Effect of an Educational Program on nurses' performance regarding the care of Patients with Head Injuries

Hayat Mohamed Abd Elkader[1], Mariam SabryShehab[2], Noha Mohamed Ibrahim[3]

[1, 3]Lecturer of Medical-Surgical Nursing Department, Faculty of Nursing - Port Said University

[2]Lecturer of Medical-Surgical Nursing Department, Faculty of Nursing –DamiettaUniversity

Abstract: **Head injuries are an important exporter of morbidity and mortality worldwide, with approximately 69 million affected individuals each year. Improvement of clinical outcomes by effective utilization of an educational program on nurses' performance for the patient with head injuries.** *Aim:* **This study aimed to evaluate the effect of an educational program on nurses' performance regarding the care of the patients with head injuries.** *Subjects and method:* **A Quasi-experimental design was used in the study was conducted at the neurointensive care unit in Suez Canal University hospital in Ismailia city. A convenient sample of 30 nurses was included in the study. Data were collected through two tools; Nurses' knowledge questionnaire and observational checklist to assess nurses' knowledge and practice regarding care of the patients with head injuries.** *Results:* **There was a statistically significant improvement in nurses' knowledge and practice regarding the care of patients with head injuries before and after the implementation of the educational program (p<0. 001).** *Conclusion:* **The study concluded that the implementation of an educational program for nurses improves their knowledge and practice regarding the care of patients with head injuries which support the current research hypotheses.** *Recommendation*, **The study emphasizing the importance of implementing an educational program for nurses caring for patients with a head injury to reduce the occurrence of head injuries complications, A regular training program should be applied in hospitals and conducting the same study in a larger sample is recommended.**

Keywords: **educational program, head injuries, nurses' performance.**

1. INTRODUCTION

Head injuries are the leading causes of morbidity and mortality in the world. Head injury continues to be an enormous public health problem, in the 21st century, although the presence of modern medicine. Most patients with head injury (75-80%) have a mild degree; the remaining injuries are divided equally between moderate and severe categories. The cost of head injury to society is included, both an economic and an emotional level. Almost 100% of persons with a severe head injury and as many as two-thirds of those with a moderate head injury will be permanently disabled in some functions and will not return to their premorbid level *(Ainsworth, 2015).*

Head injury is an alteration in brain function or other brain pathology caused by an external force. It occurs because of trauma to the skull, scalp or brain. There are two types of head injuries, closed (no break or tear to the skin) and penetrating (the skin and or bone of the skull is broken). Head injuries are classified into three categories: mild, moderate, and severe. Classification of head injury depending on symptoms appear on the patient post-injury, such as duration of amnesia and level of consciousness. However, in the acute phase (first 24 hrs) of a head injury, it is recommended to classify it according to the Glasgow Coma Scale measurement. *(Gillespie, McLeavy, Islim, Prescott & McMahon, 2019, Najem et al. 2018&Menon, Schwab, Wright& Maas, 2010).*

Head injury's symptoms may appear immediately following head injury, or they may develop slowly over several hours or days such as loss of consciousness for a second to a minutes, confusion, concentration problems, dizziness, headache, amnesia, nausea, vomiting, increase intracranial pressure (ICP), dilated pupils, hypertension, bradycardia, and abnormal breathing (*Oyesanya, Thomas, Brown, &Turkstra, 2016&Centers for Disease Control and Prevention, 2010).*

An understanding of medical complications during the care from injury to rehabilitation and discharge is important for the care of patients, for health care planning, and for formulating interventions that could improve outcome. The most common alteration in patients with head injury are eyes, ears, nose, and throat problems, psychiatric or behavioral disturbances, hypertension, and musculoskeletal injury at mild-to-moderate severity. Patients can develop certain complications such as deep vein thrombosis (DVT), heterotopic ossification, posttraumatic seizures, hydrocephalus, spasticity, gait abnormalities, agitation, and chronic traumatic encephalopathy if head injury left untreated. *(Varghese, Chakrabarty&Menon, 2017, Godbolt, et al. 2015& Holcomb, Millis& Hanks, 2012).*

