of physiological values associated with HI. Therefore, nurses as health care team members are the best positioned to detect and prevent secondary head injury. However, nurses vary in their practice, and little is known about how ICU nurses manage secondary head injury. Evidence-based guidelines for care of HI patients have been established, but the extent to which these guidelines influence nursing practice in the management of secondary head injury (McNett et al., 2010) and (Seliman, et al., 2014).

Nursing management intervention for HI patients at our institution resulted in significant improvements in morbidity and mortality, ICU and hospital lengths of stay, and hospital charges. Consequently, it is essential that nurses demonstrate that the care they provide is based on good clinical evidence where possible. Therefore, this study was conducted to design and implement nursing management protocol for head injury patients based on their needs. Finally, the competent nurse in the interpretation of the Glasgow coma scale in head injury leading to develop a proper nursing plan based on the actual needs of the patient, helping in the early detection of potential health problems, and prevents serious complications which contribute to improve the quality of nursing care which reflects positively on patient outcome (Singh, et al., 2016) and (Teles, et al., 2013).

1.1 Significance of the Study

Head injury is the commonest cause of death in people aged under 40 years in our society and the global "burden of trauma" is set to increase over the next 20 years Brain Trauma Foundation.; American Association of Neurological Surgeons and Congress of Neurological Surgeons (2007). Provision of such knowledge and practices related to the head injury nursing management would be beneficial for nurses in different ways. It could have a direct positive reflection upon the quality of patient care, and could support the important role of the nurse related to head trauma nursing management. In addition, it might generate an attention and motivation for further researches into this area. This improved patient's outcomes and shorten patient's length of ICU stay. Therefore, the current study was carried out to evaluate the intensive care unit nurses' performance regarding patients with head injury: An educational intervention at Zagazig University Hospitals.

1.2 Aim of the Study

The present study aimed to evaluate the intensive care unit nurses' performance regarding patients with head injury through the following:

1.2.1 Assessing Nurses' Performance (Knowledge and Practice) Level Regarding Head Injury

1.2.2 Developing and Implementing Theoretical and Practical an Educational Intervention Regarding Head Injury

1.2.3 Examining the Effect of Theoretical and Practical an Educational Intervention on Nurses' Knowledge and Practice

1.3 Research Hypotheses

1.3.1 Post Implemented the Theoretical and Practical an Educational Intervention Will Improve Critical Care Nurses' Knowledge and Practice Regarding Head Injury

1.3.2 There Will Be Positive Association Between Nurses' Knowledge and Practice

2. Subjects and Methods

2.1 Research Design

A quasi experimental design was utilized to achieve the aim of the current study dependent variable was the level of nurses' performance and Independent variable was theoretical and practical an educational intervention

2.2 Setting

The present study was conducted at the neurological & stroke intensive care unit, and neurosurgical ICU at Zagazig University Hospitals, Egypt.

2.3 Sample

A convenient sample of total 45 nurses providing direct care to neurological patient in the above-mentioned areas.

2.4 Tools of Data Collection

Data were collected using two tools in order to achieve the aim of the study. The researcher developed two tools after reviewing the related literature.

Tool one: nurses' head injury care knowledge questionnaire. This tool was assessed nurses' knowledge about head injury nursing management before and after conducting the intervention. This tool covering 36 aspects of nurses' knowledge regarding head injury nursing management including anatomy and physiology of head and brain (6 items),causes of head injury (8 items), diagnosis of head injury (8),symptoms of head injury (8) and finally nursing management of the head injury. Additionally, tool (I) was initiated to collect socio-demographic characteristics of nurses such as age, educational level, job title, years of working experience in the ICUs.

Scoring system of the knowledge:

Total knowledge score:

Satisfactory knowledge----------≥75% of total knowledge score (more than 27 marks).

Unsatisfactory knowledge----------<75%of total knowledge score (less than 27 marks).

Tool two: Nurses' head injury care practice checklists. This tool was assessed nurses' practices regarding head injury nursing management in the clinical field. This tool covering different procedure including (vital signs assessment, oropharyngeal suction, endotracheal tube care, nasogastric tube feeding care Glasgow coma scale assessment and cardio-pulmonary resuscitation.

Scoring system of the practice:

Total practice score

Incompetent practice----------< 85% of total practice score

Competent practice ----------≥85% of total practice score.

2.5 Field Work

The study was implemented during the period from the first January 2016 to the end of January 2017 The study tools were adapted and designed by the researcher after reviewing the relevant recent literatures. Content validity and reliability test were done before starting data collection process. The data collection, pre / post and two month after educational training program were done by the researcher.

