Effect of Implementing Guidelines Regarding Administering Inotropic Medications for Critically Ill Patients on Nurses' Practice

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Abstract

Background: There was Limited teaching guidelines depicted for improving the practice of nurses towards inotropic medication administration, which emphasizes the importance of teaching guidelines in improving nurses' practice,

Purpose: To assess the effect of implementing guidelines regarding administering inotropic medications for critically ill patients on nurses' practice.

Method: This single-hospital, Quasi-experimental research design was used in the study. The present study was carried out at Critical Care Units. A convenient sample of all staff nurses (60 nurses), the data were collected using one tool named nurses' observational checklist.

Results: 93.3% of studied nurses had satisfactory level of practice regarding inotropic medications post implementing intervention guidelines. The post and follow up-intervention practice mean score was high 48.80, 48 respectively when compared with pre-intervention practice mean score 31.40 with P value < .001*.

Conclusion: There was significant difference in the nurses' practice mean scores regarding inotropic medications in post and follow-up implementing guidelines when compared with pre-intervention mean practice score with P value < .001. .

Keywords: *Critically ill patients, Inotropic medications, Nurses' practice and Teaching guidelines.*

Introduction

Inotropes are medications which affect the contractile activity of the myocardium. These medications are frequently used in critical care units. Inotropic medications are short- to medium-acting medications which are used to increase tone of vessels and cardiac output in variable conditions that affect critically ill patients. They are temporary used as measure until adequate cardiovascular function returns on resolution of the pathological process**.** Inotropic medications are among the most widely used medications in Critical Care Units, since they help patients to correct hemodynamic instability**(1)**.

A critical care nurse is a vital part of the health care profession, the process of medication administration is thought as one core nursing action and nursing practice daily component that spend about 40% of nurses time in the hospital to administer medications. Also, there are

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many causes why medication administration errors can be done by a nurse, which is inadequate training, lack of knowledge and practice regarding inotropic medications and high workload[2].

Inotropic medications infusion therapy is associated with many complications including myocardial ischemia and may induce hypotension in some cases. Apart from metabolic, cardiovascular and dermatologic side effects, these sympathomimetic medications may result in central nervous system stimulation including, tremors, restlessness, and even confusion and psychosis. Also, infiltration and extravasation which might occur when the intravenous solution leaks into the surrounding tissues. When a vesicant solution leaks from the vein into the surrounding tissue, extravasation occurs, whereas leakage of a no vesicant solution is called infiltration[3].

Furthermore, in Egypt and developing countries, it is hard to obtain accurate data and statistics regarding medication administration errors due to lack of proper archiving as well as the data registered system absence. Also, in Egypt there is a lack of clinical educational guidelines aimed at improving the nurses' knowledge toward medication administration in the critical care field, which affects negatively on the quality of nursing care[4]. Observational studies likewise have revealed that the majority of nurses fail to follow the 'protocols' for the safe administration of medications[5]. Therefore, the core aim of this study is to evaluate the effect of implementing intervention guidelines regarding inotropic medications for critically ill patients on nurses' practice.

Purpose: To assess the effect of implementing guidelines regarding administering inotropic medications for critically ill patients on nurses' practice

Research Hypothesis:

The following research hypothesis is formulated be formulated to fulfill the aim of this study: The nurses' practice about administering inotropic medications for critically ill patients is improved after implementing guidelines regarding administration of inotropic medications.

Method and Procedures

Design: A single-hospital, Quasi-experimental research design was used in the study; pretest and posttest design was used for this study.

Participants: A convenient sample was used in this study. At time of data collection1st of June 2018 to end of March 2019 participants comprised nurses (male and female) (60 nurses)

Procedures:

Instruments:

Data were collected using parts as the following:

Part (1): Tool (1): It was concerned with demographic data of the studied nurses

Part (2): Tool (I): Nurses' practice observational checklist

It was developed by the researcher based on the literature[6] to assess nurses' practice regarding the administration of inotropic medications

Scoring System: The total score of the nursing practices was ranged from 0 to 53 of the 53 items of steps. The possible choice for each item was done and not done. Each nurse was given one scores for step done and zero for that was not done. A total score of 75% and more was considered satisfactory, while a score below 75% was considered unsatisfactory[4].

