



## Critical Care Nurses' Performance Regarding Care of Patients with Organophosphate Poisoning in Poisoning Centers

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### ABSTRACT

**Background** Organophosphorus compounds (OPs) are used as pesticides and developed for chemical warfare. Exposure to even small amounts of an OP can be fatal and death is usually caused by respiratory failure. **Aim of the study:** Was to assess critical care nurses' performance regarding care of patients with organophosphate poisoning in poisoning centers. **Design:** A descriptive exploratory research design was used. **Setting:** The study was conducted in the poisoning centers at Elkaser AlAiny and Ain Shams University Hospitals. **Subjects:** A Convenient sample of all available nurses (50) nurse from both sex working in poisoning centers. **Tools:** Two tools were used for data collection. Tool I: Nurses' self administered interview Questionnaire: which included (a) Demographic characteristics of nurses (b) Nurses' knowledge regarding care of patients with organophosphate poisoning Tool II: Observational check list to assess nurses' practice regarding care of patient with organophosphate poisoning. **Results:** The study results reported 70%, 64% of the studied nurses had unsatisfactory level of total knowledge and incompetent level of total practices regarding care of patients with organophosphate poisoning respectively. Additionally, there was a statistically significant correlation between total knowledge and practice regarding care of patients with organophosphate poisoning. **Conclusion:** The study concluded that more than two thirds of the studied nurses had unsatisfactory knowledge regarding care of patients with organophosphate poisoning. And nearly two thirds of the studied nurses had incompetent level of practice regarding care of patients with organophosphate poisoning. Additionally, there was a statistically significant correlation between total nurses' knowledge and practice regarding care of patients with organophosphate poisoning. **Recommendations:** Continuing educational program to improve knowledge and practices of nurses regarding care of patients with organophosphate poisoning.

**Keywords:** Nurses performance, Organophosphate Poisoning patients.

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### INTRODUCTION

A poison is a substance that is capable of causing illness or harm to living organisms on contact or upon introduction into the body and may be used deliberately with this intent. Acute poisoning is one of the commonest causes of hospitalization to the emergency department. It is a result of deliberate or accidental or homicidal ingestion of harmful chemical substance into the body. Acute poisoning is defined as an acute exposure (less than 24 hours) to a toxic substance. It is a major public and preventable health issue contributing to morbidity and mortality in many parts of the world. It is estimated that poisoning events are responsible for more than one million illnesses annually <sup>(1)</sup>.

Organophosphates (OPs) are toxic chemical substances produced by an esterification process and some other routes. They are the main components of herbicides, pesticides, and insecticides. Acute or chronic exposure to OPs can manifest in various levels of toxicity to humans, animals, plants, and insects. OPs containing insecticides were widely used in many countries during the 20th century, and some of them continue to be used today. In particular, 36 OPs have been registered in the USA, and all of them have the potential to cause acute and sub-acute toxicity. Renal damage and impairment of kidney function after exposure to OPs <sup>(2)</sup>.

Symptoms of organophosphate poisoning may originate from various systems. Muscarinic symptoms include miosis, excessive salivation, sweating, lacrimation, diarrhea, urination, and bradycardia. In severe poisonings, flaccid paralysis with areflexia is common. In moderate poisonings, muscle fasciculations may be present. CNS symptoms include coma and seizures. Pulmonary symptoms including bronchoconstriction, increased pulmonary secretions, and wheezing have been reported <sup>(3)</sup>.

Treatment of acute poisoning includes respiratory support and, if necessary, decontamination of the patient and gastric lavage or emesis. Administration of activated charcoal does not appear to be effective in removing the toxic agent. In the presence of symptoms, atropine is given to ameliorate excessive parasympathetic stimulation by competitively blocking the action of ACh at muscarinic receptors. Pralidoxime is also given as a specific antidote for organophosphate poisoning. Chronic poisoning is usually treated by avoidance of further exposure until cholinesterase levels become normal <sup>(4)</sup>.