2.5.1 Validity and Reliability of the Tool

Validity test was done by 5 experts from Medical surgical nursing specialty and 2 from neurological consultants. The nurses' knowledge questionnaire sheet reliability were confirmed by Cronbach's alpha coefficient (alpha= 0.86for nurses' knowledge questionnaire & alpha=0.93 for nurses' performance sheets).

2.5.2 Pilot Study

A pilot study was carried out on 10% of the total study sample to test the clarity, feasibility and applicability of the tools of the study. Pilot subjects were later included in the study as there was no radical modifications in the study tools.

2.5.3 Administrative and Ethical Considerations

The researcher explained the purposed of the study and their rights as a study participant, including anonymity and confidentiality, their rights to withdraw from the study at any time. Informed consent was obtained from the nurses participated in the current study.

2.5.4 Educational Program Intervention: Implemented Through Different Four Phases

2.5.4.1 Assessment Phase

The researcher were keen to assess nurses' knowledge regarding head injury management as a pretest before the evaluation of their practice, so as not to affect the content of knowledge questions on the pre nurses' practice test. The researcher interviewed each nurse individually according their available time and asked them to answer and fill the self-administer questionnaire sheet about their knowledge regarding head injury management and also asking them write what they wanted and needed to know in relation to neurological assessment; which involve the learners in the planning of the program and encouraging them to formulate their learning goals, which provides a flexible teaching focus on the learner's demands and not on the teacher's view of what the learners need to know. Evaluate their practice by used head injury management form and compared their results to the score given by the researcher.

2.5.4.2 Planning Phase

Theoretical and practical educational program was developed according to predetermine actual nurses need (pretest). It consisted of two parts (theoretical & practical) as follows: Theoretical part: it contains the following items; General knowledge regarding head injury management (definition, indication & importance), head injury management components, Scores for each component and minimum & maximum scores of head injury management. Practical part: demonstration and re-demonstration regarding head injury management. Method of teaching used was presentation & discussion by data show (computer) &Handout.

2.5.4.3 Implementation Phase

Head injury management educational program was delivered throughout ten weeks, each week involved three

sessions, and every session took about forty to sixty minutes, The total number of groups were 9 groups (for each 5 nurses). The session timing was between morning and afternoon shift, or throughout morning shift after giving the routine care to the critically ill patients. Theoretical sessions focused on: definition of head injury, mechanism of injury, types, severity, and complications of head injury, assessment of head injury patients, and nursing management strategies for their patients. Practical session focused on the following items: assessment, how to perform primary & secondary survey, and demonstration of nursing management for head injury patients. Divided as follows: each week involved three sessions (sixty minutes for each) in small groups about 5 nurses discussing with them in their working area to facilitate the meeting. Each session included displaying simple training videos for practical skills related to head trauma nursing management using audiovisual aids. Each nurse received the Arabic instructional booklet " head injury nursing intervention " to attract her attention, motivate and support her learning and practicing. The content of theoretical part was given for all the studied nurses at the end of the last session.

2.5.4.4 Evaluation Phase

Examining the theoretical and practical educational intervention on studied nurses was started immediately after implementation the educational intervention (posttest1) after one month of program intervention end during the follow-up periods after three months (posttest 2) were done using the same tools of the pretest. Then a comparison between the pre/post and follow-up tests was done.

2.6 Statistical Design

Statistical analysis was done using IBM SPSS 20 statistical software package. Cleaning of data was done to be sure that there is no missing or abnormal data by running frequencies and descriptive statistics. Data was presented using descriptive statistics in the form of frequencies and percentages for categorical variables, means and standard deviations for continuous variables paired test, and chi-square. Pearson correlation analysis was used for assessment of the inter-relationships among quantitative variables. The significant level of all statistical analysis was at < 0.001 &<0.05 (P value).

3. Results

This part represents the current study findings nurses' knowledge and practices regarding head injury. Findings of the present study revealed that 60% of the study subjects were in the age group less than 40 years old, while less than half (40%) of them are in the age group of 40 years old and more. Their mean age is 36.68±8.29 years. In relation to the level of education, it was noted that only (22.2%) of the study subjects were Secondary nursing education, while the majority (51.1%) of them have Technical nursing degree. As regards to years of experience, it was found that, more than two third (88.9%) of the study subjects had 5 or more years of experience in the ICU, while 11.1% had less than 5 years of experience in the CCU. The mean years of experience in the ICU were 8.63±4.39.

