Nurses' Performance about Nasogastric Tube Uses among Patients in Critical Care Units

Hamdi Mohammed Amein, Prof. Dr. Eman Talaat Assist. Prof. Dr. Basma Khalil
B.Sc. Nursing, Professor Of Medical Surgical Department,Assist Professor of Medical Surgical Department
Faculty of Nursing – Ain Shams University

Abstract

Background: Gastric intubation is a common procedure that gives access to the stomach through the nasal entry for diagnostic and therapeutic purposes. ***Aim of the study:*** to assess nurses' performance in nasogastric tube use among patients in critical care units.***Research design:*** an exploratory descriptive research design was used to carry out this study. ***Setting:*** The study was conducted in intensive care units at Ain-Shams University medicine hospital. ***Subjects:*** A convenience sample of (80) staff nurses. ***Data collection tools:*** data were collected by Structured Self-administered Interview questionnaire, Observational Checklist for nurses' practice, and Nurses' Attitude Likert scale. ***Results:*** Three-quarters of studied nurses had an unsatisfactory level of knowledge and one-quarter of them had a satisfactory level of knowledge regarding feeding and administration of medications via nasogastric tube. While less than three-quarters had an unsatisfactory practice level and less than one-third of them had a satisfactory practice level regarding feeding and administration of medications via nasogastric and nursing care during nasogastric tube complications tube. Also, respectively two-thirds of nurses had negative attitudes and more than one-third had positive attitudes regarding feeding and administration of medications via nasogastric tube. ***Conclusion***: there was a highly significant positive correlation between total level of knowledge, total practice, and total attitude among staff nurses regarding nasogastric tube use among patients in critical care units. ***Recommendations***: Ongoing monitoring of staff nurses' practice by head and charge nurses when caring for patients with nasogastric tubes and provision of guidance to correct poor practices. Further research is replication of the study on a larger sample selected from different geographical areas of Egypt is recommended to generalize the study.

Keywords: Nurses' Performance, Nasogastric Tube, Patients, Critical Care Unit

Introduction

Optimal nutrition is very important in the care of critically ill patients. Furthermore, malnutrition has been associated with a longer length of stay in the intensive care unit (ICU) and with higher risk-adjusted mortality ***(Abo Elezz et al., 2021).*** Nutrition is one of the most important principles in treating many diseases and directly intervenes in pathophysiological changes and critical results of the disease. Most patients including ICU inpatients fail to intake the required nutrition like normal people. These patients are exposed to critical conditions and life-threatening diseases and unable to self-care, particularly in oral intake***(Zeb et al., 2022).***

Enteral nutrition generally refers to any method of feeding that uses the gastrointestinal (GI) tract to deliver part or all of a person's caloric requirements. It can include a normal oral diet, the use of liquid supplements, or delivery of part or all of the daily requirements by use of a tube (tube feeding, when a patient has difficulty eating for whatever reason, and if the GI tract is working, then using this natural means for feeding would be preferable to feeding by intravenous means***(Hadera et al., 2022).***

Nasogastric tubes (NGT) have been in use for over 100 years and are still considered essential and resuscitative tools in multiple medical specialties for acute and chronic care. They are vital for decompression of the stomach in the presence of bowel obstruction in the critically ill and useful as a conduit for the administration of medications and sometimes for short-term parenteral nutrition***(Vadivelu et al., 2023).***

Poor management may lead to frequent complications, like pulmonary- aspiration (pneumonia and apnea), intolerance of feed (high residual volumes, regurgitation, vomiting, and diarrhea), mechanical blockage, and accidental respiratory location. The occurrence rate of pulmonary aspiration during NG feeding

is 77%, the intolerance of feeding up to 63%, and mechanical blockage up to 14%. Respiratory aspiration is a chief source of grim sickness and death among the inhabitants of nursing homes as well as hospitalized patients. The incidence of diarrhea in tube-feed patients ranges from less than 5% and greater than 60% ***(Margrate et al., 2020)*.**

