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Nurses' Knowledge and Practices about Administration of Medications via Nasogastric Tube among Critically Ill Patients

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Abstract

Administering medication via enteral tube is predominantly a nursing responsibility across countries. It is important to identify what nurses actually know and do when giving enteral medication for critically ill patients to ensure patient's safety and prevent complications. The aim of this study is to assess the nurses' knowledge and practices about administration of medications via nasogastric tube (NGT) among critically ill patients at Cairo University Hospitals. Sample consists of sixty bedside male and female nurses who are working in the different Critical and Intensive Care Units. Descriptive/exploratory research design was utilized in the current study. This study was conducted at the different Critical and Intensive Care Units at El-Manial Specialty Hospitals affiliated to Cairo University. Three tools were utilized to collect data pertinent to the study; Nasogastric medication administration nurses' knowledge questionnaire schedule, Nurses' opinionaire sheet and Nasogastric medication administration observational checklist. The nurses were interviewed for answering the knowledge questionnaire schedule and opinionaire sheet then each nurse was observed during administration of medication via NGT for three different times using nurses' observational check list. The mean of the three observations was calculated. Findings of this study shows that the majority of the studied sample were females, married and having diploma qualification as well, more than two third of them their age ranged between 26 – 45 years. More than half of them had more than 10 years of experience. All of them were having an unsatisfactory level of knowledge and practices. Results of the present study indicated that there is a gap between nurses' knowledge and practices as compared to the standard guidelines about medication administration via nasogastric tube. The study recommended that enrichment of the Critical Care nurses at El-Manial Specialty Hospital knowledge and practices related to administration of medications via nasogastric tube according to the standard guidelines will be helpful to ensure patient safety and provide cost effective care. Also replication of this study on larger probability sample at the different geographical location at Egypt is highly recommended.
Keywords: Nasogastric tube – administration of medication via nasogastric tube – critically ill patient – nurses' knowledge – nurses practices.

1. Introduction

The administration of medication is a complex process that consists of participation of three professionals: physician, nurse and pharmacist. To administer medication through digestive tubes, they need to have the knowledge about the characteristics of different drug dosage forms available in the market, the possibility of using or not using them, and the correct handling technique (Mota, et al., 2010).

In few patients for many reasons; the administration of medicines via the oral route is not possible. These patients will need their drugs administered via either the enteral or alternative routes e.g., parenteral. Problems associated with enteral drug administration are often due to drug-food interactions or inappropriate administration or preparation techniques whish often causes tube blockage, that if not possible to clear, requires changing of the enteral tube, thereby increasing patient morbidity (Vaghjiani & Atkinson, 2010).

Administering oral medications to patients with NGT is a challenging patient-care issue. Inappropriate preparation of oral suspensions given via NGT may result in significant harm to patients. There are many drugs which have not been tested regarding the oral absorption profile and bioavailability derived from NGT dosing. Although several studies and case-reports have been reported, there is no up-to-date review of drug administration via NGT (Zhu & Zhou, 2013).

Critical care nurses are playing a major role in preparing, monitoring, administrating and evaluating the patient response to medication and nutritional care. Numerous issues must be considered to make sure safe and effective drug delivery in critically ill patient receiving enteral feeding. Interactions among nutrients and medications may be significant, resulting in treatment failure or adverse effect. Nurses' knowledge and practices about administration of medications via NGT may differ from hospital to another and need to be assessed and observed to find if there is a gap between their knowledge and practice and if they follow the standard guidelines to administer medication via NGT so this study is designed to assess the nurses' knowledge and practice about administration of medication via NGT among critically ill patients at Cairo University Hospitals.

2. Material and Methods

2.1. Aim of the study

The aim of this study is to assess nurses' knowledge and practices about administration of medications via nasogastric tube among critically ill patients at Cairo University Hospitals.

2.2. Research questions:

To fulfill the aim of this study the following research questions were formulated:

Q1: What do Critical Care Nurses at Cairo University Hospitals know about administration of medications via nasogastric tube?

Q2: What are the Critical Care Nurses practices in relation to administration of medication via nasogastric tube at Cairo University Hospitals?

2.3. Subjects

Convenience sample of 60 bedside male and female nurses working in the different ICUs at the Critical Care Department of El-Manial Specialty Hospital, Cairo University, through the three shifts (morning, afternoon, and night shifts) for 3 months who were willing to participate in this study, they were classified as follow: (20) nurses from the third unit of the Critical Care Department, (15) nurses from the Neurosurgery ICU, (15) nurses from the Stroke ICU and (10) nurses from the Respiratory ICU.

2.4. Research Design:

A descriptive/exploratory research design was utilized in the current study. This design is concerned with description of phenomena of interest and focuses on a single group or population characteristics, attributes, and /or experiences (Schmidt & Brown, 2012).

2.5. Setting:

This study was conducted at the Critical Care Department of El-Manial Specialty Hospital affiliated to Cairo University. It consists of four units; the 3rd unit of the Critical Care Department, the Neurosurgery ICU, the Stroke ICU and the Respiratory ICU. The nurse patient ratio is nearly unified all over the four units which are 1:2 and sometimes 1:3.

