IMPACT OF AN EDUCATIONAL PROGRAM ON NURSES' KNOWLEDGE AND PRACTICE REGARDING CARE OF TRAUMATIC BRAIN İNJURY PATIENTS AT SRI LAKSHMI MEDICAL CENTER AND HOSPITAL

Sasikala.K[1], Dr. V. Selvanayaki[2]
[1] Ph.D (Nursing) Research Scholar, Vinayaka Missions Annapoorana College of Nursing, Vinayaka Mission's Research Foundation (Deemed to be University), Salem, Tamilnadu, India. souganthika@gmail.com
[2] Professor, Vinayaka Missions Annapoorana College of Nursing, Vinayaka Mission's Research Foundation (Deemed to be University), Salem, Tamilnadu, India. selvasahana2009@gmail.com

Abstract
Background: Aim of this study: This study was aiming to evaluate Impact of an Educational Program on Nurses' Knowledge and practice Regarding Care of Traumatic brain injury Patients at Intensive Care Unit Sri Lakshmi Medical Center and Hospital
Research design: Quasi experimental study design was used.
Setting: The study was conducted at intensive care unit at Sri Lakshmi Medical Center and Hospital, Coimbatore.
Subject: The study involved all available nurses' worked in intensive care unit at Sri Lakshmi Medical Center And Hospital, Coimbatore.
Tool of data collection: part (1): Structured Interview Questionnaire tool it includes demographic data, part (2) Nurse's Knowledge regarding care of traumatic brain injury patients, part (3) observational checklist about care of traumatic brain injury patients.
Results: Total mean knowledge score regarding care of traumatic brain injury patients were un satisfactory before the program implementation and satisfied post program implementation.
Conclusion: Nurse's level of knowledge and practice in caring of traumatic brain injury patients was un satisfactory before the program implementation and satisfied post program implementation in all items.
Recommendation: The study recommended continuous educational programs should be planned on regular basis to nurses' caring of traumatic brain injury patients for enhancing nurses' knowledge and practice to achieve high quality of care.
Keyword: Peripheral Arterial Disease, Hyperlipidemia, cholesterol, lipophilic molecule, Out Patient Department, structured knowledge questionnaire

INTRODUCTION

Traumatic brain injury (TBI) constitutes a major health and socioeconomic problem throughout the world Ghajar, 2000 and Cole, 2004. It is the leading cause of mortality and disability among young individuals in high- income countries, and globally the incidence of TBI 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 Finfer and Cohen, 2001.A traumatic brain injury (TBI) is an injury that disrupts the normal function of the brain and can be caused by a bump, blow or jolt to the head, rapid acceleration and deceleration of the calvarium, or a penetrating head injury Marr and Coronado, 2004. In 2010, the Centers for Disease Control and Prevention estimated that TBIs accounted for approximately 2.5 million emergency department (ED) visits in the United States.Of these, approximately 87% (2,213,826) were treated and released, 11% (283,630) were hospitalized and discharged, and approximately 2% (52,844) died CDC, 2016.

The leading causes of non-fatal TBI in the U.S. are falls (35%), motor vehicle- associated accidents (17%) and strikes or blows to the head from/against objects, including sport injuries (17%) Faul et al., 2016.

The severity of TBIs is typically categorized using the Glasgow Coma Scale and can range from: (a) mild; (b) moderate; to (c) severe. TBI outcomes are often determined by using the Glasgow Outcome Scale, which categorizes gross neurobehavioral ranges of recovery:

(a) dead;
(b) vegetative state;
(c) severe disability;
(d) moderate disability;
(e) good recovery. An alternative prognosis, using Russell and Smith's classification, is divided as severe or very severe Nakase- Richardson, 2011. Considering that detailed

classification helps to determine the severity of injury, informs treatment options and is used to assess prognosis and functional recovery, recent suggestions have indicated that better diagnostic and assessment criteria are needed in the TBI field Brenner et al, 2009 and Turan et al, 2016.

AIM OF THE STUDY:
This study was aiming to evaluate impact of an educational program on nurses' knowledge and practice regarding care of traumatic brain injury patients at intensive care unit at Suez canal university hospital.