Effective nursing management strategies for adults with severe head injuries are still a remarkable issue and a difficult task for neurologists, neurosurgeons, and neuro nurses. A list of justified indications and scientific rationale for nursing management of these patients is continuously evolving. So, Teaching and training are essential for the nursing staff members to improve the quality of health care and to acquire new knowledge and skills. Educational programs are considered as means for providing nurses with the theoretical and technical information needed to acquire new skills and to continually improve nursing practice. Also, Educational programs help nurses to accept responsibilities for their professional development. The well-trained nurse is the backbone of a well-organized department. Today's technical and scientific advances in nursing and increasing consumer demand for high-quality health care urged the nurse to keep current in a field that is exploding with new information and increases the need for developing nursing staff education *(Oyesanya&Snedden, 2018, Varghese, R., Chakrabarty &Menon, 2017&Derrick, Inhorn& Cowan 2007).*

Significance of the study:

Head injury is a significant source of morbidity and mortality worldwide, with approximately 69 million affected individuals each year **Montaser& Hassan (2013); Davis &Ings (2015)**. Therefore, globally, head injuries are an important cause of hospitalization, death and disability, disproportionality, communication, language difficulties, and attention disorder affecting people in low/middle-income countries (LMIC) *(Zia, et al. 2019)*. However, Head injuries are 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 the latest statistics carried out by the Egyptian Central Agency for Mobilization and Statistic Egyptian Central Agency 2018.

Aim of the study

This study aimed to evaluate the effect of an educational program on nurses' performance regarding the care of patients with head injuries.

Objectives*:*

1) Assess nurses' knowledge regarding the care of patients with head injuries

2) Assess nurses' practice regarding the care of patients with head injuries

3) Develop an educational program regarding the care of patients with head injuries

4) Implement an educational program regarding the care of patients with head injuries

5) Evaluate the effect of an educational program regarding the care of patients with head injuries

Research Hypotheses:

1. Nurses who will be exposed to the educational program regarding the care of head-injured patients will exhibit better knowledge compared to their pre-intervention level.

2. Nurses who will be exposed to the educational program regarding the care of head-injured patients will exhibit improved practice compared to their pre-intervention level. **Operational definition:**

Nursing performance in this study meant both nurses' knowledge and practices.

2. SUBJECTS AND METHOD

A quasi-experimental (pre/post-test) design used to conduct this study. Quasi-experimental studies have been widely accepted and used in the social sciences for several decades. Quasi-experimental research shares similarities with the traditional experimental design or randomized controlled trial, but it specifically lacks the element of random assignment to treatment or control *(Bärnighausen et al., 2017)*.

Research Setting:

The study carried out on the neurointensive care unit of Suez Canal university hospital at Ismailia. The intensive care unit of Suez Canal university hospital consists of two intensive care units in two separate buildings. The first unit is located on the third floor consists of one big room that contains five beds while the second unit located on the second floor consists of one big room that contains nine beds.

Subjects

A convenient sample of available nurses working in the above-mentioned setting was participating in the research. They were (30 nurses) involved in the care of head-injured patients.

Tools of data collection: The following tools utilized to collect data for the current study. The researchers developed them after reviewing related literature, periodicals, and scientific websites. These tools consisted of the following:

Tool (I): A structured Interviewing Questionnaire

This tool was prepared in the Arabic language to assess the nurses' knowledge regarding head injuries based on *(Abrahamson, Jensen, Springett, &Sakel, 2017, Glen, Constanti, &Brohi, 2016 & National Institute for Health and Care Excellence. 2014)*. Each nurse interviewed individually for answering the structured interview questionnaire sheet. It included two main parts, which are:

Part (1): This part was included the nurses' socio-demographic data as age, marital status, level of education, experience, gender and attendance training courses related to head injury.

Part (2): this Part was concerned with the assessment of nurses' knowledge regarding the care of patients with head injuries. This was consisting of 25 statement divided into 3 dimensions namely initial principles care of the patients with head injuries (12 items) such as patients more liable to increase intracranial pressure, measuring Glasco-coma scale, indication on mannitol and etc…… Basic care of the patient with head injuries (4 items) such as side effect of increasing metabolic rate, **feeding by oral** and **complication of RBC transfusion, etc…**General care of the patients with head injuries (9 items) such as nursing care to pt's eyes, nursing care when ear bleed and Positioning of the patient, etc….. Each statement response measured by two items scale, including (correct = 1) & (wrong = 0).

