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Assessment of Nurses' Knowledge and Practices Regarding Care of Patients with Traumatic Head Injury in the Intensive Care Unit

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Abstract

Background: Traumatic head injury is common neurological condition and a leading cause of morbidity, disability, and mortality worldwide. **Aim:** The study aimed to assess the nurses' knowledge and practices regarding care of patients with traumatic head injury in intensive care unit. **Design:** A descriptive exploratory design was used to achieve the aim of the study. ***Setting*** :The study was conducted at the intensive care unit at Emergency building affiliated to Zagazig University Hospitals. ***Subject:*** Convenient sample which included all available nurses (90) nurses. ***Tools:*** Two tools were used: **Tool I**: Structured Interviewing Questionnaire, **Tool II**: Nurses' Practices Observational Checklists. **Results:** The current study illustrated that less than three- quarter of the studied nurses have satisfactory level of knowledge regarding care of patients with traumatic head injury and more than four-fifths of the studied nurses have competent level of practice regarding care of patients with traumatic head injury during first, second and third observation. Also, was a highly statistically significant positive strong correlation between knowledge and practice regarding care of patients with traumatic head injury among the studied nurses. **Conclusion:** most of the studied nurses at intensive care unit had satisfactory level of knowledge and competent level of practice regarding caring of patients with traumatic head injury. **Recommendations**: Further study is required to determine the Impact of an educational program on nurses' knowledge and practice regarding care of traumatic head injury patients at intensive care unit.

Keywords: *Intensive care unit, Knowledge, practices, Traumatic head injury.*

Introduction

Traumatic head injury (THI) is an injury that results from a violent blow to the scalp, skull or brain that can result in impaired physical, cognitive, emotional, and behavioral functioning. The severity of THI can range from mild alterations of consciousness to severe comatose state and death ***(Hassan et al.,2022).*** Traumatic Head injury is the leading cause of death and disability in trauma patients and leading causes of head trauma are motor vehicle-related injuries, falls, and assaults. THI can be classified into mild, moderate, and severe by the Glasgow coma scale (GCS) ***(Rakhit et al., 2021).***

Traumatic Head Injury can cause a variety of complication. The risk of complication increases with the severity of the trauma including physical, cognitive, emotional, and behavioral complications. Complications of THI include immediate seizures, hydrocephalus or post-traumatic ventricular enlargement, CSF leaks, infections, vascular injuries, cranial nerve injuries, pain, bed sores, multiple organ system failure in unconscious patients, and polytrauma **(*Abd El star et al.,2019).***

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Nursing interventions focus on recognition and reduction of increased ICP, limiting or preventing secondary brain injury, and stabilization of vital signs. Ongoing neurologic assessments are the foundation of care for patients with THI. Assessments are the primary mechanism for determining improvement or worsening of the patient's condition .If secondary injury is to be prevented, the critical care nurse must respond immediately to events that increase ICP, reduce mean arterial blood pressure (MAP), and reduce cerebral perfusion pressure (CPP) ***(Lough et al.,2022).***

Significance of the study:

Traumatic Head injury has the highest incidence of all common neurological disorders, and poses a substantial public health burden. THI is increasingly documented not only as an acute condition but also as a chronic disease with long-term consequences, including an increased risk of late-onset neurodegeneration. Traumatic head injuries are a leading cause of morbidity and mortality in the US ***(Maas et al., 2022).***

The world health organization estimated that 70% - 90% of THI are mild, while 10% are moderate to severe injuries. The fatality rate is estimated to be 30% -50%. In Egypt each year, about two million people suffer from THI, about 500,000 patients are hospitalized ***(*Hassan *et al.,2022).*** And the number of THI in Sharkia Governorate is estimated at 3,756 according to Egyptian Ambulance Organization for the year 2022. So that the aim of the study is to assess nurses' Knowledge and Practice regarding care of patients with traumatic head injury in intensive care unit.

Aim of the study:

This study aims to assess the nurses' knowledge and practices regarding care of patients with traumatic head injury in intensive care unit through the following objectives:

1- Assess nurses' level of knowledge regarding care of patients with traumatic head injury in intensive care unit.

2- Assess nurses' level of practices regarding care of patients with traumatic head injury in intensive care unit.

Research Questions

The current study will answer the following questions:

1- What are the nurses' levels of knowledge regarding care of patients with traumatic head injury in intensive care unit?

2- What are the nurses' levels of practices regarding care of patients with traumatic head injury in intensive care unit?

Subjects and Methods

Research Design

A descriptive exploratory research design was used to achieve the aim of the study.