Table 1 illustrates personal characteristics of the studied nurses; it is indicated that 40.0% of their age group was above 40 years, with mean of 36.68 ± 8.29. In addition 60.0% of them were female, 51.1% of them had a technical nursing education. More over 66.7% of them had a year of experience from (5-<10) year with a mean of 8.63 ±4.39. Finally, only 28.9% of them had a previous training courses regarding head injury management.

Table 2 reveals the distribution of mean score of studied nurses' knowledge regarding head injury at the different three phases of assessment (pre-immediate post and follow up phases). It is showed that there was highly statistical significant differences between difference knowledge mean score at different phases of assessment.

Figure 1 illustrates the percentage distribution of total knowledge score among the studied nurses; it is indicated that more than half of them (64.4%) had unsatisfactory level of the knowledge at pre intervention phase. On the other hand 91.1% and 84.4% of them had satisfactory level of knowledge at both immediate post interventions and follow up phases respectively.

Table 3 shows distribution of total practice score among the studied nurses regarding management of head injury; it is indicated that there was a highly statistical significance.

Figure 2 illustrates distribution of total practice score of the studied nurses regarding head injury. It is indicated that 57.8% of the studied staff nurses had incompetent practice regarding caring of head injury patient at the pre-intervention phase. On the other hand 84.4, 77.7% of them had a competent practice at both immediate post and follow up phases respectively.

Table 4 Reveals that, there was a highly statistical significant positive association between head nurses knowledge, and practice at the immediate post and follow up intervention phases.

Table 1. Distribution of personnel characteristics of the studied nurses (n=45)

Personnel characteristics	No	%
Age in years		
18-25	14	31.1
25-40	13	28.9
More than 40	18	40.0
Mean ±SD	36.68±8.29	
Gender		
Female	27	60.0
Male	18	40.0
Educational qualification		
Secondary nursing education	10	22.2
Technical nursing education	23	51.1
Baculare of nursing	12	26.7
Years of experience		
Less than 5 years	5	11.1
5-<10 years	30	66.7
10-<15	10	22.2
Mean ±SD	8.63±4.39	
Marital status		
Single	13	28.9
Married	32	71.1
Training		
Yes	13	28.9
No	32	71.1

Table 2. Distribution of studied nurses knowledge score regarding head injury (n=45)

Item		Pre and post intervention				Pre and follow up intervention			
		Pre-intervention Mean ±SD	Post intervention Mean ±SD	Paired t test	P value	Pre-intervention Mean ±SD	Follow up Mean ±SD	Paired t test	P value
Anatomy and physiology of head and brain.	**6**	3.0889±1.47	5.2444±93	-8.415	<00.001**	3.0889±1.474	5.0000±1.167	-5.791	<00.001**
Causes of head injury	**8**	4.4222±1.65	6.9778±98	-7.940	<00.001**	4.4222±1.658	6.8000±1.140	-6.938	<00.001**
Diagnosis of head injury	**6**	3.6222±1.26	5.4444±86	-7.446	<00.001**	3.6222±1.266	5.3556±883	-7.137	<00.001**
Symptoms of head injury	**8**	5.4889±1.45	7.2889±84	-7.809	<00.001**	5.4889±1.455	6.9111±1.183	-5.256	<00.001**
Nursing management of head injury	**8**	4.9333±1.80	7.1778±1.09	-7.608	<00.001**	4.9333±1.801	7.0222±1.117	-5.979	<00.001**
	36	21.5556±4.8	32.1333±2.0	**14.77**	<00.001**	21.5556±4.84	31.0889±3.22	-9.180	<00.001**

