

Impact of Self Learning Package on Nurses' Performance about Care of Head Injury Children

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Abstract

The aim of the study was to assess the impact of self-learning package regarding care of children with head injury on nurses' knowledge and performance. **Research design:** A quasi experimental study was utilized for conducting the study. **Settings:** The study was carried out in Neurosurgery Department, Emergency Department and Pediatric Intensive Care Unit at Benha University Hospital. **Subjects:** A purposive sample consisted of 100 nurses working in the previously mentioned settings and providing direct care for children having head injury. **Tools and data collection:** A questionnaire formats to assess nurses' knowledge, and observation checklists to assess practices followed by administration of the self-learning package. **Results:** The study revealed that there was a statistical significant difference between nurse's performance about care of children with head injury pre and post implementation of the self-learning package. **Conclusion:** The study concluded that, the implementation of self-learning package upgrade nurses' performance regarding care of children with head injury. **Recommendations:** The self-learning package for nursing care regarding head injury in children should be available in Neurosurgery Department, Emergency Department and Pediatric Intensive care Unit to be followed by all nurses and updated periodically. Further researches should be performed in a large scale for generalization of the research results.

Key words: Self-learning package, Head injury, Nurses' performance.

Introduction

Head injury is defined as damage to the scalp, bony skull, and brain tissue which may involve injury to cerebral blood vessels. Traumatic brain injury (TBI) is a leading cause of morbidity and mortality among pediatric patients, it is responsible for the majority of trauma-related hospitalizations followed by deaths in the pediatric population (Zollman, 2011& Smith et al., 2016).

The common causes of traumatic brain injury include falls, sports-related injuries, motor vehicle accidents, violence

and assaults, and being struck by or against objects. Boys experience head injury twice as frequently as girls. Many children die each year from head trauma, and children who survive their injuries can have significant long-term disability (Burns et al., 2013).

The head injury varies according to age, and reflects developmental abilities and risks associated with each stage of life. Falls account for approximately 50% of head injury in children ages from birth to 14 years, followed by collision events with a moving or stationary object (24.8%), and motor vehicle accidents (6.8%). The

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youngest children have the highest rate of fall-related head injuries. However, the most common cause of severe TBI and death in this age group is non-accidental trauma, which accounts for between 24% and 63% of head injuries requiring hospitalization (*Aminoff et al., 2015*).

Motor vehicle accidents and assault occur most often in adolescents greater than 15 years old. School-aged children are also commonly injured from sports and recreational activities. The number of sports and recreation-related emergency department (ED) visits for head injury in this age group increased by 60% in the last decade. Bicycle-related head injuries accounts for 40% of bike-related deaths. An increasing cause of pediatric mortality is use of all-terrain vehicles (ATV), fatalities and nonfatal injuries increased by 14% and 25%, respectively in recent years (*Aminoff et al., 2015*).

Primary injury occurs at the time of the traumatic event, can cause immediate, irreversible neuronal damage or death, and can be classified as focal (localized) or diffuse (widespread). Focal injury as scalp lacerations, contusions, skull fractures, epidural hematoma, subdural hematoma. Diffuse injury as concussion and diffuse axonal injury. Secondary injury arises when the brain is starved of O₂, which makes damage from the initial injury worse. Causes of secondary injury are cerebral edema, cerebral hypoxia, cerebral ischemia and intracranial hematomas (*Smith et al., 2016 & Glasper et al., 2016*).

Nursing management of head injury include careful neurologic assessment that are repeated at frequent intervals, identify signs and symptoms of increased Intracranial Pressure (ICP) and level of consciousness. Place the child with head of the bed elevated slightly. Implementation of safety measures and seizure precautions. Provide anticonvulsant for the child as prescribed. Promote comfort and relieve anxiety for the child and family (*Perry et al., 2014*).

The objective of self-learning package is to improve the participant's knowledge and skills in a particular area, and which involves a study plan, study goals and assessment of progress (*Sanrock, 2011*).

