

# Effect of Educational Guidelines on Nurses' Performance Regarding Care for Patients with Acute Poisoning in Emergency Unit

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**Abstract.** Acute poisoning is a major public and preventable health issue contributing to morbidity and mortality all over the world. This study aimed to evaluate the effect of educational guidelines on nurses' performance regarding care for patients with acute poisoning in emergency unit. A one group quasi-experimental research design, with pre and post-test was utilized in this study. The study was conducted at a poisoning treatment center affiliated to Ain Shams University Hospitals. A convenience sample of all available nurses (30) caring for patients with acute poisoning. Three tools were used: Tool (1): Nurses' self-administered questionnaire, tool (2): Nurses' Observational checklist and tool (3): Likert scale. The present study revealed that there was a highly significant relation between the effect of educational guidelines on nurses' performance regarding care for patients with acute poisoning in emergency unit and total nurses' practice in which (P value= 0.001). In addition, there is a significant relation with total knowledge and attitude as (P value= 0.004 & 0.007) respectively. The implementation of the educational guidelines has a positive effect on nurses' performance level regarding care for patients with acute poisoning in emergency unit which supported the research hypothesis. Nursing care protocol for patients with acute poisoning in emergency unit should be available in the ER department.

**Keywords:** Acute poisoning; Guidelines; nurses' performance; Effect; Emergency.

## Introduction

Poisoning is defined as injury or death caused by ingesting, breathing, touching, or injecting a variety of medications, chemicals, venoms, or gases. All over the world, it is a cause of both morbidity and mortality. Poisoning episodes are thought to cause more than one million diseases each year around the world. (Tassew, et al., 2022).

Poisoning may occur either intentionally or unintentionally. While toxicology may be defined as the study of the action of poisons on the living organism (Satpathy & Parida, 2020). This effects on multiple body systems and symptoms are frequently numerous and non-specific. Some of the signs and symptoms include cerebral and neuromuscular features such as staggering and dizziness, coma, convulsions, delirium, and hallucination. (Rutto, et al., 2012)

Acute poisoning is a dynamic medical illness often representing an acute and potentially life-threatening exacerbation of a chronic underlying psycho-social disorder. Patients with acute poisoning have highly variable clinical presentations, making diagnosis difficult,

particularly in resource limited settings (Chelkeba, et al., 2018).

Management should focus on prevention of poisoning, but when poisoning does occur, give priority to airway, breathing, and circulation. Regularly monitor vital signs and provide supportive care. There are few unique antidotes for drugs or other toxins. Inducing vomiting with ipecac is an uncommon occurrence in the medical field. Gastric lavage activated charcoal administration (binds with the chemical material in the intestine), or whole bowel irrigation with polyethylene glycol electrolyte solutions are all options. To reduce the amount of toxin in the bloodstream, dialysis can be needed on occasion. The intervention is dependent on the ingestion source. Activated charcoal, for example, is effective in preventing the absorption of certain drugs but not in the case of an iron overdose (Abdallah, 2018).

## Significant of the study

Acute poisoning is a global health problem that getting worse throughout the world because the development of

new chemicals and drugs, leading to increase morbidity and mortality. According to WHO statistics, in 2021 a mortality rate was 1.4 persons per 100000 populations globally and 2.7 persons per 100000 populations in Africa from unintentional poisoning. (Joda, et al., 2021)

The mortality rate of unintentional poisoning in Egypt was significantly higher than other Arabic countries where Egypt is the most populated nation in the Middle East with an estimated 106.6 million people. In Egypt, according to recent estimates of WHO in 2019, the overall mortality rate was 0.2 per 100,000 inhabitants. (WHO Statistics 2022)

### **Aim of the Study**

This study aimed to assess the effect of educational guidelines on nurses' performance regarding care for patients with acute poisoning in emergency unit through: -

1. Assessing nurses' performance (knowledge, practice, and attitude) regarding care for patients with acute poisoning.
2. Developing & implementing educational guidelines for nurses' performance about care for patients with acute poisoning.
3. Evaluating the effect of educational guidelines on nurses' level of performance regarding care for patients with acute poisoning.