Scoring system

Nurses' knowledge questions:

The multiple-choice questions (MCQ) is corrected against model answer as (1 mark) for correct answer and (0) for incorrect answer. The scoring of closed-ended questions was giving score (1) for the correct and complete answers, (0) for incomplete answers, incorrect answer, or do not know answers. The total score ranged from 0-25. Then, subtotal and total knowledge categorized as a score of 75 %, and more were considered satisfactory; a score of less than 75 % was considered unsatisfactory.

Tool (II): Nurses 'observation checklist:

It was developed by **Seliman, Morsy, Sultan, Elshamy& Ahmed, (2014)** to assess nurses' practices regarding the care of patients with head injuries. This was consisting of 112 items divided into 8 checklists included that tracheal suctioning (26 items), oxygen therapy (12 items), SaO2 monitoring (10 items), arterial puncture in different sites (21), cardiac monitoring (13 items), CVP measurement (14 items), DVT Prophylaxis (6 items) and neurological management (10 items).

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 7, Issue 1, pp: (294-304), Month: January - April 2020, Available at: **www.noveltyjournals.com**

Scoring system

Nurses 'observation checklist:

Total practice scores were (112 items). Each nurse observed during each procedure for three different times before the program, after one month and after 3 months using nurses' observational checklists. Each correctly done step gave the score of (1), (0) for each incorrectly done step or not done and not applicable was omitted from the calculation. The subtotal and total scoring for practice classified as follows:

- Satisfactory: Equal to or more than 80%.

- Unsatisfactory: Less than 80%.

Operational Design

The operational design of this research included preparatory phase, tool and content validation, tool reliability and the field work.

Content Validity:

Tools were reviewed with nine professors of medical –surgical nursing and critical care field. Modifications made according to the experts' judgment on the clarity of sentences, appropriateness of the content, and sequence of items. The experts' agreed on the contents but recommended minor language changes that would make the information clearer and more precise.

Pilot study

A pilot study had been undertaken before starting the data collection phase. It was carried out on 10% of participants to test the feasibility of the research process 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.

Fieldwork description

Fieldwork conducted from the beginning of August (2018) to the end of August (2019). This study has been conducted through four phases:

The program conducted in four phases:

Phase I: (assessment phase): the pre-test process was completed before the introduction of the program. The assessment phase involves assessing the knowledge and practice of nurses regarding the care of patients with head injuries. Originally, the researchers introduced themselves to the nurses they researched. Nurses who agreed to take part in the study consulted by the researcher individually to explain the nature, intent and desired outcomes of the study. Evaluation of nurses pre-program implementation, level of nurses' knowledge was evaluated by using tool I and the practice of care provided to patients with head injury was evaluated using a tool II, observation carried out by the researcher to determine the level of practice of nurses; each nurse was examined by the researcher during the various shifts, at 5 hours/day for 6 days a week for one month using tool II, and the researcher completed the observational.

II. Educational program development phase

The training program was built based on the established needs and needs of nurses gathered in phase I, taking into account the most current relevant literature.

A –Formulation of objectives: the purpose of the program was to improve the performance of nurses in the care of patients with head injuries through:

Improving nurses' information relevant to the care of patients with head injuries.

Improving nurses' practice to the care of patients with head injuries.

B- Contents: theoretical part include (nurses' knowledge regarding initial principles care of the patients with head injuries, basic care of the patient with head injuries, and general care of the patients with head injuries & practical part includes steps of (tracheal suctioning, oxygen therapy, SaO2 monitoring, arterial puncture in different sites, cardiac monitoring, CVP measurement, DVT Prophylaxis and neurological management for patients with head injuries).

C-Planning of action:

In this stage, the researcher drew up a plan for the implementation of the training program. The program was carried out in ten weeks included three sessions to be conducted for each group separately. One group of nurses was included each week. That group consisted of three nurses from the same department. The time spent describing each group was 45 minutes and 75 minutes of break between classes. The researcher visited the neurointensive care unit twice-weekly (Saturday and Monday) in different shifts.

Also, the strategy of teaching program was determined by; choosing the appropriate teaching method in the form of (lecture, small-group discussion, demonstration, and re-demonstration) and choosing the appropriate teaching medium in the form of (handout, audiovisual material).