Significance of the study

It was observed that nurses in previously mentioned settings had lack of knowledge and skills regarding head injury in children and its care which result in dangerous complications. Provision of such knowledge and practices related to the nursing management of head injury would be beneficial for nurses in different ways. It could support the important role of the nurse related to head trauma nursing management. Also, it might generate an attention and motivation for further researches into this area which improved children outcomes and shorten their length of stay in hospital. Therefore, the current study was carried out to evaluate the impact of self-learning package on nurses' performance about care of head injury children.

Education is essential for nurses as it is a vital appropriate need. It improves quality of care, gain in professional status and job satisfaction. A self-learning package is a document for all that is independently of the teacher.

Aims of the study

To assess the impact of self-learning package on nurses' performance about care of head injury children after developing, implementing and evaluating the outcome of self-learning package.

Research hypothesis

The implementation of self-learning package will upgrade nurse's knowledge and performance regarding care of children with head injury.

Subjects and Methods

I. Technical Design

Research design:

A quasi experimental study was utilized for conducting the current study including one group with pre/posttest.

Settings

The study was carried out in Neurosurgery Department, Emergency Department and Pediatric Intensive Care Unit at Benha University Hospital, the three departments have been selected for being the highest capacity of nurses caring for children suffering from head injury at Benha City.

Subjects

A purposive sample consisted of 100 nurses working in the previously mentioned settings, 45 nurses from Neurosurgery Department, 25 nurses from Emergency Department and 30 nurses from Pediatric Intensive Care Unit at Benha University Hospital. One hundred nurse with different categories working in the previously mentioned settings. Inclusive criteria being permanent staff, provide direct care to the children suffering from head injury regardless their age, educational level and years of experience.

Tools of data collection

1- A questionnaire format: It was designed by the researcher in simple Arabic language to suit all nurses categories after reviewing of literature regarding care of head injury children. It was consisted of the following parts:

Part I: It was concerned with the characteristics of the studied nurses, as regards to their age, level of education, years of experience and attendance previous

training programs about care of children with head injury.

Part II: It was dealt with assessing nurses' knowledge regarding the following items: concept of head injury, causes, signs and symptoms, types, complications, patient's main problems and disabilities, diagnosis and medical treatment, nursing management for head injury children, instructions for parents and teaching home care and importance of follow-up for children with head injury.

Scoring system regarding nurses' knowledge

The total score for the questionnaire formats was "112" marks which represents 100%.

According to nurses' answers, the score calculated according to the grade obtained:

- Score < 75% referred to poor knowledge.
- Score 75 < 85 % referred to average knowledge.
- Score \geq 85% referred to good knowledge.

2- Observational checklist sheet:

This tool was adopted and developed by the researcher after reviewing the related literature used to assess nurses' performance about care of head injury and include: An observational checklist of the child with head injury that was adopted for (Silvestri, 2010; Hockenberry & Wilson, 2011; Abd El-Azim et al., 2012; Bowden & Greenberg, 2012; Price & Gwin, 2012; Kyle & Carman, 2013; Ball & Bindler, 2014; Hockenberry & Wilson, 2014; Perry, Potter & Ostendorf, 2014 and Perry et al., 2014 and Glasper et al., 2016). Checklists include all tasks done by nurses during providing the actual care for head injury children such as: the

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Modified Glasgow coma scale, hand washing and gloving, measuring vital signs, oral suctioning, administering intravenous medication and wound care.

Scoring system regarding nurses' practice:

The total score for the observation checklists formats was "264" marks. Nurses was observed by the researcher 3 times for each observation checklist.

The total score were evaluated as:

- Score less than 90% referred to incompetent practices.
- Score \geq 90% referred to competent practices.

3- Self-learning package about head injury:

The Self-learning package about head injury was developed by the researcher guided by related literature (Silvestri, 2010; Urden, Stacy & Lough, 2010; Votrobk & Tabacco, 2010; Hockenberry & Wilson, 2011; Abd El-Azim et al., 2012; Bowden & Greenberg, 2012; Price & Gwin, 2012; Attia, 2013; Hockenberry & Wilson, 2013; Kyle & Carman, 2013 and Richardson, 2013;) Hockenberry & Wilson, 2014; Perry, Potter & Ostendorf, 2014 and Perry, Hockenberry & Lowdermilk, 2014; Bickle & Smith, 2016) to provide basic knowledge and practice about care of head injury in children for nurses and revised by the supervision.