Nurses are typically the first health care providers to contact patients who have consumed poisons. When it comes to this early and critical judgement, they are frequently at the forefront. The knowledge and skills of nurses are critical to their practice and have a significant impact on the overall patient outcome. To ensure that problems are identified and treated appropriately, all nurses must be aware with the clinical priorities in initial poisoning management. It is critical to assess nurses' knowledge and skills in order to improve nursing poisoning management and have a beneficial outcome for poisoned patients<sup>(5)</sup>.

### **Significance of the study:**

According to the World Health Organization (WHO), nearly 200,000 people die worldwide from accidental poisoning and around 84% of them occur in low- and middle-income countries. Unintentional poisoning led to loss of over 10.7 million years of healthy life in terms of disability-adjusted life years <sup>(1)</sup>. According to WHO, three million cases of organophosphate poisoning occurs every year, out of which, about one million are accidental and two million are suicidal poisonings, resulting in more than 0.25 million deaths annually: Organophosphorus poisoning was the 2nd common cause of poisoning among cases admitted to Menoufia Poison Control Center during the period of the study <sup>(6)</sup>.

Developing countries are suffering from organophosphate (OP) poisoning as a serious health problem. Many cases of severe poisoning and more than 220,000 deaths recorded every year <sup>(7)</sup>. Organophosphates (OPs) are commonly used for pest control in agriculture. The commonly used compounds in developing countries include methyl parathion, malathion, fenthion, chlorpyrifos, quinalphos, and diazinon. The number of intoxications with OP compounds is estimated to be three million per year, and the number of deaths approximately 100,000 per year <sup>(8)</sup>.

### **AIM OF THE STUDY**

The aim of this study was to assess critical care nurses' performance regarding care of patients with organophosphate poisoning in poisoning centers. This aim was achieved through:

1- Assess nurses' level of knowledge regarding care of patients with organophosphate poisoning.

2- Assess nurses' level of practice regarding care of patients with organophosphate poisoning.

## **SUBJECTS AND METHODS**

### **I-Technical item:**

**Research design:** Descriptive exploratory research design was used in this study.

### **Setting:**

This study was conducted in the poisoning centers at Elkaser AlAiny and Ain Shams University Hospitals.

### **Subjects:**

A convenient sample of all available nurses from both sex. The total number of nurses (50); with various ages, years of experience, different level of education who provide direct patient care and willing to participate in the study.

### **Tools for data collection are:**

There were two tools utilized to collect the data during the study period:-

#### **Tool I: Nurses' self-administered interview Questionnaire:**

This tool was developed by the investigator based on the relevant and recent scientific literature review **Gupta** <sup>(9)</sup> and was written in Arabic language to suit nurses level of education. To assess the nurses knowledge regarding care of organophosphate poisoned patients. It consists of two parts:

**Part 1: Demographic characteristics of nurses:** such as (gender, age, marital status, level of education, years of experience and training courses). It composed of (7) closed end question.

**Part 2: Nurses' knowledge regarding care of patients with organophosphate poisoning:** This part includes (47) questions about general knowledge on organophosphate poisoning.

### **Scoring system**

Regarding scoring system: the self-administrated questionnaire nurses' total score was 47 points. The scoring system was distributed according to the following:- Correct response scored as(one) point and incorrect response scored as( zero) point. The score were summed up and were converted into a percentage score.

### **It was classified into two categories:**

- Satisfactory knowledge if score  $\geq 75\%$ .
- Un satisfactory knowledge if score  $< 75\%$ .

### **Tool II: Observational check list to assess nurses' practice regarding care of patient with organophosphate poisoning:**

This tools was adopted from **Rutto et al.** <sup>(10)</sup>. This part contains two main items as the following: (A) emergency management which include 5 sub items : airway which include 6 points, breathing which include 4 points, circulation which include 6 points, neurological status which include 3 points, drugs which include 3 points. (B) gut and skin decontamination which contain 4 points.

### **Scoring system:**

Regarding scoring system: the nurses' performance checklist, the total score was 26 points. The

score was distribute according to the following, the task which is performed correctly done was graded as(one) point, the task which is performed incorrectly or not done was graded as(zero) point. The score were summed up and were converted into a percentage score.