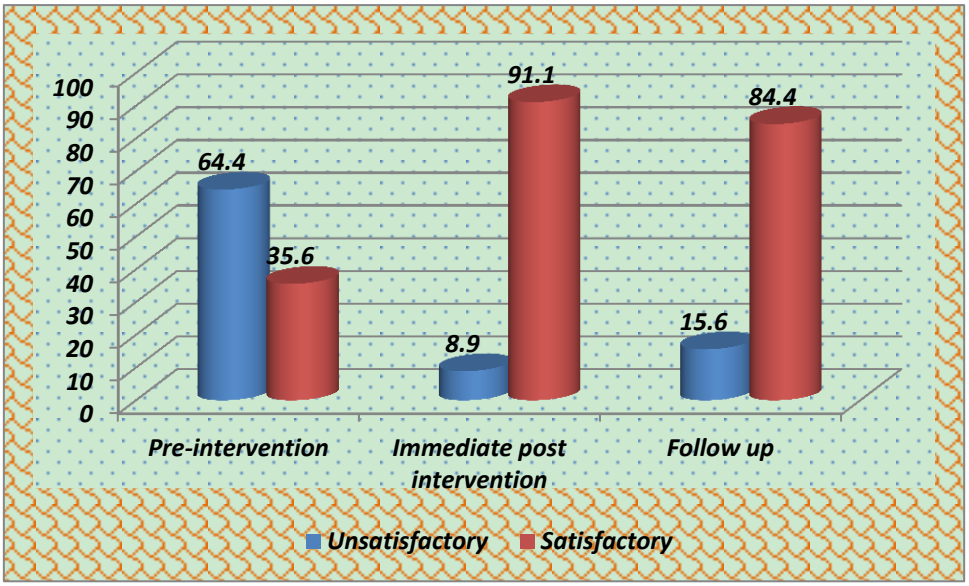

Figure 1. Percentage distribution of total knowledge score of the studied nurses regarding head injury

Table 3. Distribution of studied nurses practice score regarding head injury (n=45)

Procedure	Times of assessment	Incompetent <85%		Competent ≥ 85%		$X^2(1)$	P value	$X^2(2)$	P value
		No	%	No	%				
Vital signs assessment	Pre-intervention	16	35.6%	29	64.4%	**11.27**	**<0.001****	**6.01**	**<0.05***
	Immediate post intervention	3	6.7%	42	93.3%				
	Follow up	6	13.3%	39	86.7%				
Oropharyngeal & nasopharyngeal suction.	Pre-intervention	14	31.1%	31	68.9%	**10.94**	**<0.001****	**5.40**	**<0.05***
	Immediate post intervention	2	4.4%	43	95.6%				
	Follow up	5	11.1%	40	88.9%				
Endotracheal tube care	Pre-intervention	20	44.4%	25	55.6%	**8.94**	**<0.001****	**5.00**	**<0.05***
	Immediate post intervention	7	15.6%	38	84.4%				
	Follow up	10	22.2%	35	77.8%				
Glasgow coma scale assessment	Pre-intervention	30	66.7%	15	33.3%	**16.17**	**<0.001****	**10.00**	**<0.05***
	Immediate post intervention	11	24.4%	34	75.6%				
	Follow up	15	33.3%	30	66.7%				
Nasogastric tube feeding	Pre-intervention	23	51.1%	22	48.9%	**8.08**	**<0.001****	**4.63**	**<0.05***
	Immediate post intervention	10	22.2%	35	77.8%				
	Follow up	13	28.9%	32	71.1%				
Cardiopulmonary resuscitation	Pre-intervention	19	42.2%	26	57.8%	**5.18**	**<0.05***	**4.12**	**<0.05***
	Immediate post intervention	9	20.0%	36	80.0%				
	Follow up	10	22.2%	35	77.8%				