### **Research hypothesis**

#### **The study hypothesized that**

The implementation of the educational guidelines had a positive improvement in nurses' performance (knowledge, practice, and attitude) regarding care for patients with acute poisoning.

### **Subjects and Methods**

#### **I- Technical design**

The technical design included the setting, subjects and tools used in this study for data collection.

#### **Research design**

A quasi-experimental research design was utilized to achieve the aim of the study.

#### **Setting:**

The study was conducted at Poisoning Treatment Centre affiliated to Ain Shams University.

#### **Subjects**

A convenience sample of all available nurses (30) caring for patients with acute poisoning. The staff nurses were from both genders, have different qualifications, with different ages and years of experience.

#### **Tools for data collection**

The study data were collected using the following three tools:

##### **Tool I- Nurses' self-administered questionnaire tool**

Used to assess nurses' knowledge regarding caring for patients with acute poisoning, it was adopted from (Gupta, 2018), (Hakami, 2018) and (Arslan, 2016) and modified by the researcher. It was written in Arabic language and consists of two parts:

**1<sup>st</sup> part** concerns nurses' demographic data.

**2<sup>nd</sup> part** concerned with nurses' knowledge regarding caring of patients with acute poisoning.

##### **Scoring system of nurses' knowledge:**

This part consists of 72 (MCQ) which were grouped to four subgroups. The response was on scale ranged from zero (incorrect answer) to 1 grade/mark (correct answer). A total score for nurses' knowledge was (72) and categorized into satisfactory or unsatisfactory as the follow:

- < 85% (< 61 questions) was considered unsatisfactory level.
- ≥ 85% (≥ 61 questions) was considered satisfactory level.

##### **Tool II- Nurses' observational checklist tool**

It was used to assess nurses' practice in caring for patients with acute poisoning; This tool was adapted from (Abebe, 2019), (Beyene, 2017) and (Liu, 2018) and modified by the researcher.

It contains 84 steps identified by subscales as the following:

- A. Steps related to primary survey.
- B. Steps related to initial assessment and immediate intervention.
- C. Steps related to intervention according to type of poison.

##### **Scoring system**

The total score of the checklist was 84 marks. It was distributed as the following: one point for each item done correctly while zero point was given to not done or done incorrectly and the total level of nurses' psychomotor skills were categorized into satisfactory or unsatisfactory as the follow:

- < 85% (< 71 steps) was considered unsatisfactory level.
- $\geq 85\%$  ( $\geq 71$  steps) was considered satisfactory level.

### **Tool III- Nurses' attitude Likert scale**

It was used to assess nurses' attitude in caring of patients with acute poisoning. It contains 25 steps. The attitude items were categorized into positive or negative as the follow:

- < 85% (< 22 steps) was considered negative attitude.
- $\geq 85\%$  ( $\geq 22$  steps) was considered positive attitude.

### **Operational Design**

The operational design consists of the preparatory phase, content validity and reliability, pilot study and field work.

#### **Preparatory phase:**

It involved reviewing the recent related literatures and theoretical knowledge of various aspects of the study using books, articles, periodicals, and magazines to develop tools for data collection.

#### **Validity and reliability:**

Validity of the developed tools was tested through face and content validity. Validity was tested through a jury of five experts. The experts reviewed the tools for clarity, relevancy, comprehensiveness, and simplicity; minor modifications were made.

#### **Pilot study:**

A pilot study was conducted on 3 nurses (10% of the study sample) to test applicability of the study and to test clarity of the designed data collection tools, as well as to estimate the time needed to answer the tool.

#### **Field work:**

The field work included three phases: Assessment phase, implementation phase and the evaluation phases.