It was classified into two categories:

- Competent if score  $\geq 75\%$ .
- Incompetent if score  $< 75\%$ .

**II- Operational Item:** operational item included the preparatory phase, validity, reliability of the developed tools, pilot study and field work.

**A) Preparatory phase:**

It was include reviewing of past, current, national and international related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop tools for data collection. During this phase, the investigator also visit the selected place to get acquainted with the personal and the study setting. The development of the tools was under supervisors guidance and experts opinions were considered.

**B) Validity:**

The tools of study were revised by a jury of 5 experts: assistant professors and lecturer of medical surgical nursing from faculty of nursing, Helwan University to review tools for clarity, relevance, comprehensiveness, understanding and applicability. Modifications of tools were done according to the panel judgment on clarity of sentence, appropriateness of content, sequence of items and accuracy of scoring.

**Reliability:**

Cronbach's Alpha were used to determine the internal reliability of the tool. The result was as the following: Nurses' knowledge regarding care of patients with organophosphate poisoning (0.784), Observational checklist (0.80). Statistical equation of Cronbach's alpha reliability coefficient normally ranges between 0 and 1. Higher values of Cronbach's alpha (More than 0.7) denote acceptable reliability.

**C) Pilot study:**

The pilot study was done on 10% of the sample (5 nurses) to examine the clarity of questions, assess the ability of the tools to achieve the stated study objectives, determine to applicability of the study, and time needed to complete the study tools. There was no modification done for used tool, and nurses in the pilot study were included in the study.

**D) Field work:**

- An approval was obtained from a scientific ethical committee of the Faculty of Nursing at Helwan University.
- An approval was obtained from the director of poison centers at Elkaser AlAiny and Ain Shams University Hospitals.
- A oral informed consent was obtained from each participant prior to data collection after explanation aim of the study.
- Data collection was started and completed within three months from March (2022) until the end of May (2022).

- Purpose of the study was simply explained to the nurses who agree to participate in the study prior to data collection.
  - Data collection was done 3days/week by the investigator from 9 am: 4 pm to collect data from nurses in morning and afternoon shift.
  - The observational checklist was used prior to administration of self-administrated questionnaire to ensure the maximal realistic observations of the nurses' performance and minimize bias possibility.
  - The study tools were checked in and completed as the following:-
- **The self-administrated questionnaire** were filled in and completed individually by the nurses and took the nurses about 15-20 minutes to be completed.
- **The observational checklist** to assess nurses' practice regarding care of patients with organophosphate poisoning was filled in and completed by the investigator.

### **III- Administrative Item:**

An official permission was obtained from the director of poison centers at Elkaser AlAiny and Ain Shams University Hospitals. A letter was issued to them from the faculty of nursing; Helwan University explains the aim of the study for obtaining the permission for data collection.

### **Ethical considerations:**

An official permission to conduct the proposed study was obtained from the Scientific Research Ethics Committee Helwan University. Participation in the study is voluntary and investigator gave a complete full information about the study to nurses 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 had not been accessed by any other party without taking permission of the nurses. Ethics, values, culture and beliefs were respected.

### **IV- Statistical Item:**

Upon completion of data collection, data were coded and analyzed using Statistical Package for the Social Science (SPSS), version 26 for analysis. The P value were at 0.05. Descriptive statistics tests as numbers, percentage, mean  $\pm$  standard deviation ( $\pm$  SD), were used to describe the results. Appropriate inferential statistics such as "F" test or "t" test were used as well. Numerical data were presented as mean and standard deviation (SD) values. Qualitative data were presented as frequencies (n) and percentages (%). Reliability of the questionnaire was assessed using Cronbach's alpha reliability coefficient. Cronbach's alpha reliability coefficient normally ranges between 0 and 1. Higher values of Cronbach's alpha (More than 0.7) denote acceptable reliability. Spearman's correlation coefficient was used to determine correlations between different variables. The significance level was set at  $P \leq 0.05$ . Statistical analysis was performed with IBM SPSS Statistics Version 26 for Windows.