Data Collection: Data collection of this study was carried out over eight month period that started from 1st of June 2018 to end of March 2019.Data collection was conducted through four phases (assessment, planning, implementation and evaluation phase).

Assessment Phase: Assessment of critical care nurses' practices about inotropic medications was performed.

Planning Phase: Based on the work completed in phase one,the researcher designed the teaching guidelines based on the actual need assessment of studied nurses through reviewing the literature and based on recent evidence based teaching guidelines for administered inotropic medications.

Implementation Phase: Data of current study were collected from June 2018 to March 2019. Each nurse's practice as regards the pre-determined procedure was evaluated before any information (pre-test) utilizing the formulated checklists. Then the subject was divided in small group (6 nurses), demonstration and redemonstration were carried on 2 sessions for each nurse. Practical booklet was given to each nurse.

The number of nurses was (6 nurses) during the session. The content was repeated for each group by researcher. Demonstrations and redemonstration were used in practical teaching method as regards to media used; they were booklet, posters, real object video and redemonstration.

The tools were administered to the study subject three times (1) before guidelines implementation (pre-test); (2) immediately after guidelines implementation; and (3) follow up after guidelines to assess the effect of designed guidelines.

Evaluation of designed teaching guidelines: Nurses' practice was evaluated three times pre/ post and two months later after implementation of teaching guidelines.

Statistical Analysis: Data collected through observation checklist were coded, entered and analyzed using Statistical Package for the Social Sciences (SPSS version 20).

The following statistical techniques were used:

* Percentage.
* Mean score degree $\overline{X}$.
* Standard deviation SD.
* Paired T test
* Repeated measured ANOVA test
* Proportion probability of error (P- value) and confidence interval.

Significance of results:

* When P<0.05, there is a statistically significant difference.
* When P<0.01, there is a highly statistically significant difference.

Results

Text (1): shows that 80.7% of studied nurses' age was from 20 to less than 30 with mean age 26.13±3.35. As regard the level of education, the technical institute was the highest percent with 63.9% followed by diploma 21.3%.Also, 38.3% of studied nurses had from 3 to less than 6 years of experience. The majority of studied nurses (90.%) didn't attend courses regarding inotropic medications ago.

Table (1): Total mean scores of nurses' practice (pre-post-follow up) guidelines regarding inotropic medications (n=60)

Practice item	Pre	Post	Follow up	F test	P value
	Mean±SD	Mean±SD	Mean ±SD		
Preparation phase (drugs via infusion Pump)					
Preparing phase	2.75±1.52	4.48±1.04	4.38±.95	43.439	<.001
Preparation phase (intravenous digoxin)					
Preparing phase	2.16±1.23	4.68±.77	4.61±.78	150.86	<.001
Administration Phase (infusion pump)					
General steps	6.36±2.20	7.75±.60	7.60±.69	23.331	<.001
Administration of Adrenaline	4.31±1.26	6.55±.94	6.50±.91	118.06	<.001
Administration of Noradrenaline	2.46±1.11	4.60±.90	4.58±.86	112.53	<.001
Administration of Dopamine	3.66±1.29	5.73±.70	5.56±.85	69.721	<.001
Administration of Dobutamine	1.91±.56	2.80±.51	2.75±.50	62.72	<.001
Total Score of administration skills of infused inotropes	18.73±4.19	27.43±3.27	27.00±3.34	168.99	<.001
Administration Phase (intravenous digoxin)					
Administration of Digoxin	2.75±.79	3.91±.27	3.81±.50	87.531	<.001