RESEARCH HYPOTHESIS
For fulfilling the aim of this study the following hypothesis was formulated:
There will be positive changes in nurses' knowledge and practice after implementing educational program on nurses' knowledge and practice regarding care of traumatic brain injury patients at intensive care unit at Suez canal university hospital.

Materials and Method Research Design
A quasi-experimental study design was used for conduction of this study.

Setting
The study was conducted at intensive care unit at Suez canal university hospital at Ismailia city.

Subject
The study involved all available nurses' worked at intensive care unit at Suez canal university hospital at Ismailia city about (30 nurse).

TOOL OF DATA COLLECTION
Part (1): Structured Interview Questionnaire
It was developed by the researcher based on the review of recent related literature to assess the nurses, knowledge regarding nursing care provided to traumatic brain injury patients. It Included items related to demographic characteristics of the studied nurses such as age, gender, marital status, level of education, years of experience and attending training program related to traumatic brain injury.
Part (II): Nurses, knowledge assessment
It included a group of questions to assess the nurse's knowledge in relation to key components of trauma and traumatic brain injury care.
Part (III): Nurses, practice assessment
This tool was assessed nurses' practices regarding traumatic brain injury care in the clinical field. This tool covering eleven different aspects composed of 21 checklists were included 225steps.

Scoring system
All questions was measured and divided by the number of questions to obtain the mean knowledge and practice of each nurse. Knowledge and practice below 75% was considered unsatisfactory while those equal to or above 75% was considered satisfactory.

OPERATIONAL DESIGN
The operational design of this study included preparatory phase, content validity, pilot study, and field work.

Preparatory Phase
It included reviews of current and post local and international related literatures, and theoretical knowledge of various aspects of the study using books, articles, and internet periodicals and magazines in order to develop the data collection tools.

Content Validity
It was ascertained by a Jury consisting of nine experts of professors and lecturers from the medical surgical department; Faculty of nursing and from medicine, surgery and neurology department Faculty of Medicine, Suez canal University who revised the tools for clarity, relevance, comprehensiveness, understanding and ease for implementation, according to their opinion modifications were applied.

Pilot study
Pilot study had been undertaken before starting the data collection phase. It was carried out on 10% of participants to test the feasibility and applicability of the first and second tools and to estimate the time needed to complete the tools according to the pilot study necessary modifications were done. The subjects included in the pilot study were excluded from the study sample.

Field work description
Field study was conducted from the beginning of August (2015) to the end of August (2016). The study was carried out through the following phases:

- ***Assessment phase***

In this phase after finalization of the tools, the researcher assessed nurses' learning needs using Tool II. Tool II was designed to assess nurses, knowledge related to providing care for traumatic brain injury patients. The researcher introduced this Tool to each nurse and asked them to fill it out. The time taken to fill the tool was from 30 minutes to 60 minutes. Moreover, the researcher assessed available place, time, equipment, supplies, and instructional materials for conduction of patients care.
Assessment of clinical practices provided by nurses to traumatic brain injury patients and their families were evaluated using tool III to determine level of achievement of care practice. Direct observation was conducted by the researcher to appraise nurses' practical level; each nurse was observed by the researcher throughout the different shifts, on an average 8 hours a day- 4 days a week for one month using tool III, the researcher was filling out the observational checklists and was documented nurses' practices related to brain trauma care.

- ***The program of care development phase***

The program of care was developed based on the identified needs and demands of nurses gathered in assessment phase and review of related literature. This phase included the following;

Setting objectives
The aim of program was to improve nurses knowledge and practice related to care of traumatic brain injury patients.

Preparation of the content
Content covered all areas about caring of traumatic patients.

Planning of action
In this phase, the researcher designed a plan for program of care implementation.

Implementation phase

After official permission was taken from the concerned study setting. The researcher took the list of nurses who met the inclusion criteria. The participated nurses were divided into 6 groups, each consisted of five nurses.