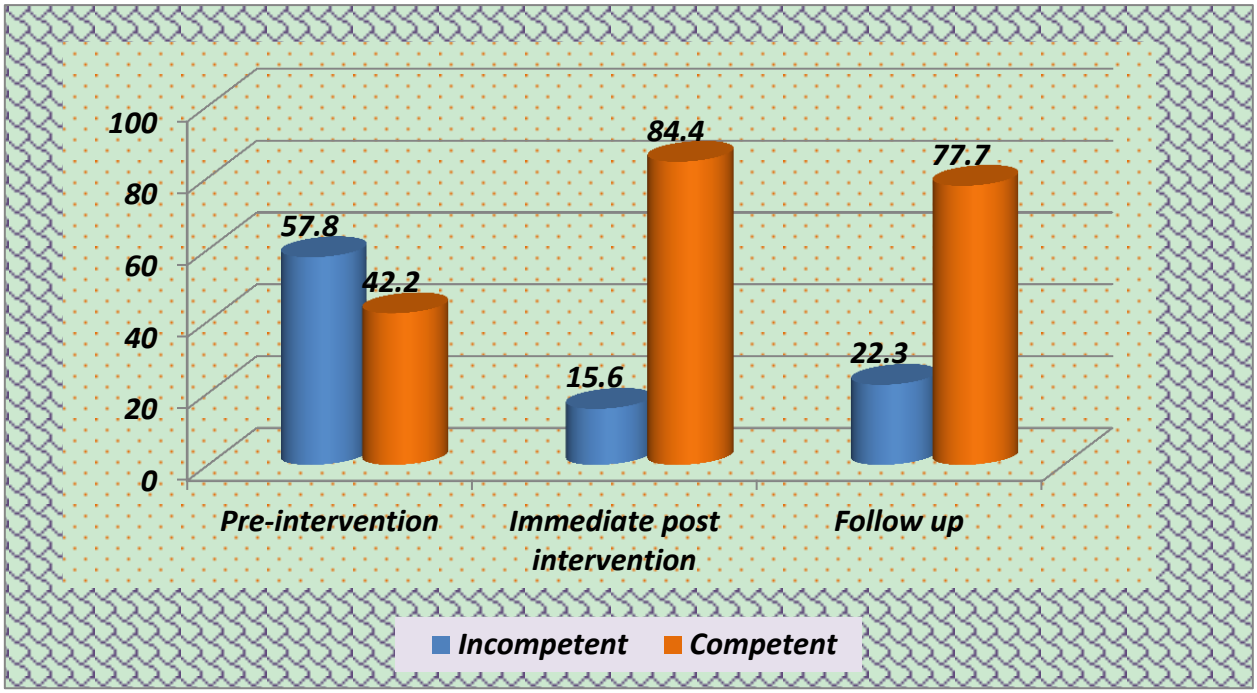

Figure 2. Percentage distribution of total practice score of the studied nurses regarding head injury

Table 4. Correlation between studied nurses' knowledge and practice scores at different phases of intervention

Total knowledge score	**Total practice score** Pre-intervention		Immediate post intervention		Follow up	
	R	**P value**	**r**	**P value**	**R**	**P value**
Pre-intervention	.254*	<0.05*	-	-	-	-
Immediate post intervention	-	-	.657**	<0.001**	-	-
Follow up	-	-	-	-	.546**	<0.001**

4. Discussion

The result of the present study shows a positive effect of an educational intervention on critical care nurses' performance regarding caring of head injury. In addition, the result of the present study supported the stated hypothesis that, there was a highly significant improvement of knowledge and practice level at both immediate post intervention and follow up phases as compared with pre intervention phase.

Nursing care for HI patients is more necessary in the ICUs that have effects on HI patients' outcome. Therefore, ever more important that trained nurses to be equipped with the appropriate knowledge and support to meet the unique needs of each patient competently (Carter & Cumming 2014). The researcher observed that the nurses had lack of knowledge regarding nursing care of HI patients at pre-intervention phase. Therefore, appropriate preparation of nurses is a vital component in providing quality care to HI patients and their families (Choudhary, 2009).

Regarding to socio-demographic characteristics, most nurses were females and about less than half of them above (40) years old and also more over (66.7%) of them had years of experience from five to less than ten years. Finally, only 28.9% of them had a previous training courses regarding head injury management. It may be due to the majority of Egyptian nurses were graduate of secondary nursing schools. This socio demographic findings were consistent with (Seliman et al., 2014) indicated "a study to evaluate impact of a designed head trauma nursing management protocol on critical care nurses' knowledge and practices at emergency Hospital Mansoura University, Cairo, Egypt", the study revealed that the majority of nurses were in the age group (30 years old). In addition, the majority of studied nurses had secondary nursing education degree. Finally, study findings indicated that not all of studied nurses units had trained and there is no protocol of care. This may be due to those training courses at hospital not included courses regarding management of head injury.

The result indicated that there were high statistical significant differences in knowledge scores related to all

items about initial care provided to head injury patients' throughout the program intervention among studied nurses ($p<0.001$). There was (35.6%) before intervention immediately after (91.1%) 1months after and (84.4%) 3 months after program intervention.

This finding agree with (cook et al., 2013) who studying "the effect of an educational intervention on nursing staff knowledge, confidence, and practice in the care of children with mild traumatic brain injury". A 25 trauma core nurses were assessed and then reassessed (1) month post intervention. The results revealed that mean scores of nurses' knowledge before completing the educational module was 33.6%; but after the educational program, the mean scores increased to become 95% and79.2% respectively. This in the same line of the current study findings.

In the current study, there were high statistical significant differences in knowledge scores related to basic care of head injury patient's throughout the program intervention. The result indicated improvement in the total score. On the other hand, findings of the current study reported a gradual decrement in nurses' knowledge by time over one and three months post program implementation. In this respect (Mansour, 2014) emphasized the result reporting a decline with limited value in nurses' knowledge level after (2) months period, than immediately after the program implementation.