D- Clinical area preparation:

Permission for the research was taken from the head of the nurse responsible for the training after the intent, time and place of the study had been clarified. She then told the head nurses of the neurointensive care unit to receive co-operation. The nurses were advised to engage in the study according to their needs. Some nurses have refused to participate as a whole in the training program phase. The decision on inclusion in the research was rendered by nurses orally. The study was conducted only on nurses who engaged in all phases of the training program. Researchers have reviewed past, current regional and international related literature covering all aspects of the study using textbooks, journals, articles, websites, and periodicals. This review helped the researchers to get acquainted with the research problem and guided them through the development of data collection tools.

Phase III: (Implementation phase): at the outset, the nurses examined were divided into ten groups, each of which consisted of three nurses, then each group was gathered separately in the conference room, and the session was held at the time available to the group gathered during the working shift. At the beginning of the implementation of the training program, the initiation and the significance of the training program, the presentation of the plan of training program and presentation of learning objectives of the training program were explained to each group separately. A copy of the handout was given to each nurse to facilitate the recalling of knowledge and steps during the theoretical part of the program and to demonstrate the progress of the program. The program was presented in a clear and concise form using different teaching methods, such as small group discussions, lectures, demonstrations and re-exhibitions, and appropriate teaching media as audiovisual material (lab). The nurses were asked to watch the researcher carefully during performing care of patients with head injuries as each of them will re-demonstrate the procedure in front of the researcher and they will be evaluated by the researcher. The researcher demonstrated all the steps of the procedure in front of the nurses while discussing with them the reasoning for each step. After the researcher's presentation, nurses were asked about any ambiguous measures that needed to be replicated or clarified before re-demonstration. The demonstrator (the nurse who performed the procedure) was asked to evaluate the performance of the demonstrator.

Phase IV: (Evaluation): the researcher evaluated the educational program outcome related to nurses' performance regarding the care of patients with head injuries three times, first time: immediately after educational program implementation, second time after one month and third time: after three months.

Administrative design:

An official letter was directed from the dean of the Faculty of Nursing, Port-Said University to the study hospital manager. Permission to conduct the research was obtained from the administrator after demonstrating the purpose of the research to gain cooperation during the period of the research.

Ethical Consideration

Ethical consideration approval was obtained from the scientific research ethics committee of the faculty of nursing–port said university. The researcher explained that there were no risk or hazards related to the study to the participants. Assured Privacy and confidentiality of the collected data. Informed each participant that his participation in the study was voluntary and they could withdraw at any stage without any responsibility.

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 7, Issue 1, pp: (294-304), Month: January - April 2020, Available at: **www.noveltyjournals.com**

Statistical Design

Data entry and analysis were performed using the Statistical Package for Social Sciences version 20 (SPSS). Qualitative data expressed as number and percentage distribution, Descriptive statistics, Correlation coefficient, Arithmetic mean, Standard deviation(SD), Chi-square ($\chi2$), and Paired sample Z- tests were used in the analysis. A significance level was considered at P value = 0.05

3. RESULTS

Table (1): shows the socio-demographic characteristics of studied nurses. It revealed that (86.7%) of the studied nurses were females and (76.7%) their age from 20 to 30 years. 63.3% of studied nurses had a secondary nursing diploma, while only (10%) had a bachelor's degree in nursing; and (76.7%) had more than 4 years of experience. All studied nurses (100%) have not any previous training course about head injuries care.

Table (2): clarifies that there was a highly statistically significant difference in post-implementation of care of patients with head injuries (after 1 and 3 months) comparing to their pre-intervention in all items of nurses' knowledge. There was improve in the total score about immediately program and after three months respectively 96.7% in all phases at (p<0.001).

Table (3): illustrates the difference in nurses' satisfactory practice about the care of patients with head injury throughout the program. The finding showed an increase in various skills and their total score improvement with a highly statistically significant (p<0.001).

Table (4): reveals a comparison of total nurses' knowledge regarding care of the patient with head injury though the program phases. The highest percentage of increase was in nurses' knowledge, between the immediate posttest and pre-program level (Z= 7.68, p <0.001)

Figure(1): Reveals that there was improvement in total knowledge post-implementation educational program about the care of the patients with head injuries compared to pre-implementation.

Table (5): Shows a significant, positive correlation between total knowledge score immediately after program implementation and total practice score immediately after program implementation at p (0.036).