#### **Assessment phase:**

1. This phase started preoperatively by obtaining the research approval from the ethical committee and hospital director before implementing the study.
2. Interviewing the nurses working in the poisoning treatment center and explaining the aim and nature of the study as well as obtaining their approval to participate in the study prior to data collection.

#### **Implementation phase:**

The nurses' knowledge assessment questionnaire was filled in by the nurses, each nurse was observed directly while caring for the patient with acute poisoning, also Likert scale was filled by nurses, and all data collected were analyzed to identify nurses' needs.

Based on nurses' needs and the recent related literatures, an illustrated Arabic-language booklet was developed covering knowledge and practice about priorities of poisoning management and nursing care for patients with acute poisoning. The booklets and schedule of the educational program were distributed to nurses as hard copies or PDF soft copies.

The appointment for starting educational sessions was scheduled with the nurses according to their roster, and the sessions were carried out in a hall at the poisoning treatment center for theoretical and practical sessions.

The implementation of the educational guidelines lasted within a period of three months for all nurses. Every educational session started by explaining the objective of the session then providing nurses with the knowledge related to the proposed topic.

The researcher demonstrated psychomotor skills, preparing materials, videos and posters. The nurses re-demonstrated each procedure one by one, and nurses were allowed to ask questions in case of misunderstanding. At the end of these sessions, the researcher emphasized the importance of continuing training courses.

#### **Evaluation phases**

1. Immediately after implementation of the educational guidelines, each nurse was reassessed using the same tools used in the pre assessment.

- Evaluating the effectiveness of the educational guidelines on nurses' competence level was tested by comparing the results of the data collected pre and post the implantation of the educational guidelines.

### Administrative Design

An official letter was issued from the dean of the Faculty of Nursing, Ain Shams University, to medical director of Poisoning Treatment Center affiliated to Ain Shams University Hospitals, explaining the purpose of the study to obtain the permission to conduct this study.

### Statistical design

The data was collected, coded, and entered a suitable excel sheet. Data were analyzed using the SPSS (version.23), as follows:

- Numerical data were presented as mean and standard deviation (SD) values. Qualitative data were presented as frequencies (n) and percentages (%).
- Cochran's Q test was used to compare between correct responses, satisfactory levels pre and post implementation of the educational guidelines.
- Chi-square test when applicable was used for comparisons regarding qualitative data.
  - No significance at  $P > 0.05$
  - Significant at  $P \leq 0.05$
  - Highly significant at  $P < 0.001$

### Results

### Ethical considerations:

The ethical considerations in the study include the following:

- The research approval was obtained from the ethical committee in the Faculty of Nursing, Ain Shams University before starting the study.
- The research approval was obtained from center director.
- The researcher clarified the objective and aim of the study to the nurses included in the study before obtaining their consent to conduct the current study.
- The researcher assured anonymity of nurses and confidentiality of subjects' data.
- Nurses were informed that they are allowed to choose to participate or not in the study, and that they have the right to withdraw from the study at any time.

### Limitations of the study:

Workload of nurses was an obstacle as the researcher was waiting for a long time to start the session with participants, also this caused some participants to be tired to listen and has low concentration and need continuous repetition, which required a lot of time and effort. Interruptions during conducting sessions by other staff members or duty call if a patient arrived emergency department.