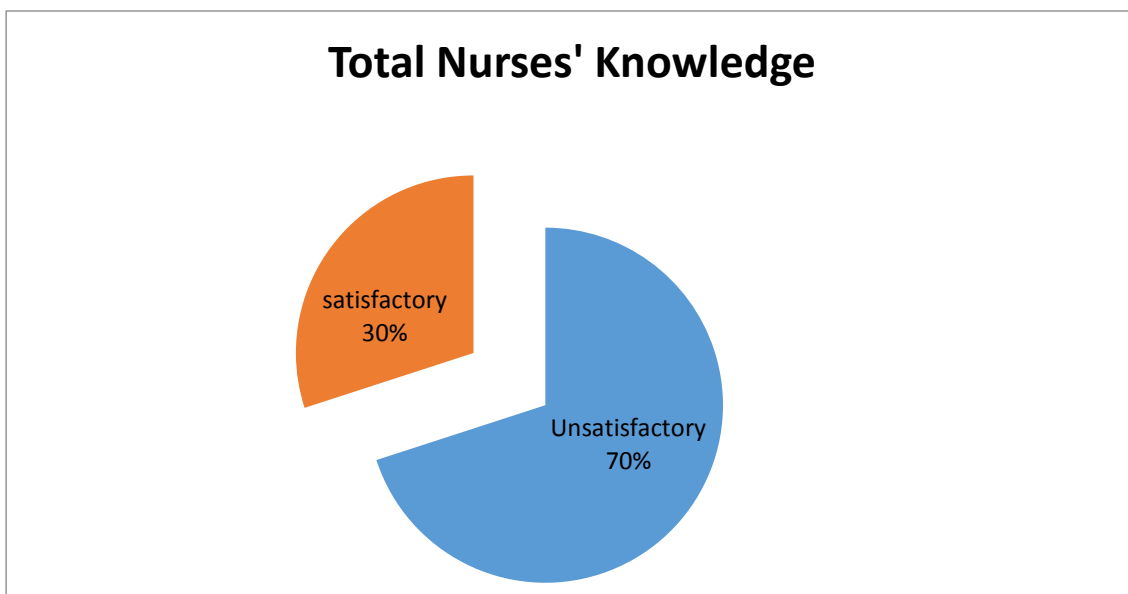
## RESULTS

**Table (1): Frequency and percentage distribution of demographic characteristics for the studied nurses (n=50):**

Items	Studied Nurses (n = 50)	
	N	%
<b>Age group:</b>		
• 20 - <30 Yrs	20	<b>40</b>
• 30 - < 40Yrs	14	28
• 40 - < 50Yrs	14	28
• 50 ≥ Yrs	2	4
<b>Mean age±SD</b>	33.22±7.78	
<b>Gender</b>		
• Female	32	<b>64</b>
• Male	18	36
<b>Marital Status:</b>		
• Single	10	20
• Married	30	<b>60</b>
• Divorced	4	8
• Widow	6	12
<b>Education:</b>		
• Nursing diploma	28	<b>56</b>
• Technical institute of nursing	16	32
• Bachelor of nursing	6	12
• Postgraduate	0	0
<b>Mean±SD</b>	11.62±7.58	
<b>Years of Experience:</b>		
• 1-5 years	16	<b>32</b>
• 6-10 years	12	24
• 11-15 years	14	28
• More than 15 years	8	16
<b>Did you attend training courses on care of poisoned patient?</b>		
• Yes	14	28
• No	36	<b>72</b>
<b>If yes, what is the time of last training course?(n=14)</b>		
• <5 years	6	42.9
• 5-10 years	8	<b>57.1</b>

**Table (1):** shows that 40% of the studied nurses their age 20-29 year. Concerning to gender and marital status, 64% & 60% of the studied nurses were females and married, respectively. Regarding to years of experience and educational level, 32% of the studied nurses had experience 1-5 years and 56% of them had nursing diploma. Moreover, 28 % of the studied nurses attended training courses regarding care of poisoned patient and 57.1% of these courses were from 5-10 years.

**Figure (1):** Percentage distribution of total nurses' level of knowledge regarding care of patients with organophosphate poisoning.