2.6. Tools:

Three tools were utilized to collect data pertinent to the current study. They were developed by the researcher. The designed tools were consisted of the following:

2.6.4 Nurses' knowledge questionnaire schedule about nasogastric medication administration It consists of two main sections; Sociodemographic data and questions related to assessment of nurses' knowledge related to administration of medications via nasogastric tube. It covers three main parts which are; Pre administration, during administration and post administration. The scoring system classified as follows:

- Satisfactory knowledge level: Equal to or more than 75%
- Unsatisfactory knowledge level: Less than 75%

2.6.5 .Nurses' opinionaire sheet

It is consists of three main areas and designed to assess nurses' opinions in relation to administration of medication via nasogastric tube, information about working unit and their source of information.

2.6.6 . Nasogastric medication administration observational check list

It is designed to assess nurses' practice related to administration of medication through NGT. It is divided into three main parts as followed; pre administration phase, during administration phase and post administration phase. The results of scoring system classified as follows:

- Satisfactory practice level: Equal to or more than 75%
- Unsatisfactory practice level: Less than 75%

8. Content validity:

Three tools were developed by the researcher reviewed by a panel of five experts in medical surgical, critical care and emergency nursing specialties for ensuring content validity. Based on the experts' opinions responses, the researchers developed the final validated form of the tools.

9. Pilot study

A pilot study was carried out on 10 nurses over a period of one month to test feasibility, objectivity, and applicability of the study tools. Carrying out the pilot study gave the investigator experience to deal with the included subjects, and the data collection tools .Based on the results of the pilot study needed refinements and modifications were done and pilot study subjects were excluded from the actual study sample.

10. Protection of human rights

An official permission to conduct the proposed study was obtained from the ethical committee and hospital directors. Then participation in the study was voluntary; each potential subject was informed about the purpose,

procedure, benefits, and nature of the study and that he/she had the right to withdraw from the study at any time without any rationale, then written consent obtained from them. Subjects were informed that obtained data will not be included in any further researches without second consent. Confidentiality and anonymity of each subject was assured through coding of all data and all information has taken was protected and didn't affect their annual appraisal.

11. Procedure:

11.1. **Preparation phase:**

It was concerned with constructing and testing different data collection tools, in beside the managerial arrangements to carry out the study as well as to conduct the pilot study. Nurses who agreed with participate in the study interviewed individually by the researcher to explain the nature and purpose of the study and a written consent was obtained

11.2. **Implementing phase:**

Data were collected from March 2012 to June 2012. The researcher visited the selected Critical Care and Intensive Care Units daily during their working shifts (morning, afternoon and night) each nurse was interviewed for 15 – 20 minutes to fill out the knowledge questionnaire schedule about nasogastric medication administration (Tool 1) and the opinionaire sheet (Tool 2). The researcher clarified and answered any related questions. Then, each nurse was observed during administration of medication via NGT on three different shifts using nasogastric medication administration observational check list (Tool 3). The time needed for each observation was 10-20 seconds. The mean of the three observations was calculated.

12. **Results:**

7.1. **Figure 1:** shows the distribution of sample according to their demographic data as can be seen from Figure (1), that (75 %) of the studied subjects were females.

7.2. **Table 1:** shows that the majority of the studied sample were married and having diploma nursing degree with percentages of (73.3%) and (86.7%) respectively. As well, more than two third of them their age ranged from 26 to 45 years and half of them (51.7 %) are having more than 10 years of working experiences in ICU.

7.3. **Figure 2:** shows that (78.3%) of the studied sample point of view is that procedure is not dangerous. 7.4. **Figure 3:** reveals that (65 %) of the studied sample needs to have training sessions about administration of medication via NGT.

7.5. **Table 2:** shows that (68.3%) of the studied sample reported that some mistakes can happen from administration of medication via NGT. Tube blockage and aspiration were considered by most of nurses as the expected mistake (53.7%) and (36.6%) respectively. Interestingly, (63%) suggested that workshops and continuous training are the ways to overcome most of these mistakes.

7.6. **Table 3:** reveals that (53.33%) of the studied sample reported that there is no available standard precaution guideline about the procedure.

7.7. **Figure 4:** reveals that the majority of the studied sample (90%) reported that all needed equipment for NGT medication administration is available with reference to use the wood mortar.

7.8. **Figure 5:** reveals that only (43%) of the studied sample reported cleaning of the tablet crusher and the same percentage reported no.

7.9. **Table 4:** reveals that the nurses' major sources of information are the doctors followed by previous experience (55% and 36.7% respectively). Moreover, none of the participants used internet as a source of information. Also, conferences, pharmacist and head nurses are not common source of information for them.

7.10. **Table 5:** shows that the total mean score of knowledge is (49.4 ± 10.7), with a higher mean scores of pre-administration information (33.5 ± 8.7).

7.11. **Figure 6:** shows that all of studied subject's (100 %) knowledge levels as regards to administration of medication via NGT were in an unsatisfactory level (less than 75%).

7.12. **Figure 7:** shows that the studied sample answered questions about Pre-administration, administration and post administration of medication via NGT incorrectly with percentage of (52 %), (45%) and (50%) respectively.

7.13. **Table 6:** shows that total practice mean score was (38.3 ± 2.99) and the great mean was (21.48 ± 2.16) in pre-administration of medication via NGT.

7.14. **Figure 8:** shows that all of studied subject's (100 %) practice levels as regards to administration of medication via NGT were in an unsatisfactory level (less than 75%).