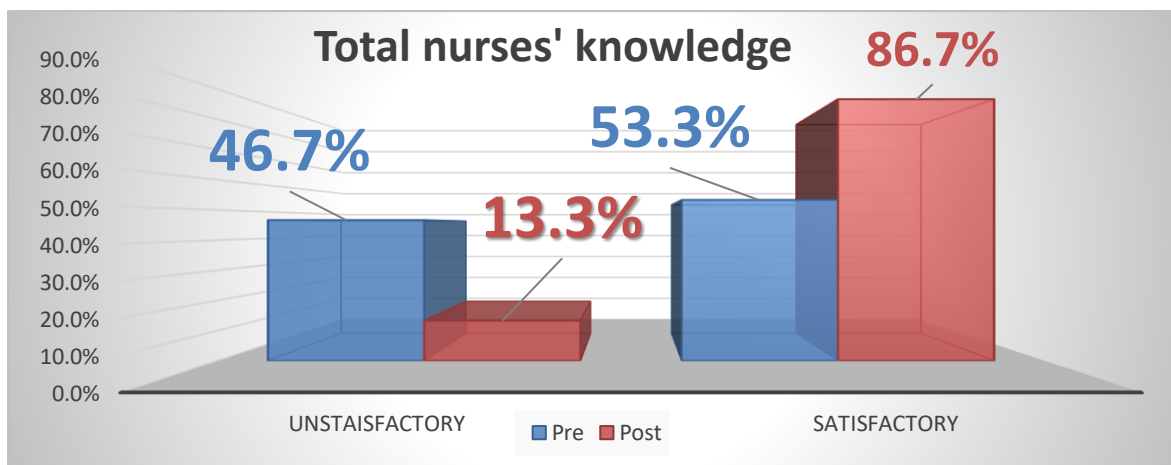
**Table 1.** Frequency and percentage distribution of demographic characteristics among nurses. (N=30)

	Items	N	%
Age	20 – <30	15	50.0
	30 – <40	8	26.7
	40 – <50	4	13.3
	≥50	3	10.0
Mean± SD	34.89 ±10.08		
Gender	Male	6	20
	Female	24	80
Marital status	Single	9	30
	Married	21	70
Educational level	Secondary	13	43.3
	Technical	12	40.0
	Bachelor	4	13.3
	Postgraduate	1	3.3

<b>Years of Experience</b>	1 – < 5	11	36.7
	5 – < 10	9	30.0
	10 – < 15	6	20.0
	≥ 15	4	13.3
<b>Training courses</b>	Yes	22	73.3
	No	8	26.7

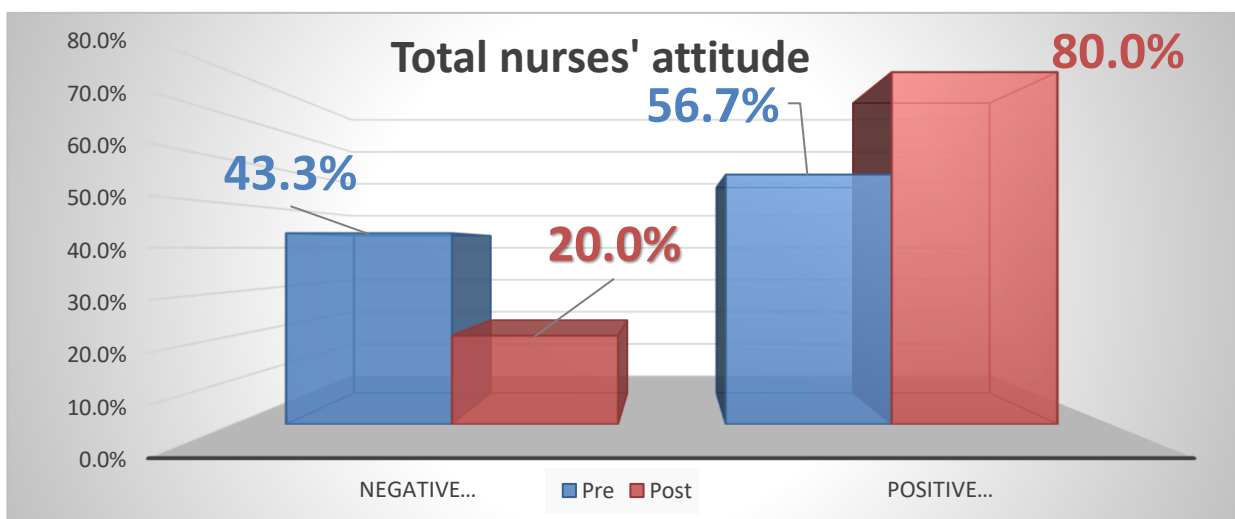
Table 1. Showed the distribution of the study nurses according to their demographic characteristics. Regarding age, the results revealed that, the mean and standard deviation nurses' age at this study was  $34.89 \pm 10.08$ , In which one half (50%) of the study nurses were within the age group 20 <30 years. As regards to gender more than three quarters (80%) were females. As regards marital status, about two thirds (70%) of them were married.