**Figure (1):** shows that 70% of the studied nurses had unsatisfactory level of total knowledge regarding care of patients with organophosphate poisoning.

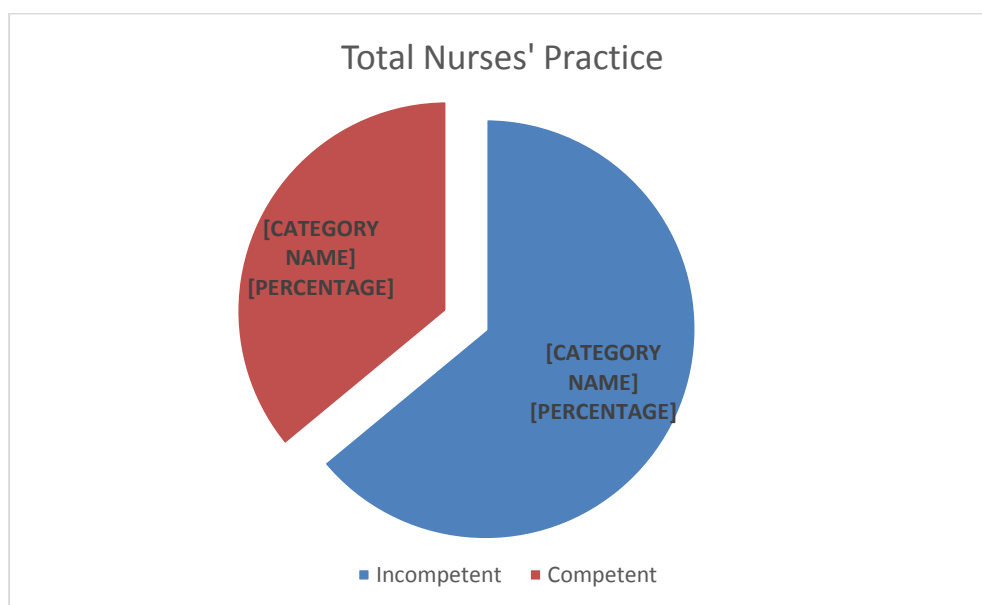
**Table (2):** Frequency and percentage distribution of nurses' practices regarding care of patients with organophosphate poisoning (n=50):

Variable	Done		Not done	
	No	%	No	%
<b>A) Emergency Management</b>				
<b>1. Airway</b>				
Check the patient level of consciousness.	40	<b>80</b>	10	20
Check airway patency.	32	64	18	36
Check gag reflex.	20	40	30	<b>60</b>
Assist in insertion of oropharyngeal or nasopharyngeal tube.	18	36	32	<b>64</b>
Regular suctioning.	26	52	24	48
Oral cavity inspected and any obvious foreign bodies removed.	20	40	30	<b>60</b>
<b>2. Breathing</b>				
Rate and rhythm of respiration.	44	<b>88</b>	6	12
Recognition of normal breathing patterns.	36	72	14	28
Recognition of compromised/distressed breathing.	22	44	28	56
Give oxygen therapy.	44	<b>88</b>	6	12
<b>3. Circulation</b>				
Checked pulse rate and rhythm.	48	<b>96</b>	2	4
Checked blood pressure.	46	<b>92</b>	4	8
Recognition of normal and abnormal cardiovascular status.	26	52	24	48
Cardiovascular monitoring of any changes.	24	48	26	52
Resuscitation fluids given.	38	76	12	24
Stop obvious bleeding.	22	44	28	56
<b>4. Neurological status ( use of AVPU and GCS)</b>				
Recognition of normal and abnormal neurological status.	28	56	22	44

Neurological assessment and monitoring	28	56	22	44
Recognition of altered LOC.	38	76	12	24
<b>5. Drugs</b>				
Given specific antidote ( <i>Specify ....atropine...</i> ).	48	96	2	4
Given any other drug ( <i>Specify....oxime...</i> ).	48	96	2	4
Fluid therapy ( <i>Specify....normal saline...</i> ).	46	92	4	8
<b>B) Gut and skin decontamination:</b>				
Gastric lavage or emesis.	40	80	10	20
Activated charcoal	34	68	16	32
Whole bowel irrigation.	30	60	20	40
Skin decontamination (wash skin by water and soap )	30	60	20	40