7.15. **Figure 9:** shows that the majority of nurses were practicing NGT medication administration incorrectly, during the pre-administration and administration phases in percentage of (55 %) and (72%) respectively. However, their post administration practices were much better among more than half (67%) of them.

7.16. **Table 7:** reveals that male nurses were having higher mean knowledge scores (51.5±10.2) than female nurses without significant statistical difference between them. As well, there is higher tendency of bachelor

nurses to have higher mean knowledge scores (regardless their number) followed by technical then diploma was the least with P value 0.015. Those who have less than one year of experience got higher mean knowledge scores (63.13 ± 8.8) than other with significant statistical difference with F= 5.7 and P= .002.

7.17. **Table 8:** reveals that there is significant statistical difference in the mean total knowledge scores of the group who had less than one year experience as compared to those of 6-10 years of experience, the group of 1-5 years of experience as compared to those of more than 10 years of experience, the group who had less than one year of experience as compared to those of more than 10 years of experience and the group who had 1-5 years of experience as compared to those of 6-10 years of experience (t = 2.8 at P = .01), (t = 2.9 at P = .000), (t = 3.1 at P = .004) and (t = 3.9 at P = .001).

7.19. **Table 9:** reveals a negative relationship (r = -.4) with significance statistical relationship (P = .001) between nurses' pre-administration of medication knowledge scores and pre-administration practice scores.

12. Discussion

As regards to subjects socio-demographic characteristics, The total number of the studied sample was sixty nurses; the three quarters of them were females that might be due to the greater fraction of the nurses in Egypt was female and may also related to the studying of nursing in the Egyptian Universities was exclusive for females only till seven years ago. Majority of them were married and having diploma nursing degree. As well, more than one third of them their age were ranged between 26 - 35 and 36 - 45 years. Also more than half of them are having more than 10 years of working experiences in the Intensive Care Units (ICU).

This result agreed with the result of a most recent study carried out in Egypt; Shahin, (2012) found in his study on eighty five nurses carried out in Al-Manial university Hospital that three quarters of the studied sample were females, more than one third of them their age was ranged between 25>34 years and one quarter between 35 > 45 years. More than half of them were diploma nurses with more than ten years of experience.

Regarding to the nurses' opinions majority of the studied sample their opinions that this procedure is not dangerous and more than half of them need to take training sessions about administration of medication via nasogastric tube. Majority of the studied sample also reported that they think that there are some mistakes from administration of medication via nasogastric tube. Tube blockage and aspiration were considered by most of nurses as the expected mistake. Interestingly, more than half of them suggested that workshops and continuous training as a way to overcome these mistakes. The current finding in this study agree with Bourgault, et al., (2007) that the most common errors that occurs when administer medication via enteral feeding tubes are patient risk for aspiration when tube displacement and tube blockage.

More than half of the studied sample sure about there is no available standard precaution guidelines about the procedure. The performance gap and high variance in procedure related to management of enteral tube feeding and administration of medication via it indicate lack of standardization and use of evidence for performance of efficient and effective patient procedure (Kenny & Goodman, 2010). On the contrary, Persenius, M.; Hall-Loard, M.; Baath, C.; Larsson, B.; (2008) revealed that the majority of nurses in three Sweden hospitals indicated that there had written guidelines regarding EN in their ICUs.

The majority of studied sample in the current study sure about availability of all needed equipment for administration of medication via nasogastric tube but they mean by tablet crusher is the Wood mortar. More than one third of the studied sample reported yes regarding cleaning of the tablet crusher and the same percent reported no. These disagree with Decloedt and Maartens (2009) which insist of using of porcelain or glass mortar instead of use of wood or metal mortar. Also Mota, et al., (2010) mentioned that usage of wood, metal or plastic mortar not suitable because there is a potential loss of fragments of the medication that may be trapped on to this instruments, there are potential interactions between the prescribed dosage form with the mortar material and there are potential drug interactions as consequence of not washing the mortar between the crushing of multiple drugs. They also emphasizes the importance of cleaning of mortar between each drug and each patient and it is preferred to be own for each patient.

The major source of information when administered medication via nasogastric tube is doctor follows by their previous experience. However, none of the participants used internet as a source of information. Also, conferences, pharmacist, previous study and head nurses are not common source of information for these nurses. This is agreed with Mota, et al., (2010) study on nurses to evaluate their knowledge concerning medication administration through nasogastric and enteral tubes they found that the study's participant don't value knowledge related to the procedure and this fact might be associated with lack of academic education related to medication, which does not address the medication administration technique and they suggest to universal the general knowledge concerning medication for the safety of the patient. They also mentioned that most of the nurses expect the physician to assume the entire responsibility for the type of dosage form and for correlating the dosage form with the correct tube site in the gastrointestinal tract. In one Dutch study, a multidisciplinary program reduced the number of tube obstructions and medication errors by promoting practice guidelines,

holding training sessions for nurses, establishing a database of oral dosage forms, and having pharmacists offer patient-specific recommendations.

For the first research question "what do Critical Care Nurses at Cairo University Hospitals know about administration of medications via nasogastric tube?"; from analysis of the Nurses' knowledge questionnaire schedule about nasogastric medication administration; it was obvious that all of the studied sample levels of knowledge as regards to administration of medication via nasogastric tube were unsatisfactory less than 75% and approximately half of the studied sample answered knowledge questions incorrectly.