In relation to educational level and years of experience more than one third of the study nurses had a diploma in nursing and had experience at 1<5 years (43.3% & 36.7%) respectively. Regarding attending the training courses, about three quarters (73.3%) of the study nurses attended training courses.



**Figure 1.** The percentage distribution of nurses' according to total scores of knowledges.

Figure (1): Finds that, more than three quarters (86.7%) of studied nurses were satisfactory according to total scores of knowledge post implementation of the educational program while one half (53.3%) of them were unsatisfactory pre implementation of the educational program.



**Figure 2.** The percentage distribution of nurses' according to total scores of attitudes.

Figure (2): Finds that, more than three quarters (80%) of studied nurses were positive according to total scores of attitude post implementation of the educational program while about one half (56.7%) of them were negative pre implementation of the educational program.

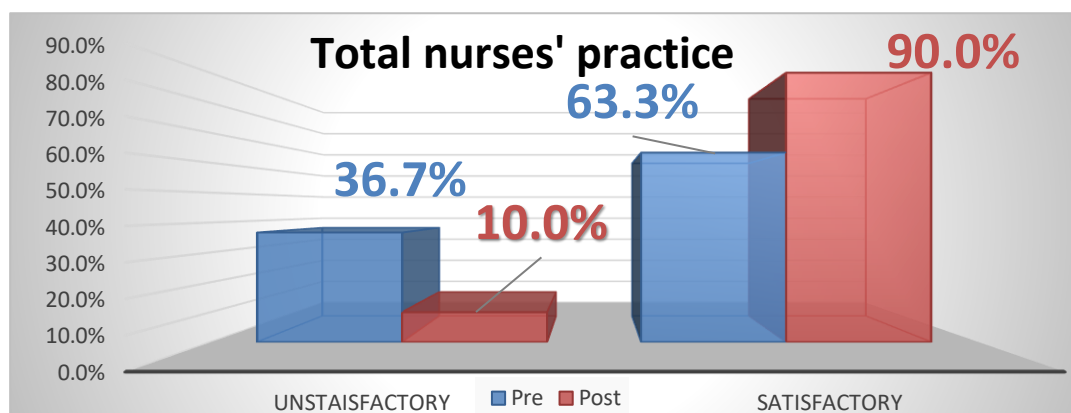
**Figure 3.** The percentage distribution of nurses' according to total scores of practices.

Figure (3): Shows that, the majority (90%) of studied nurses were satisfactory according to total scores of practice post implementation of the educational program while about two third (63.3%) of them were unsatisfactory pre implementation of the educational program.

**Table 2.** Relation of educational program effect and nurses' performance regarding care of patients with acute poisoning in emergency unit. (N=30)

Items	Pre	Post	T test	P value
	Mean $\pm$ SD	Mean $\pm$ SD		
Knowledge	59.3 $\pm$ 14.17	67.63 $\pm$ 9.26	8.27	0.004*
Practice	69.86 $\pm$ 16.05	80.53 $\pm$ 9.69	9.23	0.001**
Attitude	83.63 $\pm$ 13.60	91.7 $\pm$ 7.57	7.99	0.007*

Table 2. declares that there is a highly significant relation between the effect of educational program on nurses' performance regarding care of patients with acute poisoning in emergency unit and total nurses' practice in which (P value= 0.001). In addition, there is a significant relation with total knowledge and attitude as (P value= 0.004 & 0.007) respectively.