The Self-learning package consisted of a pretest, an introduction, and general objectives of the content, which is composed of two parts, theoretical content and its practical application. the self-learning package covered these areas: Anatomy and physiology of the brain, Concept of head injury, causes, signs & symptoms and types of head injury, Complications of head injury, Diagnostic tests and treatment of head injury, Nursing

management including all nursing care activities of children with head injury.

The validity and reliability of the tools were submitted to a jury of five experts (three professors of pediatric nursing, one professor of pediatric medicine and one professor of neurosurgery). Reliability was performed by test retest.

II. Operational Design

Preparatory phase:

A review of past, current related literature covering various aspects of the research problem was done by using available articles, periodicals, magazines, books and internet to be acquainted with the research problem and to develop the study tools and content.

Exploratory phase (Pilot study):

A Pilot study was conducted on 10% of nurses (10 nurses). Based on the findings of the pilot study, no modifications were done to the questionnaire. Therefore, the sample of the pilot study was not excluded from the total study sample.

Ethical considerations

The researcher explained the aim of the study to nurses to obtain their cooperation. Informed consents were obtained from each nurse who agreed to participate in the study. Anonymity and confidentiality of the study subjects had been assured. They were being informed that all collected data would be used for research purposes only; and they were assured about their rights to withdrawal from the study at any time without giving any reason.

Field work

- The actual field work carried out for data collection started from the first of January 2015.

- The pretest was done by using observation checklist to assess the nurses' performance before the implementation of the self-learning package.

- The researcher was distributing questionnaire sheet after all observations for all selected nurses in the unit to assess their knowledge about head injury related information and their nursing care.

- The researcher should assess the nurses' deficit areas in knowledge and performance and their needs for the care of children with head injury.

- Nurses were divided into ten groups each group consist of 10 nurses. The pretest was done at January and February.

- The nurses working with head injury children were observed four days per week (Sunday, Monday, Tuesday and Wednesday) at morning and afternoon. Each nurse observed directly for the same procedure three times.

- The researcher distribute self-learning package for nurses from March 2015 with the necessary clarification done by the researcher about how the package be used, explanation of some content areas, these were given in 45 minutes session to every unit separately.

- **The content of the package was divided into five parts, each part was presented as follows:**

- Information section
- Self check
- Correct answer

- **The self-learning package includes:**

- i. Each part should be read carefully and did not cancel any page in the package.

- ii. The questions after each unit should be answered.

- iii. Nurses can go to the model key answer after finishing the reading carefully.

- iv. Do not move to another unit unless the required score is achieved.

- v. If the nurses did not achieve the required score, they return again to the same chapter.

- vi. Nurses can return to the researcher in order to clarify the vague points.

- After 6 months of studying self-learning package, the first post assessment of knowledge and performance were conducted in November 2015 followed by the other post assessment after one year in April 2016. The pre-posttest was given to the nurses to assess whether their knowledge has improved. The posttest included the questionnaire and observation checklists mentioned previously and used in the pretest.

III. Administrative Design

To carry out the study, the necessary approvals were obtained from the director, Nursing director and Head of each department at the previous setting. Official letters were issued to them from the Faculty of Nursing explaining the aim of the study to obtain permission for the collection of data and implementation of the self-learning package.

IV. Statistical Design

Data collected from the studied sample was revised, coded and entered using PC. Computerized data entry and statistical analysis were fulfilled using the statistical package for social sciences (SPSS) version 18. Data were presented using descriptive statistics in the form of frequencies, percentages. Chi-square test (X^2) was used for comparison between qualitative variables. Significant was considered at P value <0.05 and $P < 0.01$ for interpretation of results of tests of significance. Pearsons correlation analysis was used for assessment of the interrelationship between nurses' knowledge and practices.

Results

Table (1): shows that (72%) of the studied nurses had secondary nursing school and the mean age of nurses was 29.5 ± 7.1 years.

Table (2): reveals that there were statistically significant differences between total score level of nurses' knowledge pre, post implementation and at follow-up regarding total care for head injury children as $X^2_1 = 38.50$ at **P1** level= 0.0001 and $X^2_2 = 54.54$ at **P2** level= 0.0001.