Each group was attended a conference room separately during morning and afternoon shift. The purpose and aim of the study was explained, then the researcher collect data about demographic characteristics using tool

(I). This session is considered as introductory session.

At the beginning of each session, pretest related to the session content was provided to participants, followed by hands out. During the session, the researcher teach content in a clear, simple language using lectures, illustrative pictures and discussion giving feedback using positive verbal words.

At the end of each session the researcher, close the session by summary for the main points. Posttest was at the end of the 4th session using toll II.

Practical session focused on the following items: assessment, how to perform primary & secondary survey, and demonstration of nursing care for traumatic brain injury patients. divided as follows: each week involved three sessions (sixty minutes for each) in small groups about 10 nurses discussing with them in their working area to facilitate the meeting. Each session included displaying simple training videos for practical skills related to brain trauma nursing care using audiovisual aids. Each nurse received the Arabic instructional booklet " brain trauma nursing care protocol " to attract her attention, motivate and support her learning and practicing.

EVALUATION PHASE

The program of care was evaluated three times using tool II and III. Tool II and III used to evaluate the studied nurses. Evaluation was done three times, first time: immediately after program implementation, second time after one Months, and third time: after three month.

ETHICAL CONSIDERATION

Explain the aim of the study to the directors of Intensive Care unit to take their permission to start this study**.** Oral consent was taken from the study subjects after explaining the aims and nature of the study to them, and they were assured that the information collected would be treated confidentially and used for the research purpose only, and they have the right to withdraw from the study at any time.

STATISTICAL DESIGN

The collected data organized, tabulated and statistically analyzed using statistical package for social science (SPSS) version 16 for windows, running on IBM compatible computer. Qualitative data (categorical data) were expressed as relative frequency (number) and percent distribution, and for comparison between groups, the Chi square (X2) or Mann-Whitney test (Z) was calculated. Quantitative data were expressed as mean± SD, and for comparison between two means, the student (t) test was calculated. For interpretation of results, the p value ≤ 0.05 was considered significant.

RESULTS

Table (1) shows the demographic data of studied nurses. It revealed that (86.7%) of the studied nurses were female and (76.7%) their age from 20 to 30 years. There were 63.3% of studied nurses had secondary diploma, while only (10%) had nursing bachelor; and (76.7%) had more than 4 years of experience. All studied nurses (100%) have not any previous training course about trauma care.

Table (2) Shows that there were high statistical significant differences in knowledge scores related to all items about initial care provided to traumatic brain injury patients' throughout the program intervention among studied nurses ($p<0.001$). There was (33.3%) before intervention ,(100%) immediately after ,(100%) 1months after and (100%) 3 months after program intervention .

Table (3) shows that there were high statistical significant differences in knowledge scores related to basic care of traumatic brain injury patient's throughout the program intervention. The result indicated improvement in the total score ($p<0.001$).

Table (4) shows differences in nurses' satisfactory knowledge about general care of traumatic brain injury patient's throughout the program intervention. The result indicated an improvement in various areas and their total score. Theses improvement were highly significant ($p<0.001$).

Table (5) shows difference in nurses' satisfactory knowledge about specific care of traumatic brain injury patient's throughout the program intervention. The result indicated an improvement in tow items; care of patient eyes and care when ear bleed. Theses improvement were highly significant ($p<0.001$).

Table (6) shows difference in nurses' satisfactory practice about care of traumatic brain injury patient's throughout the program intervention. The result indicated an improvement in various areas and their total score. Theses improvement were highly significant ($p<0.001$).

Table (7): percent change in the total score of nurses' knowledge about care of traumatic brain injury patient's throughout the program intervention. The highest percentage of improvement were in nurses' knowledge, between the immediate posttest and the pre- program level ($Z= 7.68$, $p < 0.001$**)

Table (8): Shows relation between nurses' knowledge score and demographic data. The results indicated that; there is no significant relation between total knowledge and level of education, age and years of experience.

Table (9): Showed that, there was significant, proportional, fair, positive correlation between total knowledge score immediately after program implementation and total practice score immediately after program implementation ($r=0.384$).