Agree with this finding Shahin, (2012) study on 85 Critical Care Nurses found that all nurses had unsatisfactory level of knowledge less than 70 % related to administration of medication via enteral tubes in the pre-test before educational program. Similarly, Mota, et al., (2010) revealed that nurses don't have satisfactory knowledge regarding administration of medication via NGT and dosage form in the study on 49 nurses working in ICU.

This low knowledge level may be related to lack of training sessions, absent of continuous supervision and evaluation, also, it might be due to lack of hospital policy, no standard guidelines for administration of medication via nasogastric tubes as they mentioned in the opinionaire sheet and absent of multidisciplinary team (Nurses- Physician- Pharmacist) cooperation when dealing with enteral tubes medication or absent of referenced person. Other reasons might be work overload, lack of nurses incentives to improve their knowledge and lack of desire to update knowledge especially whom working in ICUs for several years. This result indicates that there is a gap between theory concerning medication administration through tubes and nurses knowledge.

For the second research question "What are the Critical Care Nurses practices in relation to administration of medication via nasogastric tube at Cairo University Hospitals?"; from analysis of the nasogastric medication administration observational check list; it was obvious that all of the studied sample levels of practice as regards to administration of medication via nasogastric tube were unsatisfactory less than 75% and approximately half of the studied sample (51%) incorrectly practice this procedure. For subareas the studied sample incorrectly practice pre-administration and administration of medication via NGT with percentage of (55 %) and (72%) respectively. As well, more than two third (73%) of them correctly practice post-administration of medication via NGT. This low practice level may be related to the same causes of low knowledge level and also may be due to it in addition to increase in number of patients and work load. On other hand from the researcher observation some nurses worked by repetition, imitation and experience.

Agree with this finding a study for 30 nurses was conducted on in the Critical Care Department El-Manial University Hospital founded that the majority of nurses' demonstration were unsatisfactory when they administer medications via enteral access devices (Ismail, 2006). Disagree with this finding Shahin, (2012) study on 85 Critical Care Nurses found that more than half nurses had satisfactory level of practice (68.2 %) related to administration of medication via enteral tubes in the pre-test before educational program.

The Correlation between Sociodemographic Data, Nurses' Knowledge and Practices Scores as regards to Administration of Medication via Nasogastric Tube. Regarding gender there were no significant statistical difference between gender of the participant and their knowledge and practices scores. Although, male nurses was having higher mean knowledge score than female nurses. It may be due to the majority of male was young age less than 35 years but the female nurses get higher mean practice score it is may be related to more experienced more than 10 years.

Regarding age of the participants, there were no significant statistical difference between age of the participant and their knowledge and practices scores. Although, young nurses less than 26 years was having higher mean knowledge score than old age nurses. It may be due to the new graduation and fresh studying knowledge with intact memory but old age nurses more than 40 years get higher mean practice score than young age it is may be related to more experienced and more repetition of the procedure although it depend on their opinions and tradition rather than updating knowledge or following guidelines. Agree with this result Shahin, (2010) found also no significant statistical difference between gender and age in pre-test knowledge and practice scores related to enteral nutrition.

Regarding academic qualification; there were highly significant statistical difference between academic qualification of the participant and their knowledge scores; the bachelor nurses got higher mean knowledge scores followed by the technical then the less one is diploma nurses. On the other hand the diploma nurses got higher mean practices scores followed by technical nurses then bachelor degree nurses. This may due to the bachelor nurses were newly graduated and their age less than 26 years with experience less than one year and diploma nurses are old age with more years of experiences. There is supportive study for this finding done by Philips, C.; Palmer, C.; Zimmerman, B.; Mayfield, M. (2002) they found that diploma nurses develop stronger professional level skills. Contradiction with this result Shahin, (2010) found bachelor nurses score significantly higher in knowledge and practices scores compared to diploma nurses in the study about enteral nutrition.

Regarding years of experience those nurses who have less than one year of experience got higher mean knowledge score than other with significant statistics this may be due to new graduation with fresh knowledge.

This mean when the years of experience increase the level of knowledge decrease.
Regarding to the correlation between knowledge and practices scores there is negative relationship with highly significance statistical difference between nurses' pre-administration of medication via nasogastric tube knowledge scores and pre-administration practice scores. Disagree with this study a recent study about (The development of evidenced-based guidelines and Critical Care nurses' knowledge of enteral feeding) they found nurses' practices directly influenced by their knowledge and knowledge is essential to achieve best practices (Bourgault, et al., 2007). Also in Shahin, (2012) study found strong positive correlation between nurses' knowledge and practices scores and he mentioned the knowledge is important for safe nursing practices.

13. Conclusion and recommendations:

The current study concluded that, there is a gap between nurses' knowledge and practices as compared to the standard guidelines about medication administration via nasogastric tube. Knowledge level for all nurses participate in this study as regards administration of medication via nasogastric tube was unsatisfactory in total and subtotal areas with a lot of wrong information which lead to hazardous in practices as confirming tube placement which may lead to death or dangerous complications. As well, the practices level is unsatisfactory in total score but in subtotal areas the pre-administration and administration with unsatisfactory and the post-administration was satisfactory. Also, the current study recommended that provide continuous education and training sessions about administration of medications via nasogastric tube, preparation of drugs, how to check tube placement, drug-drug and drug-nutrient interactions based on evidence and provision of nurses and Critical Care Units with printed universal guidelines and standard precaution illustrated simply in posters and booklets related to administration of medication via NGT. Also, Collaborative interaction with pharmacist, physician and nurses will improve nurses and assure safe administration of medication via nasogastric tubes.