Table (1): Frequency and percentage distribution of Socio-demographic Characteristics of the Study Sample (No=30

Socio-demographic Characteristics		N	%
Age	20 to 30 years	23	76.7
	>30 years	7	23.3
Marital status	Married	22	73.3
	Unmarried	8	26.7
Level of education	Bachelor	3	10.0
	technical nursing institute	8	26.7
	Secondary nursing diploma	19	63.3
Experience	2 to 4 years	7	23.3
	> 4 years	23	76.7
Gender	Female	26	86.7%
	Male	4	13.3%
Training courses	No	30	100.0%

Table (2): Comparison of satisfactory Nurses' knowledge regarding care of patients with head injuries pre, post and follow up implementation of educational program   (n=30)

Items	Before program		Immediately after		1 month After		3 months after		X^2	P
	N.	%	N.	%	N.	%	N.	%		
Nurses' knowledge regarding initial principles care of the patients with head injuries	10	33.3%	30	100%	29	96.7%	28.0	93.3%	72.0	<0.001**
Nurses' knowledge regarding basic care of the patient with head injuries	14	46.7%	29	96.7%	28	93.3%	28	93.3%	35.72	<0.001**
Nurses' knowledge regarding general care of the patients with head injuries	10	33.3%	27	90.0%	26	86.7%	26	86.7%	77.17	<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): Comparison of satisfactoryNurses' practice regarding the care of patients with head injuries pre, post, and follow up on the implementation of the educational program. (No=30)

Item	before program		Immediately after		1 month after		3 months after		X^2	P
	N.	%	N.	%	N.	%	N.	%		
Suctioning of trachea	30	100.0%	30	100.0%	30	100.0%	30	100.0%	NS	NS
O2 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%	NS	NS
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*

X^2= chi square

* = significant (P≤0.05)   **= High significant (P≤0.001)   NS= significant

N.B:- Satisfactory level of nurse's practice = score of 80% and more.

Table (4): Comparison of total nurses' knowledge regarding care of the patient with head injury though the program phases (No=30)

Items	Before Program		Immediately After		1 month After		3 months After	
	n	%	N	%	n	%	n	%
Satisfactory (≥ 75%)	4	13.3	28	93.3	26	86.7	25	83.3
Unsatisfactory (< 75%)	26	86.7	2	6.7	4	13.3	5	16.7
mean±SD	7.68±9.60		27.68±5.02		26.56±6.23		26±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

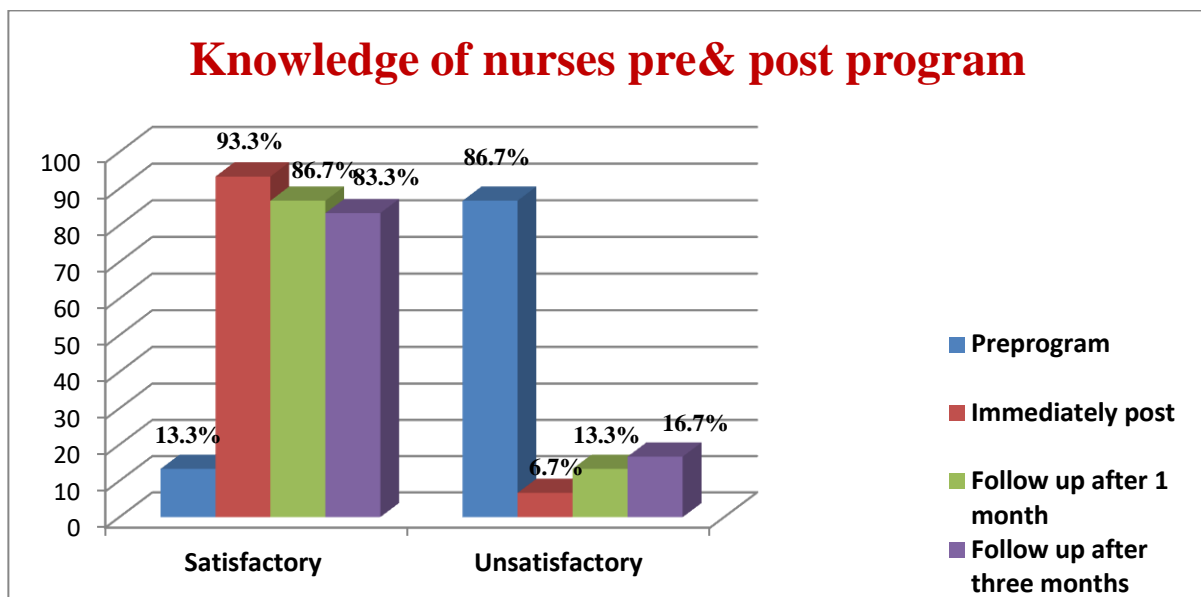Post_ preZ= 7.68F1Z= 7.42   F2Z=7.42,   p ≤ 0.05