Setting:

The study was conducted at the intensive care unit at Emergency building affiliated to Zagazig University Hospitals. The intensive care unit is located in fifth floor beside Operation department. The intensive care unit included 22 patient beds classified as 21 patient beds (contained 3 beds for isolated cases) and 1bed remain free for blue code.

Subject:

Convenient sample Which included all available nurses about (106) nurses who working in the selected setting during study period and agree to participate in the study.

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During data collection, the available existing nurses were (90), some of them, traveled abroad, some of female nurses took maternity leave and some of male nurses gone to do military service.

Tools of data collection:

Two tools were used in the current study as the following:

Tool I: Structured Interviewing Questionnaire:

This tool was developed by the investigator in simple Arabic Language after reviewing recent related literature, adapted from ***(Eid et al.,2022)*** and ***(Ahmed et al.,2021)*** and composed of the following two parts:

Part one*:* Nurses' personal characteristics:

It was concerned with assessment of personal characteristics of studied nurses, it consisted of 6 items including (age, gender, marital status, level of education, years of experience in intensive care unit, previous training courses).

Part two: Studied nurses' Knowledge Assessment Questionnaire:

It was adapted from (***Abd El star et al., 2019)*** and modified by the investigator based on review of related literature, it was used to assess nurses' knowledge regarding care of patients with traumatic head injury. This tool consisted of 50 questions in the form of (multiple choices and true and false).

It included four parts:

- **Part (I) Nurses' knowledge regarding anatomical and functional structure of the head and brain**, which consisted of (10 questions from 1 to 10).
- **Part (II) Nurses' knowledge in relation to causes, symptoms, and complications of traumatic head injury among the studied nurses**, it consisted of (10 questions from 11 to 20).
- **Part (III) Nurses' knowledge in relation to diagnostic and therapeutic measures**, consisted of 5 questions (from 21 to 25).
- **Part (IV) Nurses' knowledge regarding care of patients with traumatic head injury**, this part included two sections:

First, Nursing role for non-mechanically ventilated patients, consisted of 10 questions (from 26 to 35).

Second, Nursing role for mechanically ventilated patients, consisted of 15 questions as (7 multiple choice questions from 36 to 42 and 8 true/false questions from 43 to 50).

Scoring system of nurse's assessment questionnaire regarding care of patients with traumatic head injury.

This tool consisted of 50 questions with a total grade (50). One grade was given for each correct answer, and zero grade was given for in correct. The total grades for questions were summed up and then converted into a percentage score. They were classified into two level as the following

- Satisfactory level, which computed if total score is equal or more than 80%. (≥ 80% was considered a satisfactory level of knowledge (≥ 40 grades correct answers).
- Un-satisfactory level, which computed if the total score is less than 80%. (<80% were considered un satisfactory level of knowledge (<40 grades correct answers).

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Tool II: Studied nurses' Practices Observational Checklists regarding care of patients with traumatic head injury:

This tool was adapted from ***(Mohammad.,2018)***, ***(Abd Elkhalek et al.,2023)*** and (***Abd El star et al., 2019)*** and modified by the investigator to assess nurses' practices for patient with traumatic head injury in critical care unit. It included five checklists:

- Maintain air way clear (Oropharyngeal& nasopharyngeal suction checklist), it consisted of (17 steps).
- Endotracheal tube care (ETT Care checklist), it consisted of (25steps), including pre-care of ETT (1-8), ongoing care of ETT (9-21), post-care of ETT (22-25).
- Glasgow coma scale (GCS) assessment, it consisted of (3 step), including eye opening response score from (4-1), verbal response score from (5-1), motor response score from (6-1).
- Checklist for Enteral Feeding via Nasogastric Tube, it consisted of (35steps), including pre-care of enteral feeding (1-8), bolus feeding (9-20), continuous feeding (21-35).
- Arterial blood gases (ABG) Checklist, it consisted of (26 steps).

Scoring system of practices regarding care of patients with traumatic head injury.

This tool consisted of 106 steps with a total grade (106). One grade was given for done step and zero grade was given for not done step after 3 observations for each step. The total grades for each step were summed up and then converted into a percentage score. They were classified in to two level as the following:

- Competent level, which computed if total score is equal or more than 80%. (≥ 80% was considered a competent level of practice (≥ 85 correct actions).
- In-competent level, which computed if the total score is less than 80%. (<80% was considered in competent level of practice (≥ 85 correct actions).

Validity:

The tools were revised by a panel of five experts in medical surgical nursing department, Faculty of Nursing, Helwan University, from different academic categories (assistant professors and lecturers). The expertise revised tools for clarity, relevance, comprehensiveness, understanding and ease for implementation. All recommended modifications were done.