14. Acknowledgement:

I would like to acknowledge all the critical care nurses who accepted voluntarily to take part in this study. Because of their participation in this study, we had a successful research. Finally, I would like to thank hospital administration who allowed us to conduct this study.

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Figure (1): Percentage Distribution of the Studied Sample in Relation to Their Gender. (n=60)

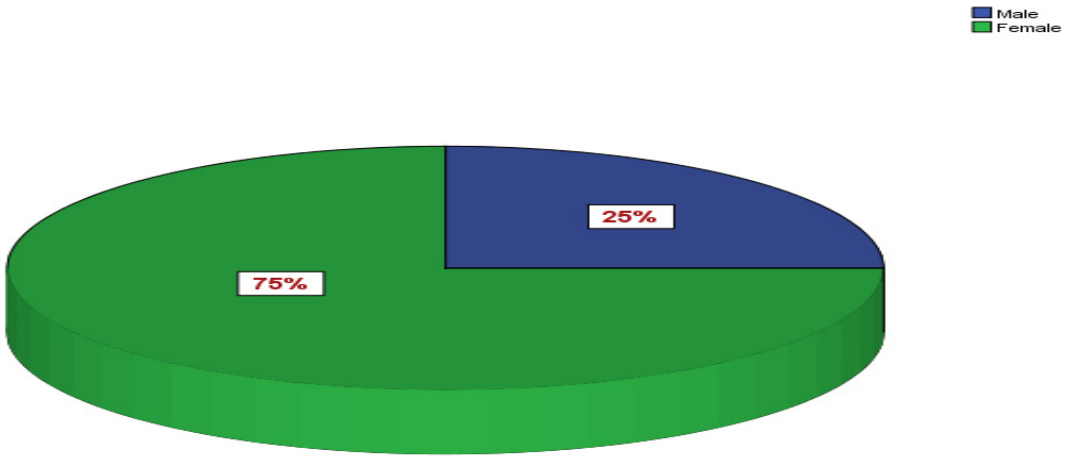

Table (1): Percentage Distribution of the Studied Sample as Regards to Their Sociodemographic Data (n=60)

Variables	No.	%
Marital status		
Married	44	**73.3**
Single	15	25
Widowed	1	1.67
Academic Qualification		
Diploma	52	**86.7**
Technical	6	10
Bachelor	2	3.33
Age Categories		
16 – 25	12	20.0
26 – 35	23	**38.3**
36 – 45	23	**38.3**
> 46	2	3.3
Years of experience		
<1year	4	6.7
1-5 years	7	11.7
6 -10 years	18	30
>10 years	31	**51.7**

Figure (2): Percentage Distribution of the Studied Sample's Point of View in the Light of Being Dangerous or Not (n=60).

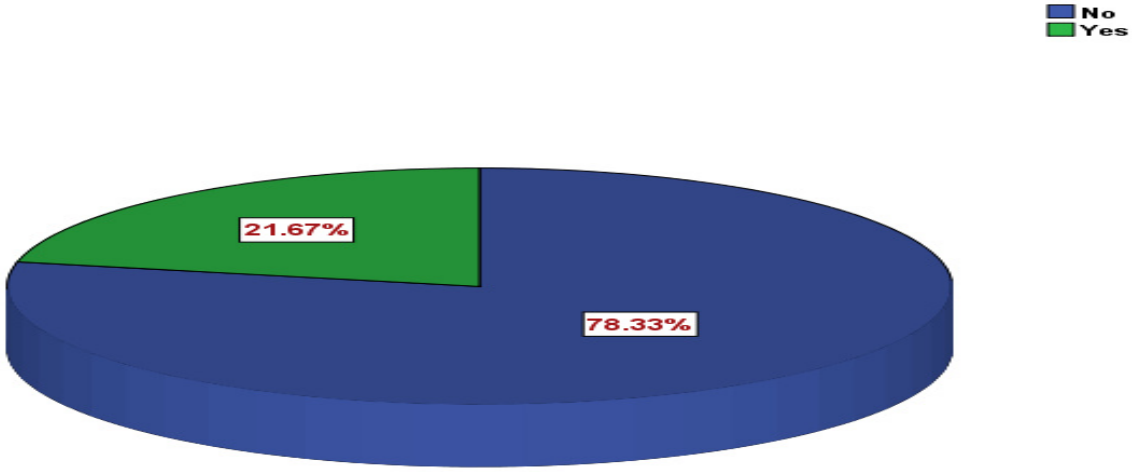

Figure (3) Percentage Distribution of the Studied Sample's Point of View about Training Needs (n=60).