Figure1. Percentage distribution of Nurses' total knowledge of care the patients with head injuries pre, post, and follow up on the implementation of the educational program

Table (5) correlation between total knowledge score and practice score related to the care of patients with head injuries 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 month	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= (0.25 to 0.49) mean (fair correlation)

*r= (0.50 to 0.74) mean (moderate correlation)   *r= (0.75) mean (strong correlation)

4. DISCUSSION

Updated statistical records for head injuries in Egypt are lacking According to health information systems. But the **World Health Organization (2010)** reported that there were nearly 20 000 deaths and 800 000 reported injuries (a ratio of 1:40) in Egypt in 2008. In 2005, there were 16 245 deaths, 112 982 hospitalizations, and 748 686 emergency room registrations due to injuries. This shows an increase of nearly 4000 deaths per year between 2005 and 2008**.** So, this study helps to upgrade nurses' knowledge and improve their practice regarding the care of patients with head injuries, decrease the duration of hospital stay that consequently decreases cost and increases the quality of provided care and decreases infection.

Additionally, it decreases the occurrence of complications for patients with a head injury. However, Head injury 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*(Mohammad, 2018&Hyder, Wunderlich, Puvanachandra, Gururaj, &Kobusingye, 2007).*

This study revealed a low percentage of satisfactory knowledge in the pre-intervention phase, which might be related to there was no accurate source for acquiring knowledge as; doctors, head nurses, training courses and even no guidelines for nursing intervention about the care of a patient with head injuries. In addition to high patient or nurse ratio workload, lack of training, motivating factors, lack of staff supervision, and evaluation system during their working. This pointed to an area of deficient continuing nursing education.

The results of the current study indicated that there were highly statistically significant differences in knowledge scores related to all items about whole care provided to patients with head injuries throughout the program intervention among studies nurses immediate and three months post-program implementation. An obvious improvement in nurses' knowledge scores with highly significant statistical differences in all items post-program implementation compared to their pre-program implementation. These findings in agreement with **Cook et al., (2013)** who make a study on 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

Also agree with **Seliman, Morsy, Sultan, Elshamy, &Ahmed,** (2014) who observed a clear improvement in nurse awareness scores post-program implementation relative to their pre-program with significant statistical differences. So; nurses need to learn more about head injury nursing management through continuous training. These findings are supporting the first research hypothesis.

Moreover, the current study revealed that a significant difference in total nurses, the practice was among the pre and all post-program scores where p=0.03. From the researcher, s point of view, this significant difference was related to the effect of educational programs regarding the care of patients with head injury. While nearly all nurses' practices regarding the care of patients with head injuries regarding DVT prophylaxis and neurological management and more than half of nurses' practices regarding the care of patients with head injuries regarding arterial puncture were unsatisfactory pre-program intervention.

Furthermore, from the researcher's point of view, This might be due to that, not all studied nurses had any under or postgraduate training courses about care of head injury patients regarding the previously mentioned weak points of practice, absence of supervision of nurses' performance or staff workload due to the shortage of nursing staff to provide high-quality nursing care for head injury patients. This result is in agreement with **Ghoneim, Elden, Okab, &Elsaay,** (2012), who study implementing nursing care protocol for moderate head-injured patients associated with poly head injuries indicated that nursing education program had the best effect on minimizing the incidence of all systemic complications, decrease morbidity as well as the mortality rate.

In this respect, **Taha**, (2004), **Seliman, Morsy, Sultan, Elshamy, &Ahmed,** (2014) &**Elmowla, El-Lateef& El-Khaya**, (2015) and **Ali et al., (2010)** reported an improvement in nurses to practice scores after implementation of the educational program with highly significant statistical differences between pre and post-intervention. These findings supported the second research hypothesis.

According to the correlation between nurses' total knowledge score and total practice score. The findings of the present study reported that there is a positive correlation between nurses' knowledge and practice immediately after intervention. This result may reflect that once nurses ' knowledge improved nurses ' practice is further strengthened.