***Reliability*:**

Reliability for the utilized tools was tested to determine the extent to which the items of the tools are inter-correlated to each other. The Cronbach's alpha model is one of the most popular reliability statistics is use today and considered as a model of internal consistency that is used to estimate reliability of test scores.

The statistical equation of Cronbach's alpha reliability coefficient normally ranges between 0-1, ***(Malkewitz et al., 2023)***. Reliability for knowledge questionnaire was (.,966) and practice questionnaire was (.,986).

Ethical considerations:

An official permission to conduct the proposed study is obtained from the Scientific Research Ethics Committee of Faculty Nursing Helwan university. Participation in the study is voluntary and studied nurses were given complete full information about the study and their role before signing the informed consent. The ethical considerations included explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it will not be accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs were respected.

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Pilot study:

The pilot study was carried out on 10% (11nurses) to test the clarity and applicability of the tools and time needed for data collection. Based on the results, Subjects included in the pilot study and no modifications were done from the study.

Field work:

Field work of this study was executed in six months from October, 2023 to March 2024 during this period all the data were collected from the studied nurses.

1- The investigator met the study subjects, each nurse was met individually, got a full explanation about the aim of the study and was invited to participate.

2- The nurse who gave his/ her verbal informed consent to participate in the study was handed the self-administered questionnaire and was instructed how to fill it.

3- The data were collected two days a week in the morning and afternoon shifts, the time used for finishing the self-administered questionnaire ranged between 15-20 minutes for each nurse.

4- The investigator might obtain (4 to 5) self-administered questionnaire per day, while the emergency day the investigator sometimes could not obtain any questionnaire

5- Also, the investigator was observing studied nurses' practical skills using an observational check list about studied procedures.

6- The investigator observed studied nurses 3 times for each step in each procedure for more accurate assessment.

7- The time needed to complete the checklist varies ranged between 30-45 minutes for each nurse.

Administrative item:

To carry out this study, the necessary approval was obtained from the hospital director. A letter was issued from the Dean of Faculty of Nursing, Helwan University explaining the purpose of the study to obtain the permission for conducting the study.

Statistical Item:

Data entry and analysis were performed using SPSS statistical package version 25. Categorical variables were expressed as number and percentage while continuous variables were expressed as (mean ±SD). Chi-Square (x2) was used to test the association between row and column variable of qualitative data. Chi-Square in one sample (Non- parametric Chi-Square) was used to compare between satisfactory and un-satisfactory of knowledge. While independent T test used to compare mean in normally distributed quantitative variables between two groups. While ANOVA test (F) used to compare mean in normally distributed quantitative variables to compare difference between three-different times and (r) most commonly refers to Person's correlation coefficient. This is a measure that indicates the strength and direction of the linear relationship between two variables. Pearson correlation was done to measure correlation between quantitative variables. For all tests, a two -tailed p-value ≤ 0.05 was considered statistically significant, P-value ≤ 0.01 was considered highly statistically significant. While p-value> 0.05 was considered not significant.

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Results:

Table (1): Frequency and percentage distribution of the studied nurses regarding to their personal characteristics (n= 90)

Personal characteristics		F	%
Age (year)	▪ 18 < 30	58	**64.4**
	▪ 30 < 40	32	35.6
	▪ **Mean ± SD**	**25.85 ± 6.34**	
Marital status	▪ Married	54	**60.0**
	▪ Single	36	40.0
Level of education	▪ Secondary school nursing	2	2.2
	▪ Technical institute	69	**76.7**
	▪ Bachelor	18	20.0
	▪ Post graduate degree	1	1.1
Years of Experience in intensive care unit	▪ < 5 years.	17	18.9
	▪ 5 < 10 years.	40	**44.4**
	▪ 10 < 15 years.	32	35.6
	▪ ≥ 15 years.	1	1.1
	▪ **Mean ± SD**	**8.06 ± 4.13**	
Previous training courses	▪ Yes	25	27.8
	▪ No	65	**72.2**
No of courses	▪ **Mean ± SD**	**1.61 ± 0.95**	

Table (1) shows that **(64.4%)** of studied nurses age was ranged from 18 < 30 years old, with a mean age of **25.85 ± 6.34**. regarding marital status, **(60.0%)** of studied nurses were married. Considering level of education, **(76.7%)** of the studied nurses holding a technical institute of Nursing, while the minority **(1.1%)** of studied nurses holding post graduate degree. Regarding years of experience **(44.4%)** of studied nurses were had experience in nursing field ranged from 5 < 10 with a total mean of **8.06 ± 4.13.** Additionally, **(72.2%)** didn't attend training courses with a mean **1.61 ± 0.95 (out of total no of attending courses=25).**