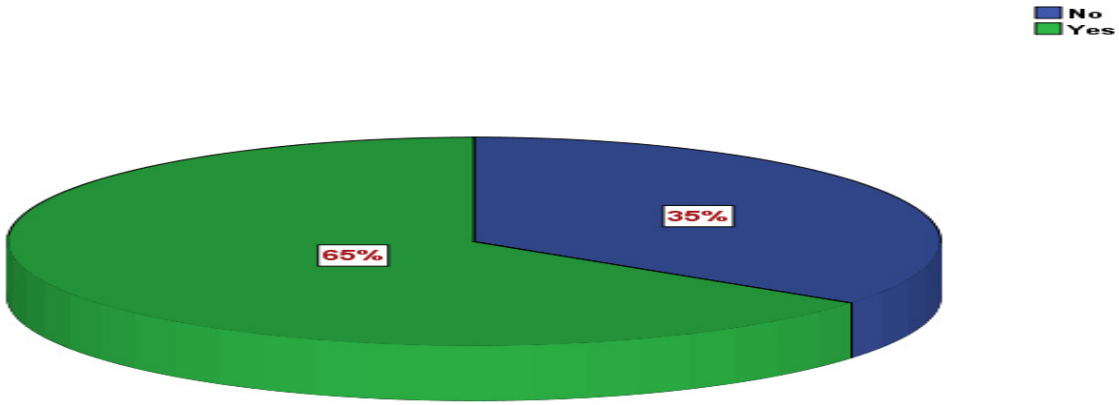

Table (2): Percentage Distribution of the Respondents' Point of View in Relation to the Occurrence of Mistakes Related to Medications Administration via Nasogastric Tube. (n=60)

Items	No.	%
Do you think that there are some mistakes can occur during the procedure		
Yes	41	**68.3**
No	16	26.7
I don't know	3	5.0
If yes; what are the most expected mistakes can be done?		
Drug – drug interaction	13	31.7
Drug – nutrient interaction	3	7.3
Tube blockage	22	**53.7**
Patient aspiration if tube displacement	15	36.6
I don't know	6	14.6
Nurses' suggestions to overcome these mistakes		
I don't know	3	6.8
Workshops & continuous training	28	**63.6**
Continuous evaluation	3	6.8
Follow the standard precaution	3	6.8
Only ICU nurses work in ICU	3	6.8
Improve financial level & hospital performance	4	9.1

Table (3): Percentage Distribution of the Respondents' Point of View in Relation to the Availability of NGT Medication Administration Guidelines (n=60).

Items	No.	%
Availability of standard precautions guidelines for medication administration via nasogastric tube		
Yes	0	0
No	32	**53.3**
I don't know	28	46.7

Figure (4): Percentage Distribution of the Studied Sample Point of View about Availability of Needed Equipment for Nasogastric Tube Medication Administration. (n=60).

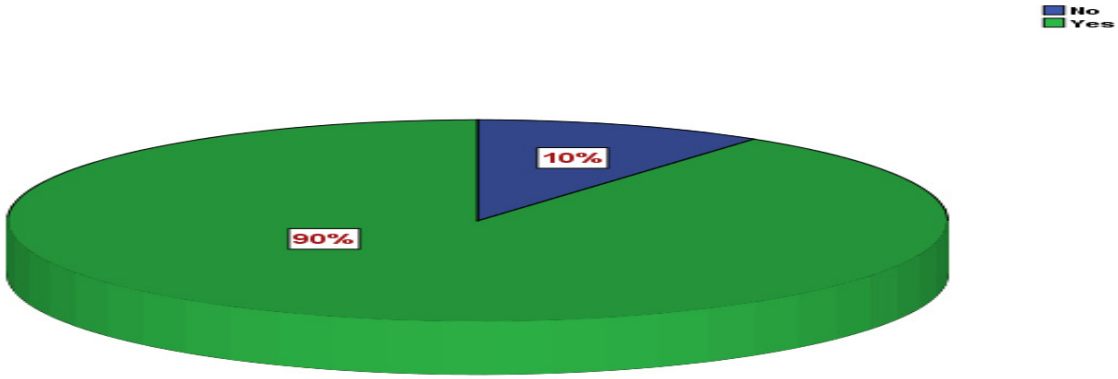

Figure (5): Percentage Distribution of the Studied Sample's Point of View about Cleaning of the Tablet Crusher (n=60)

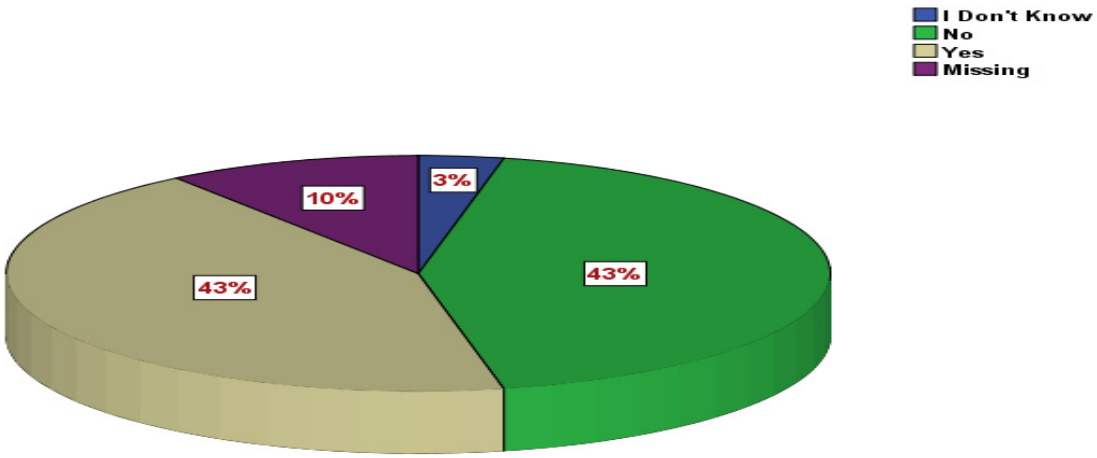

Table (4): Percentage Distribution of the Respondents' Point of View in Relation to their Source of Information When They Need to Ask about Medication Administration via Nasogastric Tube (n=60)