Finally, the present study revealed that there is an obvious improvement in the post-implementation phases compared to the pre-implementation phase of educational intervention. This is consistent with **Eldesouky**, (2016) who mentioned that improved nurse information leads to improved performance and increases self-confidence, which contributes to the quality of care. Moreover, **Mohammed,** (2018**), Shahin, Mohamed, &Sayed** (2012) **&Taha** (2004) who stated that a highly statistically significant correlation was found between participants' scores of knowledge and practice in the pre-program, post-program, 1 month and 2 months following the instructional program. Based on this finding, the research hypotheses were fulfilled.

5. CONCLUSION

Based on the result of the present study, it can be concluded that the research hypotheses are accepted, the implementation of an educational program for nurses improves their knowledge and practice

6. RECOMMENDATION

Based on the finding of the present study, it is recommended to:

- Conducting periodical orientation programs for nurses with continuous regular updating of knowledge and practice regarding head injury for adult patients.

- Effect of the educational program about head injuries on patients' outcome is recommended

- Emphasizing the importance of implementing designed practice guidelines for nurses caring for patients with a head injury to reduce the occurrence of head injury complications

REFERENCES

[1] Abrahamson, V., Jensen, J., Springett, K., &Sakel, M. (2017). Experiences of patients with traumatic brain injury and their carers during the transition from in-patient rehabilitation to the community: a qualitative study. Disability and Rehabilitation, 39(17), 1683-1694

[2] Ainsworth C. (2015). Head injury. Availableathttps:/emedicine.medscape.com.

[3] Ali, SA; Abu-Elseoud, AR; Heybah, SM; and Mohamed, AA. (2010): Implementation of An educational training program in first aid for newly graduated nursery school teachers at zagazig city. Zagazig Journal of Occupational Health and Safety; 3(1): 20-29.

[4] Brnighausen, T., Tugwell, P., Ratingen, J. A., Shemilt, I., Rockers, P., Geldsetzer, P., &Bor, J. (2017). Quasi-experimental study designs series—paper 4: uses and value. Journal of clinical epidemiology, 89, 21-29.

[5] Centers for Disease Control and Prevention. (2010). Facts about concussion and brain injury: Where to get help. Obtained via http://www.cdc. gov/TraumaticBrainInjury/outcomes. HTML on November 16, 2010.

[6] Cook, MC; Gillespie, GL; Kronk, R; Daugherty, MC; Moody, SM; Allen, LJ; Shebesta, KB; and Falcone, RA. (2013): Effect of an educational intervention on nursing staff knowledge, confidence, and practice in the care of children with mild traumatic brain injury. J Neurosci Nurs; Apr;45(2):108-118.

[7] Davis, T., &Ings, A. (2015). Head injury: triage, assessment investigation and early management of head injury in children, young people, and adults (NICE guideline CG 176). Archives of Disease in Childhood-Education and Practice, 100(2), 97-100.

[8] Derrick S, InhornE, Cowan T.(2007).The professional development series, staff nurses survival guide, 2nd ed., Wolfe Publishing LTD, London, 15.

[9] EL-AZIZ, M. A. A. (2014). Effect of educational program on nurses, knowledge, and skills about oral care for traumatized patients.AAMJ, 12(1).

[10] Eldesouky E. (2016, March). impact of an educational program for nurses' knowledge and practice about the Glasgow Coma scale. International Journal of Recent Scientific Research, 7(3), 9690-9695.

[11] Elmowla, R. A. A. A., El-Lateef, Z. A., & El-khayat, R. (2015). Impact of Nursing Educational Program on Reducing or Preventing Postoperative Complications for Patients after Intracranial Surgery. Journal of Education and Practice, 6(9), 60-70.

[12] Ghoneim, N. I., Elden, S. A., Okab, M. E., &Elsaay, O. E. A. E. (2012). Impact of implementing nursing care protocol on moderate head-injured patient's outcome.Rehabilitation, 9, 10.