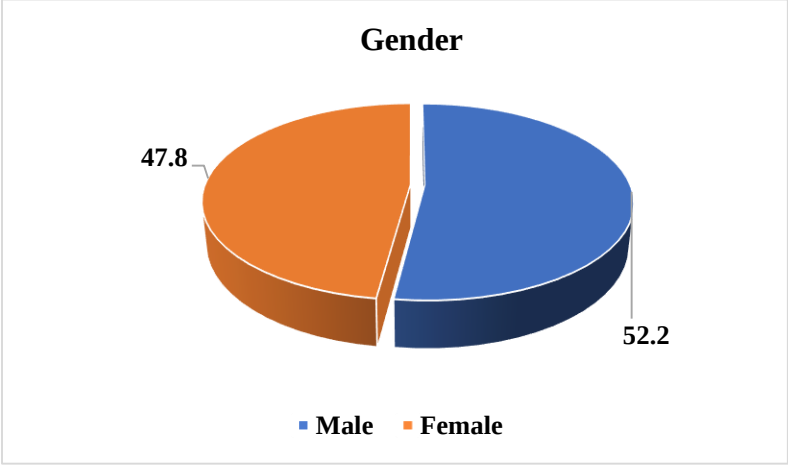

Figure (1): Percentage distribution of the studied nurses regarding to their gender (n= 90)

Fig (1) illustrates that **(52.2%)** of the studied nurses were male, with a male to female ratio=1.1:1.

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Table (2): Total mean score of knowledge regarding care of patients with traumatic head injury among the studied nurses (n= 90)

Knowledge regarding care of patients with traumatic head injury.	N	%	Min	Max	Mean ± SD	T	P Value
Un-satisfactory level	26	28.9	0	35	7.65 ± 11.49		
Satisfactory level	64	71.1	40	50	49.03 ± 2.23		
Total (total score 50)	**90**	**100.0**	**0**	**50**	**37.08 ± 19.9**	**27.5**	**0.000****

Table (2): represents that the total mean score of knowledge regarding care of patients with traumatic head injury among the studied nurses is $\bar{x}$ ± SD= 37.08 ± 19.9 (Total score is 50). In addition to, there is a highly statistically significant difference total mean score with P0.000.

Table (3): Total mean score of practices regarding care of patients with traumatic head injury among the studied nurses (n= 90)

Practice regarding care of patients with traumatic head injury:	First observation	Second observation	Third observation	F Test	P-Value
	$\bar{x}$ ± SD	$\bar{x}$ ± SD	$\bar{x}$ ± SD		
In-competent	51.18±19.7	52.36±19.5	53.67±21.3	**0.034**	**0.966**
Competent	101.76±3.1	101.73±3.1	101.81±3.1		
Total (Total score is 106)	**95.58±18.1**	**95.70±17.7**	**95.39±18.3**		

*Significant p ≤ 0.05 **Highly significant p ≤ 0.01 F: ANOVA Test

Table (3): Clarifies that total mean score of practices regarding care of patients with traumatic head injury among the studied nurses is **95.58±18.1, 95.70±17.7** and **95.39±18.3** (Total score is **106**). during first, second and third observation respectively. In addition to, there isn't statistically significant difference between three-time observations.

Table (4): Crosstab association between level of knowledge regarding care of patients with traumatic head injury and personal characteristics. **(n=90)**

Personal characteristics		No.	Level of Knowledge				χ^2	P-Value
			Un-satisfactory		Satisfactory			
			26	28.9	64	71.1		
			N	%	N	%		
Age (year)	▪ 18 < 30 Yrs.	58	25	27.8	33	36.7	16.0 FET	0.000**
	▪ 30 < 40 Yrs.	32	1	1.1	31	34.4		
Gender	▪ Male	47	2	2.2	45	50.0	29.0 FET	0.000**
	▪ Female	43	24	26.7	19	21.1		
Marital status	▪ Married	54	18	20.0	36	40.0	1.3 FET	0.343
	▪ Single	36	8	8.9	28	31.1		
Level of education	▪ Secondary	2	2	2.2	0	0.0	13.8	0.003**
	▪ Technical	69	24	26.7	45	50.0		