Items	No.	%
Source of information regard administration of medication via NGT		
Available doctor	33	**55%**
Pharmacist	3	5%
Scientific reading	4	6.7%
Conferences & Workshops	1	1.7%
Previous Experiences	22	36.7%
Previous Studies	3	5%
Head nurse & Colleges	1	1.7%
Internet	0	0

Table (5) The Mean Total and Subtotal Knowledge Scores of the Respondent's as Regards to Administration of Medication via Nasogastric Tube (n=60)

Variable	Mean ± SD	Min.	Max.
Total Knowledge	**49.4 ± 10.7**	**30**	**72.5**
• Pre-administration of medication	**33.5 ± 8.7**	17.5	60
• Administration of medication via NGT	8.9 ± 3.75	0	17.5
• Post administration of medication	7.04 ± 3.27	0	12.5

Figure (6): Critical Care Nurses' Knowledge Level as Regards to Administration of Medication via Nasogastric Tube (n=60)

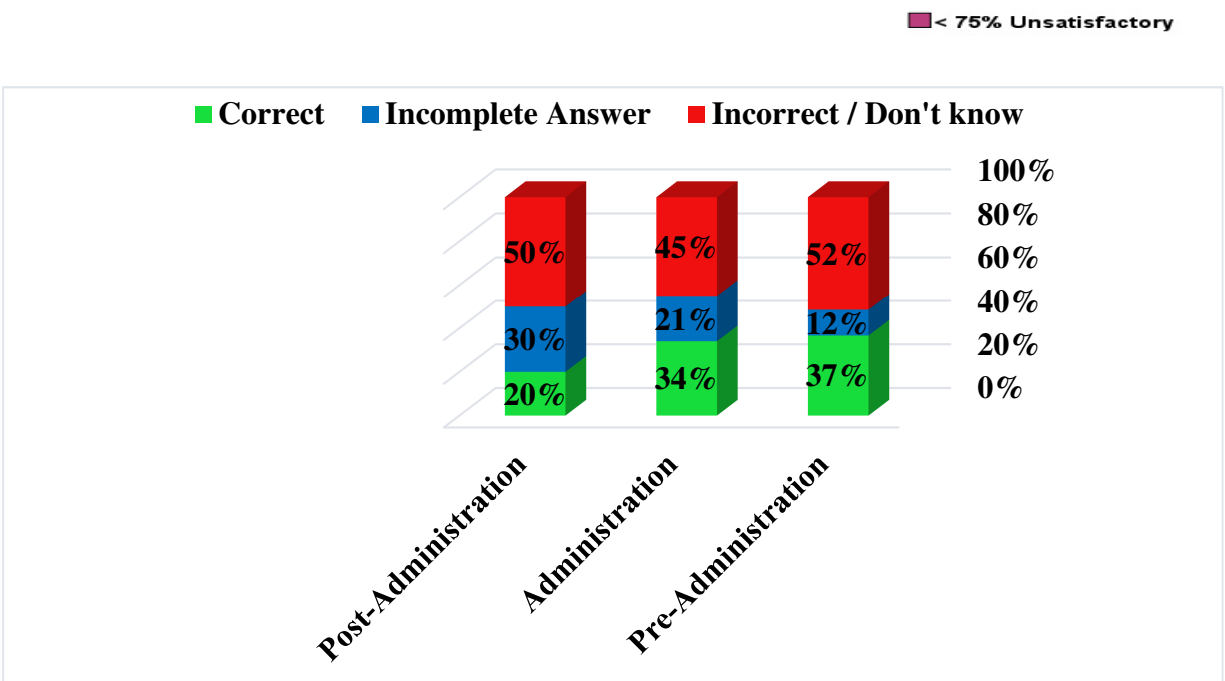

Figure (7): Percentage Distribution of the Respondents' Total Knowledge Answers about Administration of Medication via Nasogastric Tube during Pre-administration, Administration and Post-administration Phases (n=60).

Table (6): Total, Subtotal Means Practice Scores as Regards to Administration of Medication via Nasogastric Tube. (n=60).

Variable	Mean ± SD	Min.	Max.
Total mean practice	**38.3 ± 2.99**	32.7	45
• Pre-administration of medication	**21.48 ± 2.16**	16.7	26
• Administration of medication	2.3 ± .5	2	3.7
• Post administration of medication	14.7 ± 1.4	11.33	17.7

Figure (8): Critical Care Nurses' Practice Level as Regards to Administration of Medication via Nasogastric Tube (n=60).