**Table 3.** Relation between knowledge, practice, and attitude at pre implementation of the program.

Items	<u>Knowledge (pre)</u>				X <sup>2</sup>	P value
	Unsatisfactory		Satisfactory			
	N	%	N	%		
<b>Practice</b>						
Unsatisfactory	11	78.6	0	0	19.85	0.000**

Satisfactory	3	21.4	16	100		
<b>Attitude</b>						
Negative	13	92.9	0	0	26.21	0.000**
Positive	1	7.1	16	100		

Table 3. explores that there is a highly significant relation between total knowledge pre-educational program and total nurses' (practice & attitude) as (P value= 0.000).

**Table 4.** Relation between knowledge, practice, and attitude at post implementation of the program.

Items	<u>Knowledge (post)</u>				X <sup>2</sup>	P value
	Unsatisfactory		Satisfactory			
	N	%	N	%		
<b>Practice</b>						
Unsatisfactory	3	75	0	0	21.66	0.000**
Satisfactory	1	25	26	100		
<b>Attitude</b>						
Negative	3	75	3	11.5	8.72	0.003
Positive	1	25	23	88.5		

Table 4. presents that there is a highly significant relation between total knowledge post-educational program and total nurses' practice as (P value= 0.000).

**Table (5)** Correlation between knowledge, practice, and attitude at pre and post implementation of the program.

Items		Pre		Post	
		Knowledge	Practice	Knowledge	Practice
Practice	R	0.81**		0.85**	
	P	0.000		0.000	
Attitude	R	0.93	0.73**	0.53**	0.38
	P	0.000**	0.000	0.002	0.03

**Table 5.** shows statistically significant correlation between nurses' practice and their knowledge (pre & post) educational program in which (r= 0.81 & 0.85) respectively. In addition, there is a significant correlation between nurses' attitude and practice at pre-educational program as (r=0.73) and between nurses' attitude and practice at post educational program as (r=0.53).

## Discussion

The results of the present study revealed that about half of the study nurses' age were in their second decade. This



explains that most of those nurses were newly graduated and young and tolerate the nature of work. This finding was consistent with what was reported by (Abebe, et al., 2019), who conducted a study titled "Assessment of knowledge and practice of nurses on initial management of acute poisoning in Dessie referral hospital Amhara region, Ethiopia". He stated that three quarters of the study nurses were less than thirty years old.

Related to gender, the present study revealed that more than three quarters of the study sample were female nurses. This might be due to the studying of the nurses in Egyptian universities exclusive for females only till few years ago. The finding agreed with (Mohamed, 2021) who conducted a study titled "Nurse's performance for patient with acute organophosphate poisoning". She reported that, about two third from the nurses were females.

Regarding to marital status, the present study results showed that about two thirds of the studied nurses were married. This finding agrees with (Mohamed, et al., 2015), who conducted a study titled "Nurse's knowledge and practices regarding detection and management of acute drug poisoning at Cairo university hospitals ". He showed that more than two thirds of the studied sample was married.

Concerning the level of education, the present study revealed that about half of nurses had a diploma degree. In contrast of this result, (Tassew, et al., 2022) reported that more than half of study sample had bachelor's degree, his study conducted under the titled "Knowledge, attitude and practice of nurses working in south Gondar zone hospitals toward initial management of acute poisoning".

In relation to years of experience, the current study showed that more than one third of the nurses' study had experience less than five years. According to the research point of view this may be due to most of those nurses being newly graduated and more interested in working at critical care units. This finding is consistent with (Lekei, et al., 2017) study entitled "knowledge and practices relating to acute pesticides poisoning among health care providers in selected regions of Tanzania", who found that more than half of nurses had experience less than five years.

Regarding attending courses, the present study finding showed that three quarters of the study nurses attended courses about acute poisoning. This finding goes on the same line with (Mohammed, 2021) study entitled "Effect on Emergent Nursing Educational Program on Nurses' Performance for Patients with Acute Poisoning", who showed about two third from nurses' study attended poisoning management course.