Table (3): shows that there were highly statistically significant differences between pre, post self-learning package implementation and at follow-up regarding assessing neurological status by assessing for changes in level of consciousness, assessing motor function, reflexes and vital signs, monitor for manifestations of increased intracranial pressure (ICP) and position the child so that the head is maintained in the midline to avoid jugular vein compression that cause increase ICP as $X^2_1 = 15.37, 12.02, 15.85$ and 20.19 respectively at **P1** level= 0.0001 and $X^2_2 = 24.75, 20.63, 18.21$ and 28.72 respectively at **P2** level= 0.0001.

Table (4): shows that there were highly statistically significant differences between pre, post self-learning package implementation and at follow-up regarding assess injuries: immobilize the neck if a cervical injury is detected and caring for any other injuries resulting from trauma, initiate seizure precautions as ordered,

withhold sedating medications during the acute phase of the injury to assess changes in levels of consciousness, assess the wound dressings for the presence of drainage and record the type and amount of drainage from the ears and nose as $X^2_1 = 20.45, 29.09, 19.11$ and 12.77 at **P1** level= 0.0001 and $X^2_2 = 27.27, 37.38, 37.07$ and 18.10 at **P2** level= 0.0001.

Table (5): indicates that there were highly statistically significant differences between pre, post self-learning package implementation and at follow-up regarding (GCS) eye opening response, verbal response in infant and child and motor response as $X^2_1 = 24.65, 25.37, 27.63$ and 26.50 respectively at **P1** level= 0.0001 and $X^2_2 = 32.83, 31.49, 35.99$ and 33.89 respectively at **P2** level= 0.0001.

Table (6): shows that there were highly statistically significant differences between pre, post self-learning package implementation and at follow-up regarding total nursing management for head injury as $X^2_1 = 12.20$ at **P1** level= 0.0001 and $X^2_2 = 14.05$ at **P2** level= 0.0001.

Figure (1): shows that the highest percent of the studied nurses (32%) their years of experience ranged between $5 < 10$ years, and their mean years of experience was 11.03 ± 7.7 years.

Figure (2): reveals that the highest percent of the studied nurses (85%) had no previous training about head injury in children.

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Table (1): Number and percentage distribution of the studied nurses according to their age and qualification (n=100)

Characteristics	Frequency	%
Age in years		
• 20 < 30	62	62.0
• 30 < 40	24	24.0
• ≥ 40 years	14	14.0
Mean± SD	29.5±7.1	
Level of education		
• Secondary nursing education	72	72.0
• Nursing technical institution	21	21.0
• Bachelor degree in nursing	7	7.0

Figure (1): Percentage distribution of the studied nurses according to their years of experience

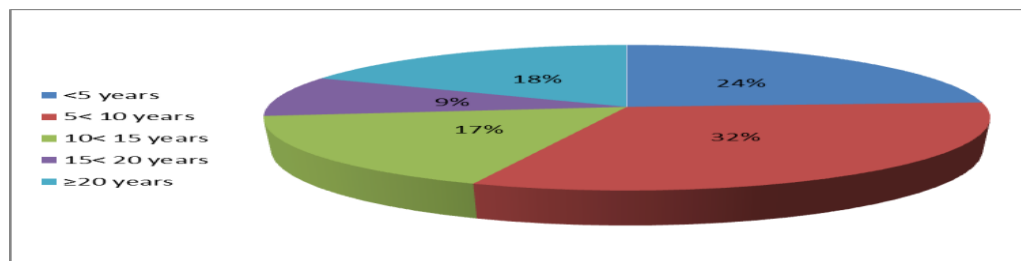


Figure (2): Percentage distribution of the studied nurses according to their previous training