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	▪ Bachelor	18	0	0.0	18	20.0		
	▪ Post-graduate	1	0	0.0	1	1.1		
Years of Experience in intensive care unit	▪ < 5 years.	17	1	1.1	16	17.8	33.9	0.000**
	▪ 5 < 10 years.	40	24	26.7	16	17.8		
	▪ 10 < 15 years.	32	1	1.1	31	34.4		
	▪ ≥ 15 years	1	0	0.0	1	1.1		
Training courses	▪ Yes	25	0	0.0	25	27.8	14.0 FET	0.000**
	▪ No	65	26	28.9	39	43.3		

*Significant p ≤ 0.05 **Highly significant p ≤ 0.01 FET: Fisher Exact Test

Table (4): represents that, there is a highly statistically significant relation between demographic data regarding age, gender, level of education, years of experience in intensive care unit, attending training courses and total level of knowledge among the studied nurses**,** at P ≤ 0.01.

Table (5): Crosstab association between level of practice regarding care of patients with traumatic head injury and personal characteristics. (n=90)

Personal characteristics		**No.**	**Level of practice (Cumulative)**				χ^2	**P-Value**
			In-competent		**Competent**			
			11	**12.2**	**79**	**87.8**		
			N	**%**	**N**	**%**		
Age (year)	▪ 18 < 30 Yrs.	58	10	11.1	48	53.3	3.8 FET	0.05**
	▪ 30 < 40 Yrs.	32	1	1.1	31	34.4		
Gender	▪ Male	47	2	2.2	45	50.0	5.8 FET	0.023*
	▪ Female	43	9	10.0	34	37.8		
Marital status	▪ Married	54	7	7.8	47	52.2	0.06 FET	1.0
	▪ Single	36	4	4.4	32	35.6		
Level of education	▪ Secondary	2	2	2.2	0	0.0	17.0	0.001**
	▪ Technical	69	9	10.0	60	66.7		
	▪ Bachelor	18	0	0.0	18	20.0		
	▪ Post-graduate	1	0	0.0	0	0.0		
Years of Experience in intensive care unit	▪ < 5 years.	17	9	10.0	31	34.4	7.2	0.066
	▪ 5 < 10 years.	40	1	1.1	16	17.8		
	▪ 10 < 15 years.	32	1	1.1	31	34.4		
	▪ ≥ 15 years	1	0	0.0	1	1.1		
Training courses	▪ Yes	25	0	0.0	25	27.8	4.8 FET	0.031*
	▪ No	65	11	12.2	54	60.0		

*Significant p ≤ 0.05 **Highly significant p ≤ 0.01

FET: Fisher Exact Test Cumulative sum of three observations

Table (5): Represents that, there is a statistically significant relation between personal characteristics regarding age, gender, and attending training courses and highly statistically significant regarding level of education and total level of practices among the studied nurses**,** at P ≤ 0.05.

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Table (6): Correlation between knowledge and practices regarding care of patients with traumatic head injury among the studied nurses (n=90)

Items		Knowledge	Practice
Knowledge	**r**	**1**	0.741
	P		0.000**
Practice	**r**	0.741	**1**
	P	0.000**	

*Significant p ≤ 0.05 **Highly significant p ≤ 0.01

Table (6): Represents that there is a highly statistically significant positive strong correlation between knowledge and practice regarding care of patients with traumatic head injury among the studied nurses at r = 0.741 & P = 0.000.