Gastric intubation is a common procedure that gives access to the stomach through the nasal entry for diagnostic and therapeutic purposes. By inserting a nasogastric tube, you are gaining access to the stomach and its contents. While generally considered a basic medical procedure, it frequently includes some level of uneasiness for the patient, if he isn't adequately prepared with anesthesia to the nasal passages and explicit guidelines on how to participate with the administration during the procedure***(Abdelrahman et al., 2020)*.**

Significance of the study:

Nasogastric tube (NGT) feeding is recommended to provide nutrition and hydration to patients unable to swallow. Every year, approximately 790,000 adults and children in the UK are required to be fed by NGT to avoid malnutrition and dehydration and to give essential medications. The incidence of nausea and vomiting (20%), high gastric residual volumes (HGRVs; 20–70%), diarrhea (63%), and constipation (5–83%) were noted. These complications usually interfere with the achievement of adequate nutrition support ***(Kadamani et al., 2014).***

According to a study published in Egypt by ***Mohammed and Othman,(2018)*** entitled 'Effect of Gravity Feeding Versus Bolus Feeding Technique on Gastrointestinal Disturbance among Stroke Patients', the incidence rate of diarrhea in more than 80% followed by constipation (40%) and then vomiting (33%) was revealed. Nutritional status tends to deteriorate during hospitalization unless appropriate nutrition support is started early and continually reassessed ***(Elay et al., 2020).***

Aim of the study

The aim of this study is to assess nurses' performance in nasogastric tube use among patients in critical care units.

Research Question

- What is the level of nurses' knowledge regarding feeding and administration of medications via nasogastric tube?
- What is the level of nurses' practice regarding feeding and administration of medications via nasogastric tube?
- What is the level of nurses' attitude regarding feeding and administration of medications via nasogastric tube?

Subjects and methods

Research Design:

An exploratory descriptive research design was utilized to fulfill the aim of the study and answer the research questions.

Research Setting:

The study was conducted in intensive care units at Ain-Shams University Medicine Hospital. The general intensive care unit is located on the ground floor and divided into two parts; intensive care unit(A), and intensive care unit(B). Each ICU consisted of 15 beds and two isolation rooms. The blood disorders intensive care unit is located on the second floor and consists of 11 beds separated by curtains with no isolation rooms. The thoracic intensive care unit is located on the first floor and consists of 12 beds including 2 isolation beds.

Subjects:

A convenience sample of (80) staff nurses from the above-mentioned setting. **Data were collected using three tools namely** a Structured Self-administered Interview questionnaire, an Observational Checklist for nurses' practice, and a Nurses' Attitude Likert scale:

Tool I: Structured Self-administered Interview Questionnaire Form:

This tool was adopted from *(Babapour et al., 2016; Metwaly, Mohammed& Mohammed, 2013).* It developed into two parts. It aimed to assess nurses' knowledge regarding nasogastric tubes.

Part (1)Nurses' demographic data: This part is concerned with the assessment of nurses' demographic characteristics. It is composed of five questions related to age, sex, educational level, years of experience, and training courses.

Part (2) Nurses' Knowledge Questionnaire sheet: this part is designed to assess nurses' knowledge regarding nasogastric tubes as basic concepts of a nasogastric tube (5

questions), indications(2 questions), contraindications(2 questions), feeding administration (11 questions), medication administration (2 questions)and complications(17 questions).

Scoring system: The score is distributed as one mark for each correct answer and zero for each incorrect answer. The total score is converted into a percentage. The total score of the questionnaire was (39) grades. knowledge was considered an unsatisfactory level of knowledge if the total percent score was below 75% (below 29 grades) and a satisfactory level of knowledge if the total percent score was above ≥75% (above ≥29 grades) *(Attia et al .,2021).*

Tool II: Observational Checklist for nurses' practice

This tool was adopted from *(Abdullah, Mohammed & Ismail,2014; Willihnganz&Clayton,2016; Cooper& Gosnell, 2018).* It aimed to assess nurses' practice during caring for patients with nasogastric tubes. It consisted of two parts:

Part one: Aimed to assess routine nursing care as Nasogastric tube feeding administration and medication administration. The nasogastric tube feeding administration checklist consisted of 51 items regarding general Preparation (13 items), procedure (28 items), and post-procedure (10 items). The nasogastric tube medication administration checklist consisted of 43 items regarding general Preparation (9 items), procedure (26 items), and post-procedure (8 items).