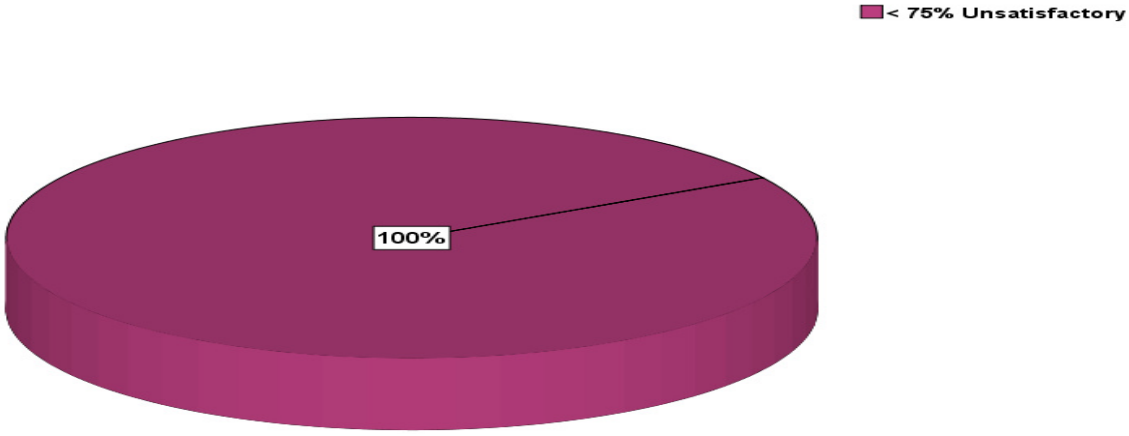

Figure (9): Percentage Distribution of the Respondents' Total Practice Scores about Administration of Medication via Nasogastric Tube during Pre-administration, Administration and Post-administration Phases (n=60).

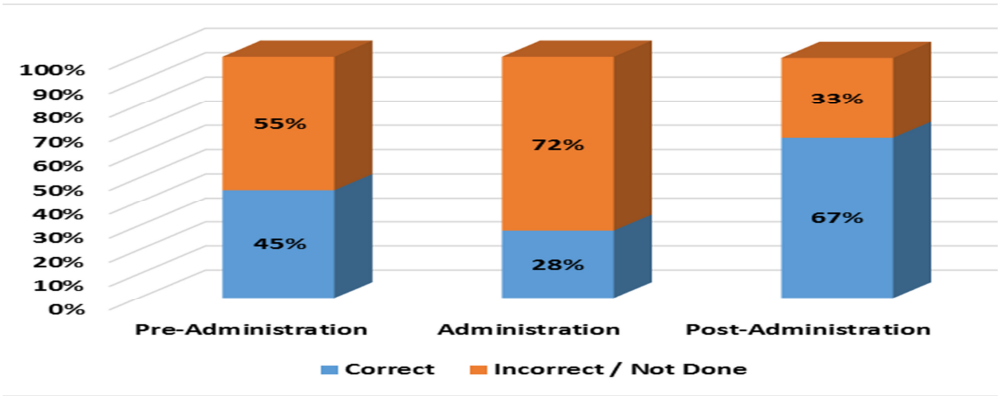

Table (7): Relationship between Sociodemographic Data and Total knowledge Score among Studied Sample (n=60).

Variables	X ± SD	t/F/ P value
Gender		
Male	51.5±10.2	t= .9 /.4
Female	48.7 ±10.9	
Marital status		
Married	48.9 ±10.6	F=.7 /.5
Single	51.5 ±11.25	
Widow	40	
Academic Qualification		
Diploma	47.9 ± 10.4	**F= 4.5 / .015***
Technical	57.5 ± 7.07	
Bachelor	63.8 ± 5.3	
Age Categories		
16 – 25	52.3 ±12.1	F= 1.9 / .144
26 – 35	47.3 ± 9.9	
36 – 45	51.09 ± 10.1	
> 46	36.25 ± 8.8	
Years of experience		
<1year	63.13 ± 8.8	**F= 5.7 / .002***
1-5 years	58.2 ± 4	
6 -10 years	46.7 ± 10.7	
>10 years	47.17 ± 9.7	

* P < 0.05 Significance value

Table (8): Relationship between Sociodemographic Data and Total Practice Score among Studied Sample (n=60).

Variables	X ± SD	t/F/ P value
Gender		
Male	37.9 ± 2.9	t= -.6 /.57
Female	38.4 ± 3	
Marital status		
Married	38.5 ± 2.8	F= 1.5 / .22
Single	37.5 ± 3.3	
Widow	42.33	
Academic Qualification		
Diploma	38.5 ± 1.18	F= 2.04 / .139
Technical	36.9 ± 4.3	
Bachelor	35.17 ± 1.18	
Age Categories		
16 – 25	37.5 ± 3.5	F= 1.95 / .132
26 – 35	39.2 ± 2.6	
36 – 45	37.6 ± 2.99	
> 46	40.66 ± 2.35	
Years of experience		
<1year	35.6 ± .9	F= 1.4 / .25
1-5 years	38.25 ± 3.9	
6 -10 years	38.97 ± 2.9	
>10 years	48.28 ± 2.9	

* P < 0.05 Significance value

Table (9): Relationship between the Studied Sample Knowledge and Practice Scores (Pre-administration, Administration and Post-administration) (n=60)

Variables	**X ± SD**	**r / P value**
Total Knowledge Scores	49.4 ± 10.7	r = -.19 / .13
Total Practice Scores	38.3±2.9	
Pre-administration Knowledge	33.5 ± 8.7	**r = -.4 / .001**
Pre-administration Practice	21.5 ± 1.6	
Administration Knowledge	8.9 ± 3.7	r = -.004 / .98
Administration Practice	2.3 ± .4	
Post-administration Knowledge	7 ± 3.3	r = .02 / .8
Post-administration Practice	14.7 ± 1	

* P < 0.05 Significance value