[13] Gillespie, C. S., McLeavy, C. M., Islim, A. I., Prescott, S., & McMahon, C. J. (2019).Rationalizing neurosurgical head injury referrals: The development and implementation of the Liverpool Head Injury Tomography Score (Liverpool HITS) for mild traumatic brain injury. medRxiv, 19004499

[14] Glen, J., Constanti, M., &Brohi, K. (2016). Assessment and initial management of major trauma: summary of NICE guidance. BMJ, 353, i3051

[15] Godbolt, A. K., Stenberg, M., Jakobsson, J., Sorjonen, K., Krakau, K., Stalnacke, B. M., &DeBoussard, C. N. (2015). Subacute complications during recovery from severe traumatic brain injury: frequency and associations with outcome. BMJ Open, 5(4), e007208.

[16] Holcomb, E. M., Millis, S. R., & Hanks, R. A. (2012). Comorbid disease in persons with traumatic brain injury: Descriptive findings using the modified cumulative illness rating scale. Archives of physical medicine and rehabilitation, 93(8), 1338-1342

[17] Hyder AA, Wunderlich CA, Puvanachandra P, Gururaj G, KobusingyeOC.(2007) The impact of traumatic brain injuries: a global perspective. Neuro Rehabilitation-An Interdisciplinary Journal;22(5):341–354.

[18] Menon, D. K., Schwab, K., Wright, D. W., & Maas, A. I. (2010) Position statement: definition of traumatic brain injury. Archives of physical medicine and rehabilitation, 91(11), 1637-1640

[19] Mohammad, E. E. H. (2018). Intensive Care Unit Nurses' Performance Regarding Caring Patients With Head Injury: An Educational Intervention. International Journal of Studies in Nursing, 3(3), 141.

[20] Montaser, T., & Hassan, A. (2013). Epidemiology of moderate and severe traumatic brain injury in Cairo University Hospital in 2010. Critical Care, 17(2), P320

[21] Najem, D., Rennie, K., Rebecca-Lutkiewicz, M., Ly, D., Haukenfrers, J., Liu, Q., ... &Bani-Yaghoub, M. (2018). Traumatic brain injury: classification, models, and markers. Biochemistry and cell biology, 96(4), 391-406

[22] National Institute for Health and Care Excellence. (2014). Head injury: assessment and early management. Clinical guideline [CG176].Available at https://www.nice.org.uk/ guidance/cg176 /resources/ head-injury- assessment-and-early management-pdf-35109755595493.

[23] Oyesanya, T. O., &Snedden, T. R. (2018). Pediatric nurses' perceived knowledge and beliefs of evidence-based practice in the care of children and adolescents with moderate to severe traumatic brain injury. Journal for Specialists in Pediatric Nursing, 23(2), e12209

[24] Oyesanya, T. O., Thomas, M. A., Brown, R. L., &Turkstra, L. S. (2016). Nurses' beliefs about caring for patients with traumatic brain injury. Western journal of nursing research, 38(9), 1114-1138.

[25] Seliman, A. M., Morsy, W. Y., Sultan, M. A., Elshamy, K. F., & Ahmed, H. H. E. (2014). Impact of a designed head trauma nursing management protocol on critical care nurses' knowledge and practices at emergency hospital Mansoura University. Journal of American Science, 10(12), 13-25.

[26] Shahin, M. A., Mohamed, W. Y., &Sayed, M. (2012). Nurses' knowledge and practices regarding enteral nutrition at the critical care department of Al-Manual university hospital in Egypt: Impact of a designed instructional program. Journal of American Science, 8(9).

[27] Taha, N. (2004). Comatose patients: impact of a training program provided for nurses working in critical care units, Zagazig University Hospitals on nurses' knowledge and performance levels as well on patient outcome. Unpublished Doctorate Degree in Medical/Surgical Nursing, Faculty of Nursing, Zagazig University.

[28] Varghese, R., Chakrabarty, J., &Menon, G. (2017). Nursing management of adults with severe traumatic brain injury: A narrative review. Indian journal of critical care medicine: peer-reviewed, official publication of Indian Society of Critical Care Medicine, 21(10), 684.

[29] World Health Organization. (2010). Injury surveillance: A tool for decision-making: Annual injury surveillance report, Egypt, 2009 (No. WHO-EM/HLP/067/E)

[30] Zia, N., Mehmood, A., Namaganda, R. H., Ssenyonjo, H Kobusingye, O., &Hyder, A. A. (2019). Causes and outcomes of traumatic brain injuries in Uganda: analysis from a pilot hospital registry. Trauma surgery & acute care open, 4(1), e000259.