Part two: Aimed to assess nursing care during nasogastric tube complications as mechanical, infectious, and metabolic complications. The nasogastric tube mechanical complications checklist consisted of (72 items) and was divided into the displacement of the tube (29 items), tube obstruction (26 items), and irritation and inflammation at the nose (17 items). The nasogastric tube infectious complications checklist consisted of (87 items) and was divided into nasopharyngeal and ear infection (19 items), infective diarrhea (26 items), feeding intolerance (21 items), and lung aspiration (21 items). The nasogastric tube metabolic complications checklist consisted of (34 items) and was divided into electrolyte disturbance (18 items), and hypo or hyperglycemia (16 items.

Scoring system: The score is distributed as one mark for each step correctly done, and zero for incorrectly done & not done the total score is converted into percentages and graded as the following: - Below 85% is considered an unsatisfactory level of practice. 85% and above is considered a satisfactory level of practice *(Attia et al., 2021).* Total score of nasogastric tube feeding administration and medication administration checklist 94 grades. The total score of the nasogastric tube complications checklist was 193 grades.

Tool III: Nurses' Attitude Likert scale:

This tool was developed by *Mohamed et al.,(2022)* and modified by the researcher. It aimed to assess nurses' attitudes regarding care of the patients with nasogastric tubes.

Scoring system: scoring each statement was as the following; agree response was given one grade while disagree/neutral responses were given zero for positive statements and the opposite score for negative statements (numbers 2,9). The total score was classified as the following; ≥80% was considered positive attitude, and <80 % was considered negative attitude *(Mohamed et al., 2022)*.

Preparatory Phase:

This phase started with a review of current and past, national and international related literature and theoretical knowledge concerning the subject of the study using textbooks, articles, journals, and websites. This review was helpful to the investigator in reviewing and developing the data collection tools, and then the investigator tested the validity of the tool through a jury of experts to test the content, knowledge, accuracy, and relevance of questions for the research.

Pilot Study:

A pilot study was conducted in January 2023. Eight staff nurses representing 10% of the total study subjects were selected randomly. The pilot study aimed to examine the clarity of language, and applicability of the tools, and to test the feasibility and suitability of the tools. It also served to estimate the time needed to complete the forms by each study subject and identify potential obstacles and problems that may be encountered during data collection. The time for filling out the questionnaires was around 30-45 minutes. Data obtained from the pilot study was analyzed and modifications

were made to the questionnaires and didn't interfere with the structures of data collection tools. The study sample in the pilot was excluded from the main study sample.

Validity:

Testing validity refers to how well a scientific test measured what it intended to measure of the proposed tools by using face and content validity. Face validity is aimed at inspecting the items to determine whether the tools measured what supposed to measure. Content validity was conducted to determine whether the content of the tools covered the aim of the study.

Validity was tested by a jury of three experts (two assistant professors, and one lecturer) from the medical medical-surgical nursing department at the faculty of nursing, at Ain Shams University. The experts reviewed the tools for clarity, relevance, comprehensiveness, simplicity and applicability, accuracy, and clarity in language. Based on their recommendations, correction, addition, and omission of some items and minor modifications were done.

Reliability:

The reliability of a self-administered questionnaire used to assess nurses' knowledge = 0.90, the reliability of the Nurses' knowledge Questionnaire sheet used to assess nurses' practice = 0.95, and the Nurses' attitude Likert scale used to assess nurses' attitude = 0.93.

Fieldwork:

The fieldwork of the study started at the beginning of February 2023 after securing the official approvals for conducting the study to the end of March 2023. The researcher obtained approval from the head nurses of intensive care units and the director of Ain Shams Hospital to decide the suitable time to collect the data. The letter was issued to them from the faculty of nursing at Ain Shams University to examine the aim of the study and order to obtain their permission and cooperation.