**Table (2):** Shows that, the studied nurses check the patient level of consciousness, check rate and rhythm of respiration, give oxygen therapy, check pulse rate and rhythm, check blood pressure, recognition of altered LOC, give antidote and other drugs and do gastric lavage 80%, 88%, 88%, 96%, 92%, 76%, 96% & 80% respectively. Also the nurses not assist in insertion of oropharyngeal tube, don't check gag reflex and don't check oral cavity 64%, 60% % 60% respectively.

**Figure (2):** Percentage distribution of total nurses' level of practices regarding care of patients with organophosphate poisoning.



**Figure (2):** shows that 64% of the studied nurses had incompetent level of total practices regarding care of patients with organophosphate poisoning.

**Table (3):** Relation between total level of knowledge and demographic characteristics of the studied nurses(n=50):

Variable	Nurses Knowledge				X <sup>2</sup>	P-value
	Satisfactory		Unsatisfactory			
	No	%	No	%		
<b>Age group:</b>					1.088	0.78
• 20 - <30 Yrs	6	12	14	28		
• 30 - < 40Yrs	4	8	10	20		



<ul style="list-style-type: none"> <li>• 40 - &lt; 50Yrs</li> <li>• 50 ≥ Yrs</li> </ul>	5 0	10 0	9 2	18 4		
<b>Gender</b>						
<ul style="list-style-type: none"> <li>• Female</li> <li>• Male</li> </ul>	7 8	14 16	25 10	50 20	2.794	0.117
<b>Marital Status:</b>						
<ul style="list-style-type: none"> <li>• Single</li> <li>• Married</li> <li>• Divorced</li> <li>• Widow</li> </ul>	6 9 0 0	12 18 0 0	4 21 4 6	8 42 8 12	8.751	0.036*
<b>Education:</b>						
<ul style="list-style-type: none"> <li>• Nursing diploma</li> <li>• Technical institute of nursing</li> <li>• Bachelor of nursing</li> </ul>	8 6 1	16 12 2	20 10 5	40 20 10	0.964	0.618
<b>Years of Experience:</b>						
<ul style="list-style-type: none"> <li>• 1-5 years</li> <li>• 6-10 years</li> <li>• 11-15 years</li> <li>• More than 15 years</li> </ul>	4 4 5 2	8 8 10 4	12 8 9 6	24 16 18 12	0.567	0.904
<b>Did you attend training courses on care of poisoned patient?</b>						
<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>	10 7	20 14	4 29	8 58	3.389	0.05*
<b>If yes what is the time of last training course?(n=14)</b>						
<ul style="list-style-type: none"> <li>• &lt;5 years</li> <li>• 5-10 years</li> </ul>	3 2	21.4 14.3	3 6	21.4 42.9	0.933	0.343

\*: Significant at  $P \leq 0.05$

**Table (3):** shows that there is statistically significant relation between total level of nurses' knowledge, their marital status and attending training courses at p-value = 0.036 & 0.05 respectively.

**Table (4): Relation between total level of practice and demographic characteristics of the studied nurses (n=50):**

Variable	Total practice				X <sup>2</sup>	P-value
	Competent		Incompetent			
	No	%	No	%		
<b>Age group:</b>						
<ul style="list-style-type: none"> <li>• 20 - &lt;30 Yrs</li> <li>• 30 - &lt; 40Yrs</li> <li>• 40 - &lt; 50Yrs</li> <li>• 50 ≥ Yrs</li> </ul>	10 4 3 1	20 8 6 2	10 10 11 1	20 20 22 2	3.497	0.321