Concerning the acquisition of knowledge, the result of the current study revealed that the nurses hadn't a good

level of knowledge about acute poisoning before program implementation. This might be related to the fact that most nurses had nursing technician in nursing education in which the content was limited in their curriculum, lack of availability of manual booklets, nurses abandon reading or work overload.

These results were congruent with (Mohammed, et al., 2021). He revealed that most of the studied nurses had unsatisfactory level of knowledge before educational program and improved. Also, a study conducted by (Abebe, et al., 2019) in Ethiopia Dessie referral hospital and concluded that the studied nurses had unsatisfactory knowledge level. In addition to, (Kingsley, et al, 2017) revealed that there was a poor knowledge level among health care professionals regarding poison management in Douala.

While (Hakami, et al, 2018) concluded that most of the studied sample in Riyadh City had adequate knowledge level. Also, (Goktas, et al, 2014) carried out the study to assess knowledge regarding first aid in poisoning cases and reported that the majority of studied sample had good knowledge level in Istanbul.

According to total scores of attitudes, this finding agrees with (Rutto, et al., 2012) who mentioned that most nurses held positive attitudes towards individuals presenting with acute poisoning. Also (Paul Mathew, et al., 2022) revealed that all healthcare professionals had a 'positive attitude'. While in contrast with (Kahsay & Pitkääjärvi, 2019), they declared that most of the sample study have negative attitude.

Regarding the acquisition of skill performance, the current study shows that most of studied nurses had unsatisfactory practice in the study group before the application of nursing educational program. This may be attributed to the poor practical level and lack of nurses' evaluation against the standards nursing.

In agreement with current study finding was (Hussien et al, 2014) in Tehran who revealed that poor practices among studied nurses regarding care for poisoning at emergency unit. Additionally, (Blanchard, et al., 2019) showed that the studied sample didn't rely on proper treatment measures for poisoning patient in India.

On the other hand, the result of the present study revealed that all studied nurses had satisfactory practice level immediately post program implementation than pre-program implementation. This improvement may be attributed to a combination of the theoretical part and the practical training element of the intervention, which was effective in improving the nurses' practice, using audiovisual aids, proper communication, and demonstration.



This result is supported by (Sibani, et al., 2017) who reported improvement of health care provider for treatment of pesticide poisoning in Uganda. As well, (Hassan, et al., 2021) who revealed that (76.5%) of nurses had acceptable practices about toxicological emergencies.

Concerning relation between study variables, the present study demonstrated that, there were no statistically significant differences between total nurses' knowledge and their demographic characteristics at pre & post implementation of the program.

In this regard, (Mohammed, et al., 2021), was in the same line with this finding, who reported that there was no significant relation between nurses' knowledge and demographic characteristics, in Tanta, Egypt. Also, (Mohamed, et al., 2015), showed no statistically significant differences between demographic characteristics and total knowledge level in Cairo University. On the contrary, (Freed, et al., 2019) revealed that an association was found between the mean pre-test knowledge with their selected demographic variables such as age, gender, and experience in managing a child with poisoning. Also, (Lekie, et al., 2017) showed that there were marginally significant associations between (status & educational levels) and their knowledge.

In addition, the present study demonstrated that there was a non-significant relation between demographic characteristics and total mean of practice. (Mohammed, et al., 2021) agreed with this finding and reported that no significant statistical difference between total mean practice scores in relation to demographic characteristics at Tanta university. And (Abdallah, 2018) showed no statistical significance between demographic characteristics in (age & years of experience) and total practice level. On another hand, (Rutto, et al., 2012) revealed that demographic of nurses such as level of education and age had impacted the initial management of acute poisoning in Kenya.

Regarding the relation between total nurses' attitude and their demographic characteristics, the present study demonstrated that there was no statistically significant difference between total nurses' attitude and their demographic characteristics at pre & post implementation of the program.