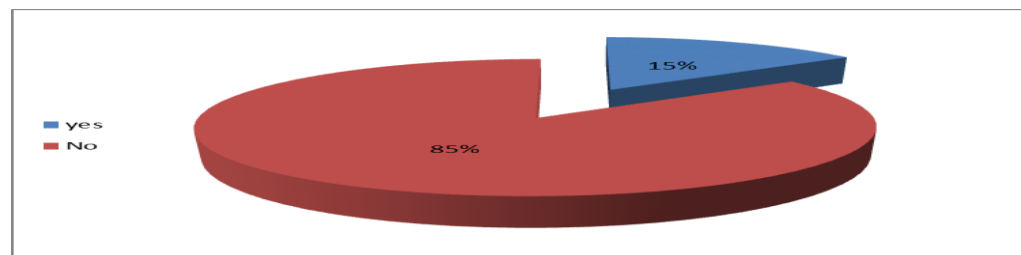


Table (2): Distribution of studied nurses regarding their total score level regarding their total knowledge about care of children with head injury pre implementation of self-learning package, post, and at follow-up period (n= 100).

Total Nurses' Knowledge	Pre		Post		Follow-up		Pre Vs. Post X1 ² (P1)	Pre Vs. Follow-up X2 ² (P2)
	No	%	No	%	No	%		
Poor	55	55.0	10	10.0	13	13.6	38.50 0.000**	54.54 0.000**
Average	26	26.0	22	22.0	27	27.0		
Good	19	19.0	68	68.0	60	60.0		

*Significant at 0.05

**Highly significant at 0.001

Table (3): Distribution of studied nurses regarding their practice about maintain adequate cerebral tissue perfusion throughout the intervention pre implementation of self-learning package, post, and at follow-up period (n= 100).

Nurses' practice	Pre		Post		Follow-up		χ^2_1 (P1)	χ^2_2 (P2)
	No	%	No	%	No	%	Pre vs. Post	Pre vs. Follow
Maintain adequate cerebral tissue perfusion: Assessing neurological status by assessing for changes in level of consciousness.							15.37 0.000**	24.75 0.000**
• Incompetent	47	47.0	12	12.0	18	18.0		
• Competent	53	53.0	88	88.0	82	82.0		
Assessing motor function, reflexes and vital signs.							12.02 0.001**	20.63 0.000**
• Incompetent	63	63.0	17	17.0	26	26.0		
• Competent	37	37.0	83	83.0	74	74.0		
Monitor for manifestations of increased (ICP). Such as: change in level of consciousness, changes in vital signs (elevated blood pressure and a decrease in pulse and respiration) and vomiting.							15.85 0.000**	18.21 0.000**
• Incompetent	73	73.0	30	30.0	33	33.0		
• Competent	27	27.0	70	70.0	67	67.0		
Position the child so that the head is maintained in the midline to avoid jugular vein compression that cause increase ICP.							20.19 0.000**	28.72 0.000**
• Incompetent	61	61.0	24	24.0	31	31.0		
• Competent	39	39.0	76	76.0	69	69.0		
Measure head circumference in infants, as should tension of the fontanel and the presence of a high-pitched cry.							0.0	0.0
• Incompetent	100	100.0	28	28.0	28	28.0		
• Competent	0	0.0	72	72.0	72	72.0		
Monitor for signs of epidural hematoma, such as asymmetric pupils (one dilated, unreactive pupil), that may require the evacuation of the hematoma.							3.02 0.082	1.93 0.164
• Incompetent	76	76.0	43	43.0	46	46.0		
• Competent	24	24.0	57	57.0	54	54.0		

*Significant at 0.05

** Highly significant at 0.001

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Table (4): Distribution of studied nurses regarding their practice about protect the child from injury throughout the intervention pre implementation of self-learning package, post, and at follow-up period (n= 100).