<b>Gender</b>						
• Female	10	20	22	44	0.870	0.376
• Male	8	16	10	20		
<b>Marital Status:</b>						
• Single	6	12	4	8	6.308	0.037*
• Married	10	20	20	40		
• Divorced	2	4	2	4		
• Widow	0	0	6	12		
<b>Education:</b>						
• Nursing diploma	10	20	18	36	1.391	0.499
• Technical institute of nursing	7	14	9	18		
• Bachelor of nursing	1	2	5	10		
<b>Years of Experience:</b>						
• 1-5 years	6	12	10	20	1.792	0.411
• 6-10 years	6	12	6	12		
• 11-15 years	4	8	10	20		
• More than 15 years	2	4	6	12		
<b>Did you attend training courses on care of poisoned patient?</b>						
• Yes	10	20	4	8	4.366	0.04*
• No	8	16	28	56		
<b>If yes what is the time of last training course?(n=14)</b>						
• <5 years	5	35.7	1	7.1	2.941	0.121
• 5-10 years	3	21.4	5	35.7		

\*: Significant at  $P \leq 0.05$

**Table (4):** shows that there is a statistically significant relation between total level of nurses' practice regarding their marital status and attending training courses on care of poisoned patients at  $p$ -value = 0.037 & 0.04 respectively.

**Table (5): Correlation between nurses' knowledge and practice regarding care of patients with organophosphate poisoning.**

Items	Total knowledge	
	Correlation Coefficient	P-value
<b>Total practice</b>	0.327	0.02*

\*: Significant at  $P = 0.05$

**Table (5):** shows that there is a statistically significant correlation between total knowledge and total practice regarding care of patients with organophosphate poisoning ( $r = 0.327$ ) at  $p$ -value = 0.02.

## DISCUSSION

### In relation to nurses' demographic characteristics:

As regards to age, the current study results revealed that two fifth of the nurses were at the age group of 20-29 years. This may be due to the majority of nurses work power providing direct care

for the patient in nursing field are young while higher age category senior nurses perform administrative role. These findings are agreed with **Abebe et al.**<sup>(11)</sup> who revealed that more than three quarters ages were less than thirty years.

As regards to gender, the current study revealed that about two thirds are females, this may be due to the nursing education in Egypt was exclusive for females for many years and nursing is a female occupation that recently changed to both gender, this give a reason why the majority of the study sample were more females than males. This was supported by **Khalil et al.**<sup>(12)</sup> which the results showed that two third of them were female. In the other hand this finding was disagreed with **Lafi et al.**<sup>(13)</sup> which the results illustrated that more than half of them were male.

As regards to marital status, the current study revealed that three fifth are married this may be due to suit the living conditions and this is traditional in live. This finding was consistent with **Mohamed et al.**<sup>(14)</sup> which the results indicated that three quarters of them were married.

As regard to years of experience, the current study revealed that nearly one third of studied nurses having 1-5 years of experience, this may be due to most of those nurses were newly graduated and were more interested to work in critical care units. This finding was consistent with **Mohammed et al.**<sup>(15)</sup> which the results displayed that nearly half of them were less than 5 years of experience. This finding was inconsistent with **Nofal et al.**<sup>(16)</sup> who found that more than half of the participants had a clinical experience more than 5 years.

As regard to level of education, the current study revealed that more than half of studied nurses had nursing diploma, this could be due to the financial burden and preference of bachelor degree nurses to work at private hospitals, and when working in the governmental hospitals, bachelor degree nurses work as head nurse not as bedside nurse. This finding was agreed with **Lafi et al.**<sup>(13)</sup> who showed that nearly three quarters were nursing diploma.

**Regarding attending courses** the present study results showed that nearly three quarters not attended training courses on care of poisoned patient. This may be due to poor reinforcement from hospital administrators, insufficient medical resources, time limits and lack of communications between nurses and the hospital policy leaders. This finding was goes hand in hand with **Khalil et al.**<sup>(12)</sup> who stated that more than half not attending previous training course. In the other hand this finding was disagreed with **Ahmed et al.**<sup>(17)</sup> who mentioned that all nurses of this study attended courses.

