Practice of Nurses Caring for Patients with Acute Poisoning in Emergency Unit: Effect of Educational Guidelines

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Abstract

Background: Acute poisoning is a major health problem leading to emergency department admission. Nurses' performance play an important role in the management of acute poisonings. **Aim:** This study aimed to evaluate the effect of educational guidelines on nurses' practice level regarding care for patients with acute poisoning in emergency unit. **Study design:** A one group quasi-experimental research design, with pre and post-test was utilized in this study. **Setting:** The study was conducted at poisoning treatment center affiliated to Ain Shams University Hospitals. **Subjects:** A convenience sample of all available nurses (30) caring for patients with acute poisoning. **Data collection:** The study data were collected using the following two tools: Tool (1): Nurses' demographic characteristics and Tool (2): Nurses' observational checklist. **Results:** The present study revealed that there was a highly statistically significant difference between level of nurses' practice pre, post implementation of the educational guidelines. **Conclusion:** The implementation of the educational guidelines has a positive effect on nurses' practice level regarding care for patients with acute poisoning in emergency unit. These findings support the research hypothesis. **Recommendations:** Regular continuous nursing educational program at least every six months should be implemented for enhancing and updating nurses' practice about nursing care offered to patients with acute poisoning in emergency unit, to achieve high quality of care.

Keywords: Acute poisoning, effect, educational guidelines, nurses' practice level.

Introduction:

A global public health problem is poisoning. It is considered one of the most important reasons for attendance in the emergency unit. The critical care nurses play an essential role in assessing poisoning patient at emergency unit. Patients with poisoning have a better chance of surviving if they are identified early and treated effectively **(Hassan, et al., 2021).**

Acute poisoning is a clinical condition caused by the exposure in less than 24 hours to a toxic substance. It can be due to ingestion, inhalation or skin-contact with substances that should not be ingested or inhaled (detergents, plants, carbon monoxide (CO), etc.) or that may be ingested, but harmful if introduced in excess. In most cases, these substances are minimally toxic and rarely can cause death or be life-threatening. **(Soave, et al, 2022)**

There are two methods of classifying poisonings: how poisons enter the body, and the poisoning exposure. Regarding the first classification "how poisons enter the body", There are four main ways for a poison to enter the body, and those are inhalation, injection, ingestion, and absorption. *Inhalation* is when the patient breathes in the poisons. This is possible when the poison is gaseous or suspended in air. *Injection* is when a poison is deposited under the skin, most commonly by a needle or insect stinger. *Ingestion* is when a poison is consumed orally. *Absorption* is when a poison is absorbed

transderal or through contact with the skin. (**Ventura, et al., 2021**)

As a rule, ancillary testing of poisoned patients is often directed by the history and physical examination. However, some tests are particularly valuable when evaluating the critically ill poisoned patient. This is especially important when attempting to determine the severity of illness. (**Yates & Kabata, 2022**).

The critical care and emergency nurses play an important role in detection and management of acute poisoning to decrease morbidity and mortality secondary to poisonings. The maintenance of the ABC (airway, breathing, circulation) is vital for severely poisoned patients. Once this has been achieved, then other therapeutic options, such as the use of pharmacologic antagonists, decontamination, and enhancement of elimination, should be considered (**Smeltzer, et al., 2010**).

Significant of the study:

Poisoning is a common cause of morbidity and mortality worldwide, with several million episodes reported annually. Acute poisoning account for nearly one half of all poisonings reported (**Frithsen & Simpson, 2010**).

According to (Poison control and unintentional poisoning, 2019), more than three million people worldwide take poison per year, resulting in 251,881 deaths. Developing countries account for almost all these deaths. The number of poisoning cases is on the rise, because of changes in human lifestyle and social behavior, (**Abebe, A. M., et al., 2019**).

While in reviewing the statistical data of Poisoning Treatment Centre's Ain Shams University Hospitals (2022), it was revealed that count of patients who were admitted for acute poisoning were 2892 patients.