Nurses' knowledge	Pre		Post		Follow-up		X^2_1	X^2_2
	No	%	No	%	No	%	Pre vs. Post	Pre vs. Follow
Protect the child from injury: Assess injuries: immobilize the neck if a cervical injury is detected and caring for any other injuries resulting from trauma. <ul style="list-style-type: none"> • Incompetent • Competent 	55 45	55.0 45.0	20 80	20.0 80.0	25 75	25.0 75.0	20.45 0.000**	27.27 0.000**
Avoid suctioning through the nares because of the possibility of the catheter entering the brain through a fracture and may cause a secondary infection. <ul style="list-style-type: none"> • Incompetent • Competent 	0 100	0.0 100.0	0 100	0.0 100.0	0 100	0.0 100.0	0.0	0.0
Initiate seizure precautions as ordered. <ul style="list-style-type: none"> • Incompetent • Competent 	43 57	43.0 57.0	18 82	18.0 82.0	22 78	22.0 78.0	29.09 0.000**	37.38 0.000**
Maintain a quiet environment to help reduce restlessness and irritability of the child. <ul style="list-style-type: none"> • Incompetent 	100	100.0	100	100.0	100	100.0	0.0	0.0
Withhold sedating medications during the acute phase of the injury to assess changes in levels of consciousness. <ul style="list-style-type: none"> • Incompetent • Competent 	46 54	46.0 54.0	14 86	14.0 86.0	24 76	24.0 76.0	19.11 0.000**	37.07 0.000**
Assess the wound dressings for the presence of drainage, which could indicate the leakage of cerebrospinal fluid (CSF), record the type and amount of drainage from the ears and nose which resulting from a skull fracture. <ul style="list-style-type: none"> • Incompetent • Competent 	58 42	58.0 42.0	15 85	15.0 85.0	20 80	20.0 80.0	12.77 0.000**	18.10 0.000**

*Significant at 0.05

**Highly significant at 0.001

Table (5): Distribution of studied nurses regarding their practice about measuring level of consciousness by using Modified Glasgow coma scale (GCS) throughout the intervention pre implementation of self-learning package, post, and at the follow-up period (n= 100).

Nurses' practice	Pre		Post		Follow-up		X ² ₁ (P1)	X ² ₂ (P1)
	No	%	No	%	No	%	Pre vs. Post	Pre vs. Follow
Eye opening response							24.65	32.83
• Incompetent	60	60.0	27	27.0	33	33.0	0.000**	0.000**
• Competent	40	40.0	73	73.0	67	67.0		
Verbal response							25.37	31.49
a) Infant (<2 years)							0.000**	0.000**
• Incompetent	67	67.0	34	34.0	39	39.0		
• Competent	33	33.0	66	66.0	61	61.0		
b) Child (>2 years)							27.63	35.99
• Incompetent	63	63.0	32	32.0	38	38.0	0.000**	0.000**
• Competent	37	37.0	68	68.0	62	62.0		
Motor response							26.50	33.89
• Incompetent	57	57.0	26	26.0	31	31.0	0.000**	0.000**
• Competent	43	43.0	74	74.0	69	69.0		

*Significant at 0.05

**Highly significant at 0.001

Table (6): Distribution of studied nurses regarding their practice about total nursing management throughout the intervention pre implementation of self-learning package, post, and at follow-up period (n= 100).

Nurses' Practice	Pre		Post		Follow-up		Pre Vs. Post X ² ₁ (P1)	Pre Vs. Follow-up X ² ₂ (P2)
	No.	%	No.	%	No.	%		
Total Nursing management for head injury							12.20	14.05
• Incompetent	77	77.0	29	29.0	32	32.0	0.000**	0.000**
• Competent	23	23.0	71	71.0	68	68.0		

*Significant at 0.05

**Highly significant at 0.001

Discussion

Head trauma is the leading cause of death and disability among children. Nurses should be competent to be able to provide complete, comprehensive nursing management for those children.

The study was aimed to assess the impact of self-learning package on nurses'

performance about care of head injury children. Regarding to subjects characteristics, more than two thirds of the studied nurses had a secondary nursing education with the mean age 29.5±7.1 years. This may be due to the fact that secondary nursing school provides the community with large number of graduate diploma nurses than both faculties of nursing and technical nursing institutes. This was supported by *Said et al., (2009) &*

Cook et al., (2013) who mentioned that the secondary nursing schools provide the hospital with the large number of graduate secondary nursing school.

In relation to the years of experience, the current study result indicated that approximately one third of nurses were between five to less than ten years of experience. This result was similar to (*Said et al., 2009 and Harris 2013*), who reported that the years of experience of nurses was more than 5 years.