In this regard, (Rishipathak, et al., 2020) was in the same line with this finding, who reported that there was no significant relation between emergency medical professionals' attitude and demographic characteristics in Pune, India. In contrast with (Mohamed, 2021) who revealed that there was a statistically significant relation between nurses' level and attitude regarding care of patients with acute organophosphate poisoning and their

gender. Also, this finding disagrees with (Jones, et al., 2015) who showed that patient care and treatment is directly influenced by the nurse's religious beliefs.

In relation to the effect of educational guidelines on nurses' performance, the current study results indicated that there was significant improvement in nurses' knowledge, practice, and attitude.

These results supported by (Mohammed, et al., 2021) as they mentioned that there was a significant improvement in nurses mean practice score immediately and one-month post program implementation. Also, (Justin & Shobha, 2014) showed that significantly improved after providing educational program regarding accidental poisoning at first and second follow up. And (Zaveri & Chaudhari, 2019) After educational intervention, improvement has been seen in knowledge and positive attitude.

Concerning the relation between knowledge, practice, and attitude at pre & post implementation of the program. The results of the current study, revealed that there are highly statistically significant relationships between nurses' level of knowledge, practice, and attitude at pre & post implementation of the program regarding care for patients with acute poisoning in emergency unit.

In this regard, (Mohamed, 2021) was in the same line with this finding, who reported that there was highly statistically significant relationship between nurses' level of knowledge, practice, and attitude regarding nurses' performance for patient with acute organophosphate poisoning. Also, (Ibrahim, et al., 2021) revealed that there is a strong relationship between adverse drug reaction reporting and healthcare professionals' knowledge, attitude, and practice. In addition, (Alshabi, et al., 2022) study which declared average to sound knowledge, positive attitude, and reflection of the same into the practice of the pharmacists in Najran, Saudi Arabia.

Regarding the correlation between knowledge, practice, and attitude at pre and post implementation of the program. The results of the current study, revealed that there is a highly statistically significant correlation between nurses' level of knowledge, practice, and attitude at pre & post implementation of the program regarding care for patients with acute poisoning in emergency unit.

This might be attributed to lack of on-the-job training, absence of clinical guidelines or protocols in providing care to poisoned patients and lack of supervision.

This finding is consistent with (Hassan, et al., 2021) who revealed that there was a positive statistically significant correlation between overall nurses' knowledge and practices about toxicological emergencies. In addition, this result is agreed with (Mohamed, 2021) who mentioned

that there was highly statistically significant correlation between nurses' knowledge and their level of practice regarding care of patients with acute organophosphate poisoning. On the other hand, this finding is disagreed with the study conducted by (Mohamed, et al., 2015) who revealed that there were no correlations between total scores of knowledges and total scores of practices regarding detection and management of acute drug poisoning.

### Conclusion

On the light of the current study results, it can be concluded that, educational program had a positive effect on nurses' performance regarding care for patients with acute poisoning in emergency unit throughout the program phases. Based on this finding, the research hypothesis was fulfilled.

### Recommendations

*Based on the finding of this study, the following recommendations are suggested*

#### Recommendations for nurses:

- Periodically updated protocol related to nursing care for patients with acute poisoning in emergency units should be available in the emergency units.
- Nurses' knowledge and practice about nursing care for patients with acute poisoning in emergency unit should be updated periodically through:
  - Encouraging nurses to attend regularly national and international congresses, seminars, symposium, workshops, and in-service educational program about nursing care for patients with acute poisoning.
  - A continuous orientation educational program about nursing care for patients with acute poisoning in emergency unit for the newly employed nurses and at least every six months for enhancing nurses' knowledge and practice to achieve high quality of care.

#### Recommendations for researchers:

Studying the impact of educational programs on acute poisoning continuously using a wide probability sample in different areas to monitor improvement in nurses' performance and identify points of weakness for

developing more educational program to nurses dealing with patients with acute poisoning in emergency unit to improve nurse's competence level.

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