Aim of the Study:

This study aimed to evaluate the effect of educational guidelines on nurses' practice level regarding care for patients with acute poisoning in emergency unit. Through the following:

1. Assessing nurses' practice level regarding care for patients with acute poisoning.

2. Developing & implementing educational guidelines for nurses' practice about care for patients with acute poisoning.

3. Evaluating the effect of educational guidelines on nurses' practice level regarding care for patients with acute poisoning.

Research hypothesis:

The study hypothesized that:

The educational guidelines would have a positive effect on nurses' practice level 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 on one group with pre and post-test 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 age and years of experiences.

Tools for data collection:

Tool (1): **Demographic characteristics**: This part used to assess nurses' demographic characteristics such as age, gender, educational level, years of experiences, and training courses.

Tool (2): Nurses' observational checklist: It was used to assess nurses' practice level in caring of patients with acute poisoning; This tool was adapted from **(Brown & Edward, 2012), (Sandra & Nettina, 2014)** and modified by the researcher. It contains 84 skills identified by subscales as the following:

A. Items related to primary survey:

1.Nurses' practice related to assessing A, B, C, D, E and Glasgow Coma Scale (15 steps).

2.Nurses' practice related to Ryle insertion and gastric lavage (18 steps).

B. Items related to initial assessment and immediate intervention:

1.Nurses' practice related to initial assessment and neurological & safety status (21 steps).

2.Nurses' practice related to assessment of poisons (6 steps).

C. Items related to intervention according to type of poison:

1.Nurses' practice related to provide nursing intervention for ingested, inhaled, absorbed, and injected poisoning. (24 steps).

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.

• ≥ 85% (≥ 71 steps) was considered satisfactory level.

II. 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, all of them from the medical surgical nursing department, Faculty of Nursing Ain Shams University (three professor and two assistant professors). The experts reviewed the tools for clarity, relevancy, comprehensiveness, and simplicity; minor modifications were done.

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 phase.

A. 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.

B. Implementation phase:

All data collected regarding nurses' practice concerning caring of patients with acute poisoning in emergency unit 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 the priorities of poisoning

management and nursing care for patients with acute poisoning.

The educational guidelines' sessions were carried out in a hall at the poisoning treatment center for practical sessions for 3 days during morning and afternoon shift, for every 5 nurses as individual or group according to their load of work.

The implementation of the educational guidelines lasted within a period of three months for all nurses starting from June 2022 to the end of September 2022. Every educational session started by explaining the objective of the session then providing nurses with the essential skills. It had taken about 1 hour to be completed.

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

C. Evaluation phases:

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

2. Evaluating the effectiveness of the educational guidelines on nurses' practice level in caring patients with acute poisoning was tested by comparing the results of the data collected pre and post the implantation of the educational guidelines.

III. 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.

IV. Statistical design:

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

1. Numerical data were presented as mean and standard deviation (SD) values. Qualitative data were presented as frequencies (n) and percentages (%).

2. Cochran's Q test was used to compare between correct responses, satisfactory levels pre and post implementation of the educational guidelines.

3. 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 $P < 0.001$

Ethical considerations:

The ethical considerations in the study include the following:

1.The research approval was obtained from the ethical committee in the Faculty of Nursing, Ain Shams University before starting the study.

2.The research approval was obtained from the center director.

3.The researcher clarified the objective and aim of the study to the nurses included in the study before obtaining their consents to conduct the current study.

4.The researcher assured anonymity of nurses and confidentiality of subjects' data.

5.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 an accident arrived emergency department.

Results:

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±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): showed 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. presented that, there were statistically and highly statistically significant differences between the nurses scores among all items regarding primary survey to patients with acute poisoning in emergency unit. pre and post implementation of the educational program.