**Regarding the total level of nurses' knowledge** the results of the current study indicated that more than two thirds of the studied nurses had unsatisfactory knowledge regarding care of patients with organophosphate poisoning. This inadequacy of nurses' knowledge reflects that more than half of studied nurses had nursing diploma, recently graduated so they are not prepared or knowledgeable enough to provide nursing care. Also nearly three quarters of nurses not attended training courses on care of poisoned patients. This finding was consistent with **Freda et al.**<sup>(18)</sup> who showed that nearly three quarters of the studied nurses had inadequate knowledge. On the other hand this finding was inconsistent with **Tassew et al.**<sup>(19)</sup> who revealed that the most of the nurses had good knowledge of initial management of acute poisoning.

**Concerning the total nurses' level of practice**, the present study results showed that nearly two thirds of the studied nurses had incompetent level of practice regarding care of patients with organophosphate poisoning. This may be attributed to the poor knowledge level, shortage of nursing staff, increasing work overload, less years of experience and refusal of some nurses to change their practice. This finding goes in the same line with **Mohammed et al.**<sup>(15)</sup> who reported that three quarters of the studied nurses had unsatisfactory practice level pre-program implementation On the other hand this finding was conversely with **Hassan et al.**<sup>(20)</sup> who revealed

that three quarters of the nurses had acceptable practices about toxicological emergencies.

**Regarding relation between nurses' knowledge and demographic characteristics** the present study results showed that there was a statistically significant relation between total level of nurses' knowledge, their marital status and attending training courses. This may be explained as the responsibilities, duties and burnouts of the married life may be effect on the ability of the nurses to attend training courses to be more knowledgeable. This finding was agreed with **Achu Kingsley et al.** <sup>(21)</sup> who illustrated that there was a statistically significant relation between age and marital status of the studied nurses and their knowledge.

On the other hand this finding was contradicted with **Al-Rawee et al.** <sup>(22)</sup> which reported that there was no significant relation between nurses' knowledge and socio demographic characteristics such as age, clinical experience and attending training courses.

**Regarding relation between nurses practice and their demographic characteristics** the current study results revealed that there is a statistically significant relation between total level of nurses' practices regarding their marital status and attending training courses on care of poisoned patient. This is due to the importance of training courses in developing practice of the nurses. This findings were supported by **Hassan et al.** <sup>(20)</sup> who demonstrated that, there was a positive statistically significant correlation between studied nurses' overall practice regarding toxicological emergencies and educational level, age and marital status.

On the other hand this finding was contradicted with **Abdallah** <sup>(23)</sup> who reported that no statistically significant difference between total mean practice scores in relation to sociodemographic characteristics.

### **In relation to correlation between nurses' knowledge and practice regarding care of patients with organophosphate poisoning**

This findings showed that there was a statistically significant correlation between total knowledge and total practice regarding care of patients with organophosphate poisoning. This is may be due to the nurses should have knowledge to provide care of poisoned patient and if nurses not have knowledge this will affect on care of patient and not understand the fatality of case of patient and two domain of performance(knowledge, practice) not achieved.

This finding was similar to **Achu Kingsley et al.** <sup>(21)</sup> who demonstrated that there was a statistically significant relation between nurses' level of knowledge and practice regarding nurses' performance for patients with acute organophosphate poisoning. On the other hand, this finding was disagreed with the study conducted by **Hakami et al.** <sup>(24)</sup> who mentioned that no correlations between total scores of knowledge and total scores of practice regarding detection and management of acute drug poisoning.

## **CONCLUSION**

**Based on the results of the current study, the following can be concluded:**

More than two thirds of the studied nurses had unsatisfactory knowledge regarding care of patients with organophosphate poisoning. And nearly two thirds of the studied nurses had incompetent level of practice regarding care of patients with organophosphate poisoning. Additionally, there was a statistically significant correlation between total knowledge and total practice regarding care of patients with organophosphate poisoning.

## **RECOMMENDATIONS**

**Based upon the results of the current study, the following recommendations were suggested:**

- Continuing educational programs to improve knowledge and practice of nurses regarding care of patients with organophosphate poisoning.
- Providing written nursing guidelines for caring of patients with organophosphate poisoning.

**Recommendations for further researches:**

- Replication of the study on large sample selected from different poison centers in Egypt to generalize the study results.

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