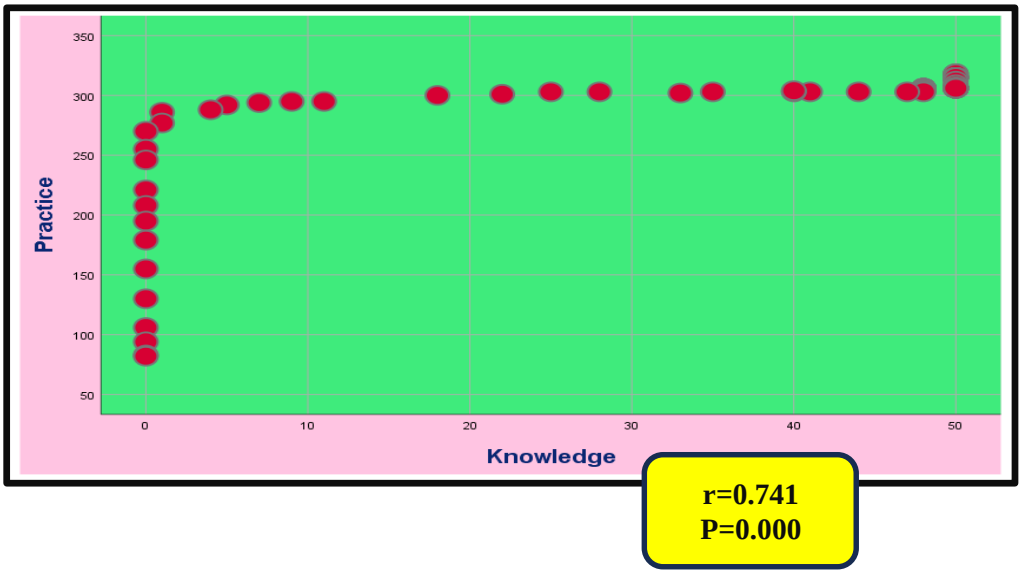

Figure (2): Scatter dot correlation between knowledge and practice regarding care of patients with traumatic head injury among the studied nurses (n=90)

Fig (2) illustrates that there was a highly statistically significant positive strong correlation between knowledge and practice regarding care of patients with traumatic head injury among the studied nurses at r = 0.741 & P = 0.000.

Discussion

Traumatic head injury (THI) is defined as an alteration of brain function or other evidence of brain pathology, caused by an external force to the head. It is a common neurological condition and a leading cause of morbidity, disability, and mortality worldwide ***(Santing et al., 2023)***. Also defined as a definite history of an upset to the head, a laceration of the scalp, or altered consciousness secondary to physical injury/structural alteration to the skull by any type of external force to the head ***(Demlie et al., 2023)***.

The discussion of the present study was covered the following sequences:

- **Part (I):** Personal Characteristic of the Studied Nurses.
- **Part (II):** Nurses' Knowledge Regarding Care of Patients with Traumatic Head Injury in Intensive Care Unit.
- **Part (III):** Nurses' Practices Regarding Care of Patients with Traumatic Head Injury in Intensive Care Unit.

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- **Part (IV):** Relations and Correlation between Studied Variables.

Part (I): Personal Characteristics of the Studied Nurses: -

Regarding personal characteristics of the current study revealed that more than half of the studied nurses age was ranged from 18<30 years old, with a mean age of 25.85 ± 6.34 this result might be due to most of studied nurses were newly graduation and should spend mandatory period after graduation and the nurses work in intensive care unit >40years old have administrative position rather than be assigned to the patients and many of studied nurses after receiving experiences tends to travel to work abroad , three-fifths of studied nurses were married, more than three-quarters of the studied nurses graduated from technical institute of nursing, while the minority of studied nurses holding post graduate degree. These results may due to technical institute of nursing provide the community with large number of nurses. Two-fifth of studied nurses had experience in nursing field, three-quarters of the studied nurses not attend any training courses while, more than one -quarter attended training courses and more than half of nurses were male.

These results were agreed with ***(Elsayed et al.,2020)***, who's study about" *Nurses' Performance Regarding Advanced Care of Trauma Patients at Emergency*" and stated that more than three quarters of studied nurses were male, three-fifths of studied nurses were married, more than half of studied nurses hade technical institute of nursing.

Also, these results were supported by***(Hassan et al.,2022)*** who's study titled " *Effect of an Educational Program on the Nurses' Performance and Health Outcomes for Patients with Traumatic Head Injury*" at *Benha University,* it revealed that more than three- fifth of the studied nurses were male and the majority of studied nurses had technical institute of nursing.

These results were disagreed with the study conducted by (***Mohammad., 2018)*** who's study title about "*Nurses' performance regarding caring patients with head injury: An educational intervention*" at zagazig university, it revealed that more than three quarter of them were female.

Also, these findings disagreed with ***(Shehab, et al.2018)***, who's study about " *Impact of an Educational Program on Nurses' Knowledge and Practice Regarding Care of Traumatic Brain İnjury Patients at Intensive Care Unit at Suez Canal University Hospital*" and stated that the majority of the studied nurses who work in intensive Care Unit were female and less than half of the studied nurses age range from 18-25 years.

Part (II): Nurses' Knowledge Regarding Care of Patients with Traumatic Head Injury in Intensive Care Unit:

As regarding to total knowledge, the current study illustrated that more than three-fifths of the studied nurses had satisfactory level of knowledge regarding care of patients with traumatic head injury, while more than one quarter hade un-satisfactory level of knowledge regarding care of patients with traumatic head injury. Although the majority did not attend any courses, the overall level of knowledge was satisfactory. This is because the nurses were recent graduates, and almost less than a quarter had a bachelor's degree, and a one third of studied nurses have taken the courses. Additionally, nurses collaborate closely with doctors and other healthcare professionals, making their knowledge of head injuries crucial for effective communication and teamwork.