Table 3. declared that there are no statistically significant differences between the nurses' level of practice regarding intervention according to type of poisoning; ingested, inhaled, absorbed, injected poisoning and evaluation pre and post implementation of the educational program as (P value ≤ 0.05) except regarding removing the contaminated clothes and keeping the patient calm where there is a significant difference with (p value= **0.020** & **0.011**) respectively. In addition to, all nurses correctly administer activated charcoal, high flow oxygen and detect life threatening condition in the initial assessment (100 %) post implementation of the educational program.

Table (4) revealed 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).

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

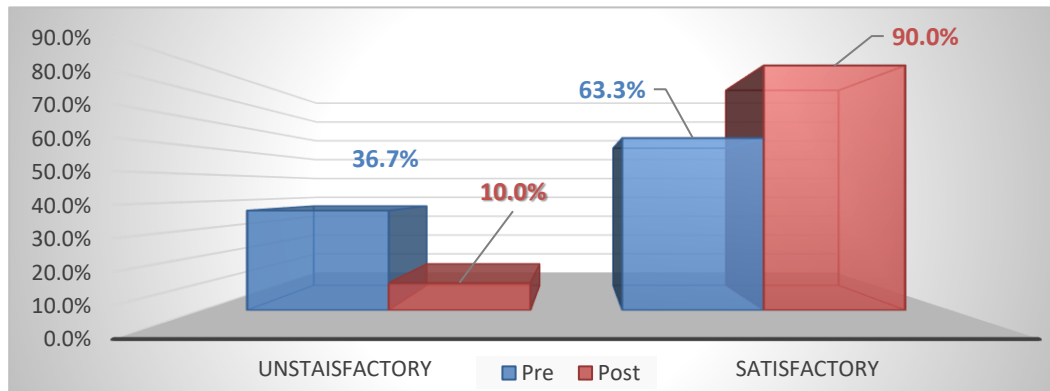| Items		N	%
Age	20 – <30	15	50.0
	30 – <40	8	26.7
	40 – <50	4	13.3
	≥50	3	10.0
Mean± SD	34.89 ±10.08		
Gender	Male	6	20
	Female	24	80
Marital status	Single	9	30
	Married	21	70
Educational level	Secondary	13	43.3
	Technical	12	40.0
	Bachelor	4	13.3
	Postgraduate	1	3.3
Years of Experience	1 – < 5	11	36.7
	5 – < 10	9	30.0
	10 – < 15	6	20.0
	≥ 15	4	13.3
Training courses	Yes	22	73.3
	No	8	26.7

Figure (1): The percentage distribution of nurses' according to total scores of practices

Table (2): Primary survey of patients with acute poisoning in emergency unit. **(N=30)**

Items	Pre				Post				Pre & Post
	Not done		Done		Not done		Done		
	N	%	N	%	N	%	N	%	
A) **Primary survey to patients with acute poisoning in emergency unit**									
1- Airway, breathing, circulation disability (A, B, C, D).									
Check patency of airway and breathing.	4	13.3	26	86.7	0	0.0	30	100	X^2=4.286 **P=0.038***
Check for neck trauma.	11	36.7	19	63.3	1	3.3	29	96.7	X^2= 10.417 **P=0.001****
Assess for chest rising	12	40.0	18	60.0	2	6.7	28	93.3	X^2= 9.317 **P=0.002****
Assess respiration.	8	26.7	22	73.3	2	6.7	28	93.3	X^2=4320 **P =0.038***
Check carotid pulse	9	30.0	21	70.0	2	6.7	28	93.3	X^2=5.455 **P =0.021***
Assess capillary refill.	12	40.0	18	60.0	2	6.7	28	93.3	X^2=9.371 **P=0.002****
2- Expose/environmental control:									
Prevent heat loss by using warm blanket.	4	13.3	26	86.7	0	0.0	30	100	X^2=4.286 **P =0.038***
3- Nurse's practice of Glasgow Coma Scale (GCS).									
Assess eye response correctly.	9	30.0	21	70.0	2	6.7	28	93.3	X^2=5.455 **P =0.021***
Assess motor response correctly.	12	40.0	18	60.0	2	6.7	28	93.3	X^2=9.371 **P=0.002****
Document GCS correctly.	9	30.0	21	70.0	2	6.7	28	93.3	X^2=5.455 **P =0.021***