Practice item	Pre	Post	Follow up	F test	P value
	Mean±SD	Mean±SD	Mean ±SD		
Post Procedure Phase (infusion Pump)					
General Steps Post-procedure	1.46±1.44	3.61±.84	3.53±.91	95.44	<.001
Post Procedure Phase (intravenous digoxin)					
General Steps Post-procedure	2.94±1.45	4.66±.91	4.66±.83	185.03	<.001
Total Practice Score (54 items)	31.41±7.71	48.80±6.60	48.01±6.65	165.207	<.001

N: sample size; SD: standard deviation; F repeated measures anova P value is significant ≤.05

Table (2): clarifies that there was statistically significant difference between the pre-practice of studied nurses and post-nurses' practice regarding inotropic medication with P value = <.001 with significant increase in their mean scores with total mean 48.80 with SD 6.60 and 48.01 with SD 6.65 respectively compared with the pre implementation phase with mean 31.41 and SD 7.71. Furthermore, that there was an improvement in the total mean scores of administration skills of infused inotropes in the post phase and follow up phase with total mean 27.43 with SD 3.27 and 27 with SD 3.34 respectively compared with the pre implementation phase with mean 18.73 and SD 4.19. Also, there was an improvement in the total mean scores of administration skills of digoxin in the post phase and follow up phase with total mean 3.91 with SD .27 and 3.81 with SD .50 respectively compared with the pre implementation phase with mean 2.75 and SD .79.

Table (2): Relationship between nurses' practice (pre and post) guidelines regarding inotropic medications (N=60).

Item	Pre- guidelines Mean (SD)	Post guidelines Mean (SD)	Confidence interval (CI)		t test	P value
			Lower	Upper		
Value	31.41(7.71)	48.80(6.60)	14.80	19.96	13.47	<.001
Mean difference (Effectiveness)	17.38(9.99)					

t test is paired sample t test, P value is significant <.05

Table (3): reveals that there was statistically significant difference between the pre-nurses' practice score of studied nurses and post-nurses' practice regarding inotropic medication with t=13.47 and P value = <.001. Also, the mean difference between the pre-nurses' practice versus post- nurses' practice was 17.38 with SD 9.99 with significant increase in their mean scores.

Table (3): relationship between nurses' practice (pre and follow up) guidelines regarding inotropic medications (n=60).

Item	Pre-guidelines mean	Follow up-guidelines mean	Confidence interval (CI)		t test	P value
			lower	Upper		
Value	31.41± 7.71	48.01±6.65	13.96	19.23	12.61	<.001
Mean difference (Effectivness)	16.60±10.19					

t test is paired sample t test, P value is significant <.05

Table (3): reveals that there was statistically significant difference between the pre-practice of studied nurses and post-nurses practice regarding inotropic medication with t=12.61 and P value = <.001. Also, the mean difference between the pre- practice versus post- practice was 16.60 with SD 10.19 with significant increase in their mean scores.