The current study agrees with ***(Sivakami and Kanitha.,2021)*** who's study about" *The satisfaction of nursing care among traumatic brain injury patients: Cross-sectional study*" and revealed that near than half of the respondents stated that the nursing care in the trauma center was very good and one quarter of them stated excellent care.

The current study disagrees with ***(Santos and Silva,2023)*** who's study about" *Assessment of nurses' knowledge in managing trauma patients during the "golden hour" in emergency care settings*" and reported that

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slightly less than three-quarters of the studied nurses had unsatisfactory total knowledge about critical trauma protocols.

As well ***(Abd El-kader et al.,2020)*** who's study about" *Effect of an Educational Program on nurses' performance regarding the care of Patients with Head Injuries*" and reported that the majority of studied nurses had unsatisfactory knowledge about traumatic head injury pre-program intervention.

This findings data answered the first research question. It states what are the nurses' level of knowledge regarding care of patients with traumatic head injury in intensive care unit, and clarified that more than three-fifths of the studied nurses had satisfactory level of knowledge regarding care of patients with traumatic head injury in intensive care unit.

Part (III): Nurses' Practices Regarding Care of Patients with Traumatic Head Injury in Intensive Care Unit.

As regarding to total practices about traumatic head injury, the current study illustrated that more than four-fifths of the studied nurses had competent level of practices regarding care of patients with traumatic head injury during first, second and third observation.

From the investigator point of view, nurse's competence in caring for patients with traumatic head injuries is demonstrated through a combination of specialized knowledge, clinical skills, and a holistic approach to patient care. Ongoing professional development and adherence to best practices ensure that nurses remain updated on the latest guidelines and research related to traumatic head injuries. This commitment to lifelong learning ultimately enhances their competence and ability to deliver high-quality care, significantly impacting patient outcomes in this challenging area of healthcare.

This study was agreed with ***(AbdELstar et al.,2019***) who's study about "*Nurses' Performance Regarding Patient with Traumatic Head Injury in Intensive care unit*" and reported that more than three-quarter of studied nurse had satisfactory level of practice. Also **(*Mohammad.,2018)*** who reported that more than half of studied nurses had competent level of practice about traumatic head injury. Also, ***(Parker and Cooper, 2023)*** who's study about "*Nurses' competence in caring for advanced trauma patients: A multicenter observational study* " showed that more than three-quarters of the studied nurses in trauma care units had competent level of practice regarding nurses' total practice regarding care of advanced trauma patients.

The current study disagreed with ***(Shehade et al.,2023)*** who's study about " *Knowledge and practice of nurses regarding the care of patients with head trauma in intensive care units in the West Bank*" and reported that majority of studied nurses had poor level of practice about traumatic head injury.

Also, these findings disagreed with (***Khalifa et al., 2021***) who's study about " *Nurses' Performance of Golden Hours for Trauma in Helwan General Hospital*" and reported that nearly two third of the studied subjects had total incompetent level of practice regarding to the care of traumatic patients

Also, this result was inconsistent with ***(Johnson and Harris, 2020)*** who's study about " *Trauma nursing deficiencies in multi-casualty events: A study of nursing practices*" and reported that more than half of the studied nurses had un competent level of nursing practices regarding head trauma nursing management in mass casualty scenarios.

This findings data answered the second research question, which stated what are the nurses' level of practice regarding care of patients with traumatic head injury in intensive care unit, and clarified more than four-fifths of the studied nurses had competent level of practices regarding care of patients with traumatic head injury.

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Part (IV): Relations and Correlation between Studied Variables.

The current result represents that there was a highly statistically significant relation between personal characteristics, age, gender, level of education, years of experience in intensive care unit, and attending training courses and total level of knowledge among the studied nurses, at P = ≤ 0.01.

From the investigator point of view, the relation between personal characteristics and total level of knowledge, this can be explained by the fact that nurses with more experience tend to have encountered a wider variety of clinical situations, leading to enhanced practical knowledge. Similarly, nurses with higher education levels often receive more comprehensive training, which contributes to their overall competence. These personal factors shape the knowledge and skills of nurses in the intensive care unit, underscoring the importance of targeted educational initiatives to improve patient care.

This result agreed with (***Ahmed et al., 2023)*** who's study about " *Nurses' knowledge and practices in managing acute traumatic brain injury patients: A cross-sectional study*" and reported that there is a highly significant (P<0.01) association between the knowledge of the nurses regarding care of acute head injury patients and selected sociodemographic variables like professional qualification, clinical experience, and area of work. Also, the study findings agreed with ***(Abd ELstar et al., 2019***) who mentioned that, there was a highly statistically significant relation between knowledge level and education level and years of experience.