Table (3): Interventions according to type of poison. **(N=30)**

Items	Pre				Post				Pre & Post
	Not done		Done		Not done		Done		
	N	%	N	%	N	%	N	%	
C) Interventions according to type of poisons									
1.Ingested Poisoning									
Gastric lavage for unconscious patient	2	6.7	28	93.3	2	6.7	28	93.3	X^2 =0.000 **P**=1.000
Administer activated charcoal	3	10	27	90.0	0	0.0	30	100	X^2 = 3.158 **P**=0.076
Administer antidote	4	13.3	26	86.7	1	3.3	29	96.7	X^2 = 1.964 **P**=0.161
2.Inhaled Poisoning									
Keep fresh air	9	30.0	21	70.0	3	10	27	90.0	X^2 = 3.158 **P** =0.076
Keep the patient quit	8	26.7	22	73.3	3	10	27	90.0	X^2 = 2.783 **P** =0.095
3.Absorbed poisoning									
Detect and treat life-threatening problems	3	10	27	90.0	0	0.0	30	100	X^2 = 3.158 **P** =0.076
Remove the contaminated clothing	5	16.7	25	83.3	0	0.0	30	100	X^2 = 5.455 **P** =0.020*
Remove the poison by **Powders:** Brush **Liquids & Eye:** Irrigate with water	3	10	27	90.0	0	0.0	30	100	X^2 =3.158 **P** =0.076
4.Injected poisoning									
Estimate type & amount of material injected	4	13.3	26	86.7	1	3.3	29	96.7	X^2 = 1.964 **P** =0.168
Administer high flow O2	3	10	27	90.0	0	0.0	30	100	X^2 = 3.158 **P** =0.076
Keep the patient calm	8	26.7	22	73.3	1	3.3	29	96.7	X^2 = 6.405 **P** =0.011*

Table (4): Effect of educational program on nurses' practice level regarding care of patients with acute poisoning in emergency unit. (N=30)

Items	Pre	Post	T test	P value
	Mean ± SD	Mean ± SD		
Practice	69.86 ± 16.05	80.53 ± 9.69	9.23	0.001**

Discussion:

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

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 the current study finding was (**Rutto, et al., 2012**) who noticed that the nurses in acute and emergency department in Kenia had unsatisfactory practical level about initial management of acute poisoning. As well, (**Hussien, et al., 2014**) in Tehran revealed that poor practices among studied nurses regarding care for poisoning at emergency unit. Additionally, (**Blanchard, et al., 2019**) revealed 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 audio visual 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. Also (**Beyene, 2017**) declared that mean practice level was (65.50%) in his study titled "Assessment of Knowledge and Practice of Nurses' on Initial Management of Acute Poisoning at Adult Emergency Department of Two Public Hospitals in Hawassa Town, Hawassa, Southern Ethiopia".

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. Also (**Mohamed, al., 2015**) showed no statistical significance between demographic characteristics in (age, years of experience and qualifications) 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 Kenia.

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

These results supported by (**Mohammed, et al., 2021**) as they mentioned that there was a significant improvement in nurses mean practice

score of both studied groups immediately and one-month post program implementation. Also, **(Little, et al., 2009)** result was matched with the current results as he revealed that there was dramatically improved in care provided to poisoned patient in emergency observation unit after service application in Perth, Australia. In addition, **(Justin, S., & Shobha, C. 2014)** showed that significantly improved after providing educational program regarding accidental poisoning at first and second follow up.

Conclusion:

In conclusion, the results of the present study revealed that, the educational program had a positive effect on nurses' practice level 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' practice about nursing care for patients with acute poisoning in emergency unit should be updated periodically through:

o 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.

o 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' 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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