Table (1): Distribution of demographic characteristics nurses (No=30)

Items		N	%
Age	>30 years	7	23.3
	20 to 30 years	23	76.7
Marital status	Unmarried	8	26.7
	Married	22	73.3
Graduation	Bachelor	3	10.0
	technical nursing institute	8	26.7
	secondary diploma	19	63.3
Experience	2 to 4 years	7	23.3
	> 4 years	23	76.7
Training	None	30	100.0%
Gender	Female Male	26 4	86.7% 13.3%
Protocol of care	No	30	100.0%

Table (2): Differences in nurses' knowledge regarding initial principles of nursing care to traumatic brain injury patients throughout the program intervention. (No=30)

Items	Before program		Immediately after		1 months after		3 months after		X2	p
	n.	%	n.	%	n.	%	n.	%		
Patients more liable to increase intracranial pressure	0	0.0%	26	86.7%	24	80.0%	23	76.7%	62.78	<0.001**
Measuring glasco-coma scale	17	56.7%	30	100.0%	29	96.7%	28	93.3%	31.73	<0.001**
I C P must not be decrease on	22	73.3%	30	100.0%	28	93.3%	26	86.7%	11.32	0.010**
To prevent increase intra cranial pressure	1	3.3%	30	100.0%	26	86.7%	25	83.3%	80.25	<0.001**
Patient have hypoxia when	3	10.0%	30	100.0%	27	90.0%	25	83.3%	73.69	<0.001**
Co2 concentration should not exceed in tissue than	23	76.7%	30	100.0%	29	96.7%	29	96.7%	14.77	0.002*
Cerebral perfusion pressure should not decrease on	4	13.3%	28	93.3%	26	86.7%	21	70.0%	52.86	<0.001**
Measuring cerebral perfusion pressure	7	23.3%	28	93.3%	26	86.7%	24	80.0%	44.97	<0.001**
Indication on manitol	30	100.0%	30	100.0%	30	100.0%	30	100.0%	A	
Side effect of manitol	7	23.3%	28	93.3%	28	93.3%	25	83.3%	52.15	<0.001**
Nursing intervention in case of increase intra cranial pressure	16	53.3%	27	90.0%	26	86.7%	26	86.7%	16.32	0.001**
Complication of hypothermia	1	3.3%	28	93.3%	22	73.3%	19	63.3%	55.54	<0.001**
Total	10	33.3%	30	100.0%	30.0	100.0%	30.0	100.0%	72.0	<0.001**

* = significant (P≤0.05) X^2= chi square **= High significant (P≤ 0.001) *Satisfactory level of nurse's knowledge = score of 75% and more

Table (3): Differences in nurses' knowledge about basic care of traumatic brain injury patient's throughout the program intervention. (No=30)

Items	Before Program		Immediately After		1 months After		3 months after		X2	p
	N	%	n	%	n	%	N	%		
Side effect of increase metabolic rate	2	6.7%	28	93.3%	25	83.3%	25	83.3%	65.70	<0.001**
Feeding by oral	22	73.3%	29	96.7%	28	93.3%	27	90.0%	9.38	0.025**
Feeding by tube feeding	28	93.3%	30	100.0%	30	100.0%	30	100.0%	6.10	0.11
Complication of RBC transfusion	20	66.7%	30	100.0%	29	96.7%	27	90.0%	19.73	<0.001**
Total	14	46.7%	29	96.7%	28	93.3%	28	93.3%	35.72	<0.001**

* = significant (P≤0.05) X^2= chi square **= High significant (P≤0.001) N.B:- Satisfactory level of nurse's knowledge = score of 75% and more.