Regarding the effect of self-learning package on nurses' knowledge, the current study revealed that more than half of the studied nurses were scored poor knowledge pre implementation of self-learning package, this result similar to *Watts et al., (2011)* who reported that nurses have deficit knowledge in all aspects of care of the traumatic brain injury child. It was obvious from the current study findings that there were statistically significant difference between pre, post and follow-up self-learning package implementation regarding total score levels of nurses' knowledge This was due to self-learning package implementation that keep nurses aware with recent advances in their area of specialty and maintain their efficiency in carrying out activities.

Regarding the effect of self-learning package on nurses practices, this study showed that nurses had incompetent practices in pre self-learning package implementation regarding maintain adequate cerebral tissue perfusion through assessing neurological status by assessing for changes in level of consciousness, assessing motor function, reflexes and vital signs, monitor for manifestations of increased (ICP), position the child so that the head is maintained in the midline to avoid jugular vein compression that cause increase ICP, measure head circumference in infants, and monitor for signs of epidural hematoma. This result similar to *Chong et al., (2016)* who reported that nurses had poor knowledge and skills in neurologic

assessment. *Prabhakar et al., (2014)* added that the primary aim of managing child with brain injury is to minimize secondary injury by maintaining cerebral perfusion and oxygenation. *Bratton et al., (2017)* also added that high ICP management can lead to good neurological outcomes. These deficits in nurses practices were also related to nurses didn't know that there were their duties and doctor orders were not clear to them.

The study revealed that there were statistical significant differences between pre, post and follow up self-learning package implementation in all previous items. This could be attributed to self-learning package implementation, the clarity of instructions that improve nurses' performance.

The current study revealed that nurses had incompetent practices in pre self-learning package implementation regarding protect the child from injury through assessing injuries, immobilize the neck if a cervical injury is detected, avoid suctioning through the nares because of the possibility of the catheter entering the brain through a fracture and may cause secondary infection, initiate seizure precautions as ordered, maintain a quiet environment, withhold sedating medications during the acute phase of the injury to assess changes in levels of consciousness, and assess the wound dressings for the presence of drainage. This was due to that studied nurses didn't attend any training programs, this may affected their performance.

After self-learning package implementation the study revealed that there were statistical significant differences between pre, post and follow up self-learning package implementation in all previous items. This could be attributed to self-learning package implementation, the content of the package which was developed based on nurses' needs, its clarity and simplicity. *Fitzgerald et al., (2012)*, added that implement training and educational practices will lead to the

optimal development of clinical skills, knowledge, and practice for nurses and help meet the goals.

The current study revealed that the studied nurses were scored incompetent practice in pre self-learning package implementation regarding measuring level of consciousness by using Glasgow coma scale (eye opening response, verbal in eye and child response and motor response). This result similar to *Said et al., (2009)*, who reported that nurses should be with good observation and alert during measuring of Glasgow coma scale for immediate child hospitalization. In addition to *Chong et al., (2016)*, who added that Glasgow Coma Scale (GCS) is a reproducible tool used by nurses in almost every healthcare facility to assess level of consciousness in a patient with a neurological problem.

After self-learning package implementation, the study showed that there were statistical significant differences between pre, post and follow up of self-learning package implementation. This could be due to the implementation of self-learning package and nurses acquired new knowledge and skills in these critical care areas.

The study showed that approximately one quarter of nurses had incompetent practice regarding nursing management for head injury in pretest, these findings agreed with *Cook et al., (2013)* who revealed that pre-intervention practice and confidence were low about traumatic brain injury. After self-learning package implementation, more than two thirds of nurses had competent practice. This was due to self-learning package implementation and the new knowledge and skills that the nurses acquire and they become able to apply it during their practice.

Conclusion

Based on the result of the current study, it was concluded that the implementation of self-learning package upgrade nurses' performance about care of children with head injury.

Recommendations

1. The self-learning package for nursing care regarding head injury children should be available in Neurosurgery Department, Emergency Department and Pediatric Intensive care Unit to be followed by all nurses and updated periodically.
2. Periodic self-learning package should be performed for nurses who work in Neurosurgery Department, Emergency Department and Pediatric Intensive Care Unit to engage them for acquiring and updating knowledge and carrying out new approaches in the area of management of head injury children and promote quality of care.
3. Further researches should be performed in a large scale for generalization of the research for enhancement techniques to help nurses to care for children with head injury.

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