This result disagrees with ***(Shehab et al., 2018)***, who reported that there is no significant relation between total knowledge and demographic data including age, level of education and years of experience. Also, ***(Ali et al., 2023)*** who's study about " *Trauma nursing education and its impact on clinical outcomes: A cross-sectional study*" and stated that no statistically significant relation between knowledge and years of experience.

In addition, the current result disagrees with (***Shehade et al.,2023)*** who reported that there was no significant difference between nurses' knowledge regarding the care of patients with a head trauma and the demographic characteristics. Also, these findings disagree with ***(Ahmed et al., 2020*)** who's study about "*The impact of nurses' experience and education on the management of traumatic brain injury patients in intensive care units*" and found no significant relation between total nurses' knowledge and personnel data such as age, training courses and year's experiences.

The current study represents that, there was a statistically significant relation between personal characteristics (age, gender, level of education, and attending training courses) and total level of practices among the studied nurses**,** at P = ≤ 0.05.

The investigator presumes that nurses with more years of experience tend to develop stronger clinical skills and competencies through exposure to diverse patient scenarios, which enhances their practice. Additionally, higher levels of education contribute to a better understanding of evidence-based care and critical thinking. Participation in training courses ensures that nurses stay updated on the latest practices and technologies, further improving their ability to provide high-quality care. While gender may influence professional opportunities and access to resources, it does not directly affect practice levels. These findings underscore the importance of demographic factors in shaping nursing practice and highlight the need for ongoing educational initiatives to enhance care delivery.

This result agreed with ***(Abd ELstar et al., 2019)*** who showed that there was statistically significant relation between training course and practice level. Also, there was a highly statistically significant relation between practice level and education level and years of experience.

Also, this finding consistent with ***(Shehade et al., 2023)*** who reported that, there was significant difference between nurses' practice regarding the care of patients with a head trauma and the experience as general and the experience in the ICU. While this result disagrees with ***(Hassan and Ali, 2022)*** who's study about " *Relationship*

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between demographic characteristics and nurses' practice in managing trauma patients in ICU settings" and found that no significant relation was found between total nurses' practice and personnel data as the age, training and years of experiences and educational level.

The current result represents that there was a highly statistically significant positive strong correlation between knowledge and practice regarding care of patients with traumatic head injury among the studied nurses**.** The investigator believes that this finding reflects the importance of integration between theory and practice. The investigator presumes that, when the nurse's knowledge of care increase, their practice will improve too.

The current result agrees with ***(Almeida and Silva, 2024)*** who's study about "*The impact of an educational program on nurses' knowledge and practice in the care of advanced trauma patients: A longitudinal study*" and stated that, there is significant positive correlation between nurses′ total knowledge and total practice for care of patients with advanced trauma at pre, post and follow up implementation of educational program.

Also, this finding agreed with (***Mohammad, 2018)*** who reported, there was a highly statistically significant positive association between head nurses' knowledge, and practice at the immediate post and follow up intervention phases. As well ***(Eid et al., 2022)*** who's study about "*Effect of Education Guidelines on Nurses' Performance Regarding Patients with Head Trauma During Golden Hour in Emergency Department*" and revealed that a statistically significant relation was found between nurse' total knowledge, their practice regarding care of patients with head trauma.

Conclusion:

Based on the study findings, more than three-fifths of the studied nurses at intensive care unit had satisfactory level of knowledge while, more than four- fifths of studied nurses had competent level of practices regarding caring of patients with traumatic head injury in intensive care unit. In addition, there is a highly statistically significant relation between personal characteristic and total level of knowledge. Also, there is a statistically significant relation between personal characteristic and total level of practices. Furthermore, there is a highly statistically significant positive strong correlation between knowledge and practice regarding care of patients with traumatic head injury among the studied nurses.

Recommendation:

Based on the results of the present study the following recommendations can be deduced:

- Creating a thorough and concise handbook with instructions for nurses caring for patients in intensive care units who have suffered traumatic head injuries.
- Constant training sessions and workshops are required for the nurses who care patients with head trauma.
- Head trauma nursing management protocol should be implemented to ensure patient care.
- Periodic evaluation of nurse's knowledge and practice regarding care of patients with traumatic head injury.
- Further study is required to determine the Impact of an educational program on nurses' knowledge and practice regarding care of traumatic head injury patients at intensive care unit
- Further study on large sample and multi geographical areas for generalization.

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