Table (4): Differences in nurses' knowledge about general care of traumatic brain injury patient's throughout the program intervention (No=30)

Items	Before Program		Immediately After		1 months After		3 months after		X2	p
	N	%	N	%	n	%	n	%		
Early signs and symptoms of increase I C P	27	90.0%	28	93.3%	29	96.7%	27	90.0%	1.32	0.72
Late signs and symptoms of increase ICP	0	0.0%	28	93.3%	23	76.7%	23	76.7%	66.69	<0.001**
Contra indication of Manitol	0	0.0%	27	90.0%	23	76.7%	21	70.0%	60.53	<0.001**
Contra indication of morphine	6	20.0%	28	93.3%	26	86.7%	24	80.0%	48.88	<0.001**
Total	0	0.0%	27	90.0%	26	86.7%	26	86.7%	77.17	<0.001**

* = significant (P≤0.05) **= High significant (P≤0.001) X^2= chi square N.B:- Satisfactory level of nurse's knowledge = score of 75% and more.

Table (5): Difference in nurses' knowledge about specific care of traumatic brain injury patient's throughout the program intervention (No=30)

Items	BEFORE PROGRAM		IMMEDIATELY AFTER		1 MONTHS AFTER		3 MONTHS AFTER		X2	p
	n.	%	n.	%	n.	%	n.	%		
Nursing care to pt. eyes	0	.0%	23	76.7%	20	66.7%	20	66.7%	45.01	<0.001**
Nursing care when ear bleed	0	.0%	25	83.3%	23	76.7%	23	76.7%	58.32	<0.001**
Changing position	21	70.0%	28	93.3%	27	90.0%	27	90.0%	8.42	0.038**
Contraindication of restrain	30	100.0%	30	100.0%	30	100.0%	30	100.0%	A	
Positioning of patient	30	100.0%	30	100.0%	30	100.0%	30	100.0%	A	
Total	**21**	**70.0%**	**29**	**96.7%**	**29**	**96.7%**	**29**	**96.7%**	**17.77**	**<0.001****

* = significant (P≤0.05) **= High significant (P≤0.001)X^2= chi square
N.B:- Satisfactory level of nurse's knowledge = score of 75% and more.

Table (6): Difference in nurses' practice about care of traumatic brain injury patient's throughout the program intervention (No=30)

Item	before porgram		Immediaterly after		1 months after		3 months after		X2	p
	n.	%	n.	%	n.	%	n.	%		
Tracheal Suctioning	30	100.0%	30	100.0%	30	100.0%	30	100.0%	a	
Oxygen Therapy	27	90.0%	30	100.0%	30	100.0%	30	100.0%	9.23	0.026**
SaO2 Monitoring	30	100.0%	30	100.0%	30	100.0%	30	100.0%	a	
Arterial Puncture	19	63.3%	30	100.0%	29	96.7%	26	86.7%	21.34	<0.001**
Cardiac Monitoring	27	90.0%	29	96.7%	29	96.7%	27	90.0%	2.14	0.54
CVP Measurement	28	93.3%	30	100.0%	29	96.7%	29	96.7%	2.06	0.55
DVT Prophylaxis	2	6.7%	25	83.3%	22	73.3%	19	63.3%	43.16	<0.001**
Neurological Management	0	.0%	28	93.3%	24	80.0%	19	63.3%	63.57	<0.001**
Total	**26**	**86.7%**	**30**	**100.0%**	**30**	**100.0%**	**29**	**96.7%**	**8.97**	**0.030***

* = significant (P≤0.05) **= High significant (P≤0.001) X^2= chi square
N.B:- Satisfactory level of nurse's knowledge = score of 75% and more.

Table (7): Percent change in the total score of nurse's knowledge about care of traumatic brain injury patient's throughout the program intervention (No=30)

Items	Before Program		Immediately After		1 months After		3 months after	
	n	%	N	%	n	%	n	%
Satisfied (≥ 75%)	0	0.0%	30	100.0%	29	96.7%	29	96.7%
Dissatisfied (< 75%)	30	100.0%	0	.0%	1	3.3%	1	3.3%
mean±SD	48.77±9.60		96.66±5.02		90.77±6.23		85.88±7.25	
Post_ pre	Z= 7.68, p < 0.001**							
F1_pre	Z= 7.42, p < 0.001**							
F3-Pre	Z= 7.42, p < 0.001**							

Pre= preprogram post= immediately post First follow up = F1 Second follow up = F3

Table (9) correlation between total knowledge score and practice score related to care of patients with traumatic brain injury throughout the program intervention