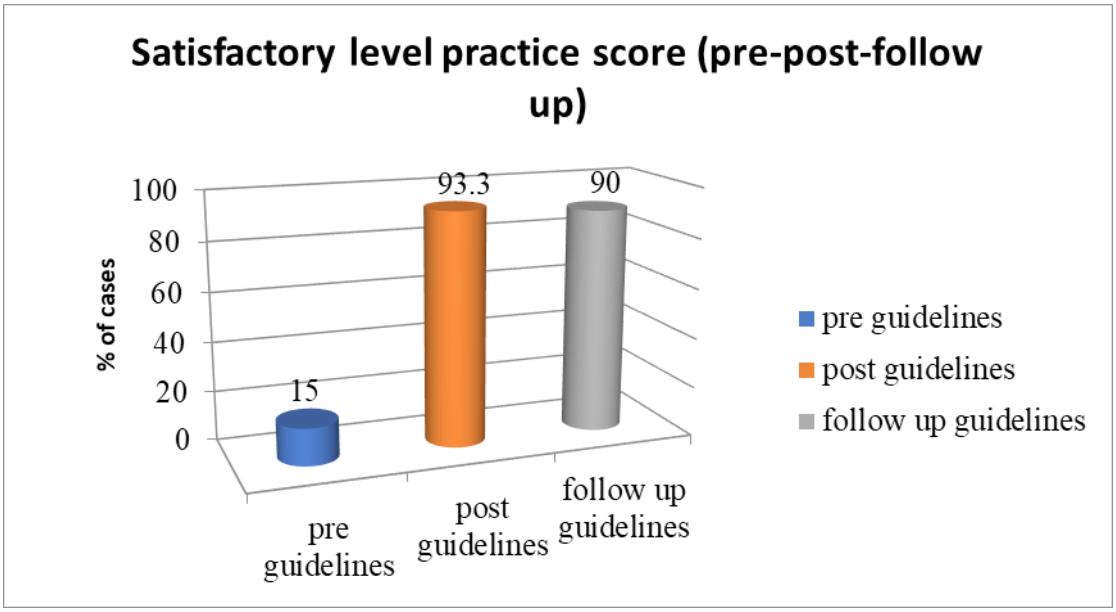

Figure (1): percentage distribution of studied nurses according to (pre- post- follow up) guidelines satisfactory level of practice (n = 60).

As illustrated by **figure (1)**, the satisfactory level of practice before guidelines implementation was 15%.On the other hand the satisfactory level of knowledge post and follow up guidelines implementation was 93.3% and 90% respectively.

Discussion

As regards nurses' practice regarding administering inotropic medications, the current study results revealed that the great majority of studied nurses had unsatisfactory practices related to administration of inotropic These results could be due to lack of medication knowledge base of nurses, limitation of medication administration process on preparing and giving to the patients. Furthermore, lack of policies, rules and training controlling the medication administration process and work overload. This point of view was generally supported by a study done by[7] which confirmed that there is no training program for improving the nurses practical performance towards medications errors, that emphasizes intervention guidelines importance to improve the practical performance of nurses

On the same line, a study done by[8] that revealed that the nurses generally did not adhere to the preparation and administration good practices, especially in double-checking, the administration and syringe labeling. Also these results were in identical line with a study done by[9] that revealed that nurses had insufficient practice regarding the medication administered.

Furthermore, these results were consistent with[10] who demonstrated lack of nurses' medication practical skills In the same context, the current results were consistent with[11] a study conducted to evaluate possible risks associated with medication administration in critical care units which depicted that there were incorrect practices related medication checking and documentation process in the medication administration as regard to the prescription, medication dosage and the administration route, preparing medication and its labeling with the appropriate patient identifiers and hand washing before and after medication administration.

As regards the nurses' practice after and follow-up intervention guidelines, these study results revealed

that the great majority of studied nurses had satisfactory level of practice regarding administering inotropic medications. These results were in correspondence with[8] who showed that the majority of studied nurses had good practices following application of intervention program.

On the same line, results done by[12] that revealed increase in post intervention mean skill regarding medication administration. Also, this study results concur with[13] who revealed that there were high statistically significant differences between pre-test, post-test and three months post-test in total mean practices scores. Moreover, these results were in the same context with [14] who revealed that there was a statistically significant difference regarding nurses' practice pre and post guidelines implementation.

Conclusion

There was significant difference in the nurses› practice mean scores regarding inotropic medications pre and after implementing guidelines with P value<.001. There was significant difference in the nurses› practice mean scores regarding inotropic medications pre and follow up implementing guidelines intervention with P value<.001

Declaration of Conflicting Interest: There is no conflict of interest

Funding: The research was not funded

Ethical Clearance: Ethical approval was taken from the faculty ethical committee that adopt the ethics rules taken by university. Nurses were informed that they were able to participate or not in the study, they have the right to withdraw from the study at any time, confidentiality and anonymity will be assured and protection of the nurse from hazards. Oral and written consent was obtained from each nurse prior to participation in the study.

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