The researcher was coming hospital to collect data for 2 days/week (Monday and Thursday of every week) at morning shift and afternoon shift. Two separate days were chosen so that data could be collected from different nurses during the week. The researcher first explained the aim of the study to staff nurses and reassured them that the information collected was treated confidentiality and was used only for the study. Two questionnaire sheets took around 30-45 minutes so the researcher collected about five sheets per day. The researcher checked each filled questionnaire sheet to ensure its completion.

Ethical Considerations

Before the study's conduction, ethical approval was obtained from the Scientific Research Ethical Committee of the Faculty of Nursing, Ain Shams University. The subjects were informed about their rights to withdraw at any time without giving any reason and the collected data was kept confidential and used for scientific work only. Oral informal consent was obtained from each participant in the study.

Administrative Design:

Before starting the study, an official letter was issued from the Dean of the Faculty of Nursing, at Ain Shams University to the director of nursing at Ain Shams Hospital to facilitate the collection of data. Based on this official letter, the director of nursing informed head nurses of the ICU to facilitate the process of collecting data from staff nurses in a way that was appropriate to the nature of the work of each care unit, so that it didn't hinder the nurses from performing their work. The letter explained the aim of the study to facilitate the data collection phase.

IV. Statistical Design:

The collected data were organized, categorized, computerized, tabulated, and analyzed using the Excel program and SPSS software version 22. For quantitative data, the range, mean, and standard deviation were calculated. For qualitative data, the number and percentage were calculated, T-test and Chi-square were used. The one-way ANOVA procedure produced a one-way analysis of variance for a quantitative dependent variable by a single factor (independent variable). Correlation between variables was done using Pearson Rank order correlation coefficient for parametric data. For all the above-mentioned statistical tests done, there was statistically significant at $P < 0.05$.

Results

Table (1): Indicates that (57.5%) of the staff nurses are between 25-35 years old, (58.8%) of them were females, As well as (45%) of them had a bachelor of nursing, As well (51.2%) have more than 10 years of

experience in ICU, and (52.5%) are attended training courses on the nasogastric tube and its complications. As well as (57.5%) of them attended one course.

Table (2): Displays that (58.7%) of the studied staff nurses have a satisfactory level of knowledge regarding the first organ of the gut in the human body. While (60%) of them have an unsatisfactory level of knowledge regarding the duration of the patient's nasogastric tube. Also, (43.8%) of the studied staff nurses have a satisfactory level of knowledge regarding the total nurses' level of knowledge regarding basic concepts of a nasogastric tube, (56.2%) of them have an unsatisfactory level of knowledge regarding the total nurses' level of knowledge regarding basic concepts of a nasogastric tube.

Table (3): Displays that (71.3%) of the studied staff nurses have a satisfactory level of knowledge regarding the purpose of using the nasogastric tube. While (62.5%) of them have an unsatisfactory level of knowledge regarding the cases that need to have a nasogastric tube installed, Also, (37.5%) of the studied staff nurses have a satisfactory level of knowledge regarding total nurses' level of knowledge regarding indications for the use of the nasogastric tube, while (62.5%) of them have an unsatisfactory level of knowledge regarding total nurses' level of knowledge regarding indications for the use of the nasogastric tube.

Figure (1) shows that (75%) of the studied staff nurses have an unsatisfactory level of knowledge regarding feeding and administration of medications via nasogastric tube. While (25%) of them have a satisfactory level of knowledge regarding feeding and administration of medications via nasogastric tube.

Figure (2) shows that (82.5%) of the studied staff nurses have an unsatisfactory level of knowledge regarding feeding and administration of medications via nasogastric tube.

Figure (3) shows that (69%) of the studied staff nurses have an unsatisfactory practice level regarding total practice levels among staff nurses regarding nasogastric tube mechanical complications.

Table (4): Reveals that there was a highly significant positive correlation between total level of knowledge, total practice, and total attitude among staff nurses regarding nasogastric tube use among patients in critical care units at ($P = < 0.01$).

Figure (4) shows that (34%) of the studied staff nurses have a positive attitude level regarding feeding and administration of medications via nasogastric tube. While (66%) of them have a negative attitude level regarding feeding and administration of medications via nasogastric tube.