	Total knowledge score pre program		Total knowledge score immediately after program		total knowledge score after 1months		Total knowledge score after 3months	
	r	p	r	p	r	p	r	p
Total practice score preprogram	0.037	0.846	0.083	0.663	0.159	0.401	0.155	0.411
Total practice score immediately after program	0.142	0.454	**0.384***	**0.036**	0.193	0.307	0.188	0.402
Total practice score after 1 months	0.182	0.336	0.313	0.092	0.082	0.666	0.078	0.670
Total practice score after 3 months	0.180	0.340	0.309	0.099	0.079	0.670	0.072	0.674

r= person correlation coefficient p = probability value (significant if ≤ 0.05)
*r= (0.00 to 0.24) mean (weak or no correlation *r= (0.50 to 0.74) mean (moderate correlation)
*r= (0.25 to 0.49) mean (fair correlation) *r= (0.75) mean (strong correlation)

DISCUSSION

Traumatic brain injury (TBI) constitutes a major health and socioeconomic problem throughout the world cole, 2004. It is the leading cause of mortality and disability among young individuals in high-income countries, and globally the incidence of TBI 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 Finfer and Cohen, 2001.

Intensive care unit (ICU) nurses are responsible for the continuous monitoring and maintenance of physiological values associated with secondary brain injury and therefore are the members of the health care team best positioned to detect and prevent secondary brain injury. However, nurses vary in their practice, and little is known about how ICU nurses manage secondary brain injury. Evidence-based guidelines for care of TBI patients have been established BTF, 2009 but the extent to which these guidelines influence nursing practice in the management of secondary brain injury is not known.

Moreover, nursing care for TBI patients is more necessary in the ICUs that have an effects on TBI 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 TBI patients. So, appropriate preparation of nurses is a vital component in providing quality care to TBI patients and their families Choudhary, 2009.

Regarding to socio-demographic characteristics, most nurses were females and about more than two third of them had 20-30 years old and also more than tow third of them had 4 or more years of experience. Finally the majority of the studied nurses were having diploma degree. It may be due to the majority of Egyptian nurses were graduate of secondary nursing schools Gaumer et al., 2008. This socio demographic findings were consistent with Seliman et al., 2014 who mad 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). Also, the majority of studied nurses had secondary diploma degree. Finally, study findings indicated that all of studied nurses units had not trained and also there is no protocol of care.

The result indicated that there were high statistical significant differences in knowledge scores related to all items about initial care provided to traumatic brain injury patients' throughout the program intervention among studied nurses ($p<0.001$). There was (33.3%) before intervention ,(100%) immediately after ,(100%) 1months after and (100%) 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 traumatic brain injury patient's throughout the program intervention. The result indicated improvement in the total score ($p<0.001$). 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 traumatic brain injury patients were documented post program implementation as compared to their preprogram with highly significant statistically differences. This improvement might be related to the fact that majority of them are secondary school nurse, not receiving any previous training about care of traumatic brain injury patients. In addition to, the highly expressed need of nurses to learn more about head trauma 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.

Regarding nurses' knowledge about specific care of traumatic brain injury patient's throughout the program intervention. The result indicated improvement in tow items; care of patient eyes and care when ear bleed. Theses improvement were highly significant ($p<0.001$). From my opinion this improvement reflect the highly expressed need of nurses to learn more about care of traumatic brain injury.

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 an training program was well recognized and supported by many researchers around the world. Moreover, the current study revealed unsatisfactory nursing practices regarding brain trauma nursing care

in the intended ICU. This may be due to shortage of nursing staff to provide high quality nursing care for traumatic brain injury patients. The ratio of nurses to patients in the intended ICU was 1 : 2 for all three shifts. The nursing practice was based primarily on individual past experience and tradition, with senior nurses teaching procedures to the junior nurses. Evidence-based nursing practice was not the standard for care. In addition to absence of training courses, or workshops regarding brain trauma nursing care.

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 post test 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.