An obvious improvement in nurses knowledge scores about general care of head injury patients were documented post program implementation as compared to their preprogram with highly significant statistically differences ($p<0.001$). This improvement might be related to the fact that majority of them are secondary school nurse, not receiving any previous training about care of head injury patients. In addition to, the highly expressed need of nurses to learn more about head injury nursing management.

This finding agree with (seliman, et al., 2014 and (Taha, 2004) who was studying the impact of a training program provided for nurses working with the comatose patients in the critical care units, Zagazig university hospitals. His sample constitutes 36 nurses working in I.C.U, neurological and emergency medical units. The study reports an improvement in nurses knowledge scores after implementation of the program with a highly significant statistical differences ($p<0.001$).

The researcher used statistical tests to identify the direction of differences in practice scores, it was clear that the significant difference was between the pre and all post program scores. The improvement of nurses' practices as a result of implementing a training program was well recognized and supported by many researcher around the world like (Abdelmowla, 2015). Moreover, the current study revealed unsatisfactory nursing practices regarding head injury nursing care in the intended ICU. At the pre-intervention phase these findings are agreed with this may be due to shortage of nursing staff to provide high quality nursing care for head injury patients.

In a comparative study conducted at the Intensive Care Unit at Tanta Emergency Hospital by (Ghoneim et al., 2012) the study aimed to evaluate the impact of implementing nursing care protocol on moderate head injured patient's outcome, the results indicates that the implementing nursing care protocol for moderate head injured patients associated with polytrauma had best effect on minimize the incidence of all systemic complications, decrease morbidity as well as mortality rate.

Also these results agree with (Abd el-Aziz, 2014) who study effect of educational program on nurses, knowledge and skills about oral care for traumatized patients; mentioned that The study concluded that the education program lead to significant improvement in nurse's knowledge and skills about oral care procedure.

Another study done by (Ali et al., 2010) the aim to develop, implement and evaluate an educational training program for newly graduate nursery school teachers about first aid of some emergency situations occurring to preschooler. The results revealed that highly significant improvement of practice of the studied group in the posttest in comparison to pretest practice increased, on the average, from 0-10% to 80-95% in first aid of wound, fractures, epileptic convulsions, fainting, epistaxis, suffocation and burn.

The correlation between nurses' total knowledge score and total practice score. Findings of the present study reported that there is a positive correlation between nurses' knowledge and practice. Findings of the present study reported that there is a positive correlation between nurses' knowledge and practice. This agree with (Shahin et al., 2012; Mohammed &Taha 2004) and (Seliman, 2014) who stated that a highly statistical significant correlation between participants' scores of knowledge and practice in pre-program, post program, 1 month and 2 months following the instructional program.

Finally, before the program, the majority of nurses unsatisfactory and less of total score knowledge and practice related to care of head injury while the majority of them had satisfactory of total knowledge and practice immediately after educational intervention. This explained by the fact that not all of studied nurses attended any

training courses in caring of patients with head injury. Also, reflect positive effect of the program on nurses' knowledge practice and importance of their application.

In connection with the indicators of program success, the present study revealed that there is an obvious improvement in the follow up test compared to the pretest. From the researcher' point of view, this may be due to the increased self-confidence of the nurses following the implementation of the educational intervention because of increased competent level of knowledge and practice. This result is consistent with the (Eldesouky, 2016) who confirmed in a similar study that improved nurse information leads to improved performance and increases self-confidence, which contribute to the quality of care and also ensured that the continuous professional development of nurses is ultimately reflected in the best care of patient outcome. From the previous conclusion, it is clear that the third hypothesis had been achieved

5. Conclusion

In the light of the present study, it was concluded that, the theoretical and practical an educational intervention had a positive effect in improving nurses' knowledge and practice regarding head injury in intensive care unit. There was also a positive correlation between levels of nurses' knowledge as regards their practice.

6. Recommendations

The study recommended continuous educational programs should be planned on regular basis to nurses' caring of head injury patients for enhancing nurses' knowledge and practice to achieve high quality of care. Nurse's managers and educators should develop educational intervention provided to all nurses caring for unconscious patient to increase and update their knowledge and practice concerning suction, endotracheal tube care, GCS assessment, nasogastric tube feeding and CPR technique. Nursing educators should Establishing and distributing a manual procedure book to all nurses who were working in intensive care units including standard of techniques that must be applied and followed. Replication the study on different settings to be generalizes the results of current study.

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