From the analysis of percent change in the total score of nurses' knowledge about care of traumatic brain injury patient's, the researcher found a highly statistical significant difference in total scores of knowledge among pre- program, immediately post and one months following program implementation. This improvement means that the program had a positive impact on nurses' knowledge about care of traumatic brain injury in the intensive care units. From the statistical analysis, it was clear that the significant was between preprogram and the immediately post program knowledge scores.

This results agree(in the same line) with Seliman et al., 2014 who found from the statistical analysis, it was clear that the significant was between pre protocol and the immediately post protocol knowledge scores.

In contradiction to this study Shahin et al., 2012 who reported that there was no significant difference between mean post test scores of knowledge and 1 month or 2 months follow up mean scores. Improvements of nurses' knowledge about enteral nutrition was sustainable and maintained for two months.

According to the relation between nurses' knowledge score and demographic data. Finding of this study reported that there is no significant relation between total knowledge and demographic data (age, education, years of experience).

This result disagree with Abd El-Aziz, 2014 who conduct a study on effect of educational program on nurses, knowledge and skills about oral care for traumatized patients who stated that; Concerning the relationships between nurses knowledge and skills and their years of experience in nurses, they findings statistical significant between diploma &. bachelor degree arid

older nurses with more years of experience and increase of years of experience showed increased of knowledge and practice.
Also found that; high education nurses (bachelor degree) more knowledge and skills than nurses diploma in all items of oral care procedure pre and post education program.
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 2014 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.
This result was congruent with a recent study which was about " mild traumatic brain injury: a Survey of perceived knowledge and learning preferences of Military and Civilian nurses ". The study found that head trauma management are directly influenced by nurses. Therefore, CCNs should be provided with the knowledge, skills, and abilities to care for this important segment of the neuroscience patient population to achieve the best practice and optimal outcomes for traumatic head injury patients Watts et al., 2011.
Finally, before the program, the majority of nurses unsatisfactory and less of total score knowledge and practice related to care of traumatic brain injury while the majority of them had satisfactory of total knowledge and practice immediately after educational program. This may be explained by the fact that all of studied nurses did not attend any training courses in caring of patients with traumatic brain injury. Also reflect positive effect of the program on nurses knowledge practice and importance of their application.

CONCLUSION

The findings of this study show that there is lack in nurses' knowledge regarding nursing care of traumatic brain injury patients in the intensive care units pre program implementation. There was a lack of educational materials, policies and protocol about traumatic head injury nursing care in the intensive care units. Therefore it was imperative to establish a written updated protocol of nursing care of traumatic brain injury patients to ensure enough knowledge and safe nursing practice.

RECOMMENDATIONS

Based on the results of the present study the following recommendations are suggested:

1. Designing an educational handout about nursing care of traumatic brain injury patients must be provided to nurses to be used as a reference guide in their knowledge and practice.
2. protocol of nursing care of traumatic brain injury could be applied in clinical practice as a routine of unit care.
4. Improve and update nurses knowledge and skills about nursing care of traumatic brain injury through attending national and international conferences and workshops.
5. Developing system of periodical nurses evaluation to determine strategies for updating their knowledge and enhancing their practice

IMPLICATION OF CLINICAL PRACTICE

This program of work set out to answer a series of related RQs, which are summarized in the previous sections. These questions have generated ideas for future research, which are outlined in the next section. However, they also have implications for current and future clinical practice, which is the subject of this section. We have been careful not to speculate beyond the results of the research work.
Observational data confirmed that systematically teaching nurse the skills to care and manage trauma patient was highly valued by participants and resulted in marked falls in the risk of severe complications. Nevertheless, the health economic analyses still showed that with these outcomes the intervention was cost-effective and generally cost-saving.
These findings strongly support the importance of providing high-quality structured training to support the skills of nurses caring of traumatic brain injury patients.
During this work we explored whether or not outcome data from participants could be collected as part of routine clinical delivery with minimal additional financial input. We had hypothesized that these results could be used to compare outcomes from different centers and identify those centers whose results were poor in terms of the incidence of complications to traumatic patients. However, we found that clinical teams struggled to consistently collect even a relatively modest set of data items.

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