Table (1): Percentage and distribution of the studied nurses according to their demographic characteristics (n=80)

Nurses' demographic characteristics	Staff nurses in studied sample (n=80)	
	N	%
Age (year)		
<25	**34**	**42.5**
25-35	**46**	**57.5**
Mean±SD	**24 ±2.82**	
Gender		
Male	**33**	**41.2**
Female	**47**	**58.8**
Educational Qualification level		
Nursing Diploma	**11**	**13.8**
Technical Institute of nursing	**20**	**25**
Bachelor of Nursing	**36**	**45**
Advanced Studies	**13**	**16.2**
years of experience in ICU		
<5	**8**	**10**
5-10	**31**	**38.8**
>10	**41**	**51.2**
Have you attended any training courses on the nasogastric tube and its complications?		
Yes	**42**	**52.5**
No	**38**	**47.5**
If yes, how many training courses were attended?		
One course	**46**	**57.5**
Two courses	**24**	**30**
Three courses	**10**	**12.5**
More than that	**-**	**-**

Table 2: Frequency and percentage distribution of studied nurses' level of knowledge regarding basic concepts of a nasogastric tube (n=80)

Item of knowledge	Satisfactory		unsatisfactory	
	N	%	N	%
The first organ of the gut in the human body	**47**	**58.7**	33	41.3
The normal ph of gastric secretions	42	52.5	38	47.5
The types of feeding tubes	44	55	36	45
The definition of nasogastric tube	35	43.8	45	56.2
Duration of the patient's nasogastric tube last	32	40	**48**	**60**
Total nurses' level of knowledge regarding basic concepts of nasogastric tube	**35**	**43.8**	**45**	**56.2**

Table 3: Frequency and percentage distribution of studied nurses' level of knowledge regarding indications for the use of the nasogastric tube (n=80)

Item of knowledge	Satisfactory		unsatisfactory	
	N	%	N	%
The purpose of using the nasogastric tube	**57**	**71.3**	**23**	**28.8**
The cases that need to have a nasogastric tube installed	**30**	**37.5**	**50**	**62.5**
Total nurses' level of knowledge regarding indications for the use of the nasogastric tube	**30**	**37.5**	**50**	**62.5**

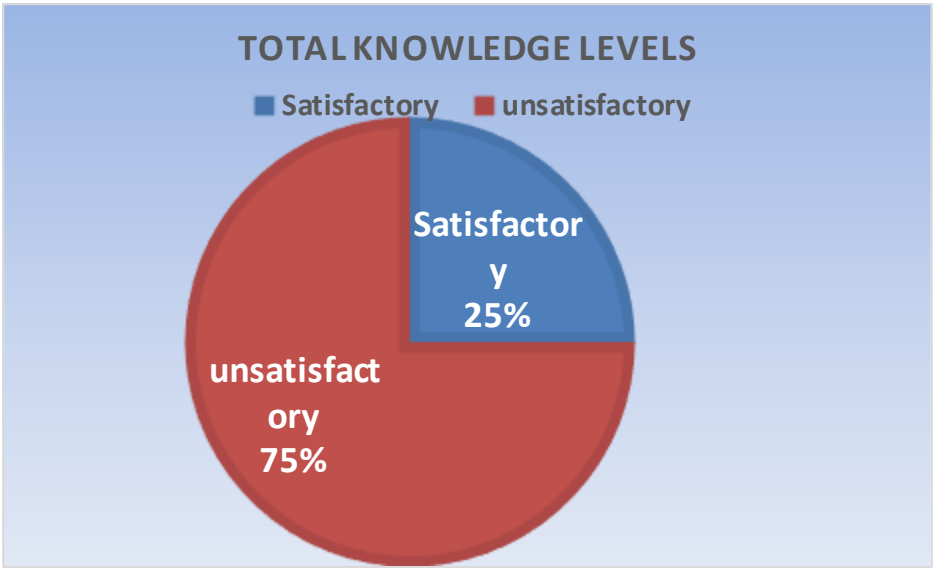

Figure 1: Total knowledge levels among staff nurses regarding feeding and administration of medications via nasogastric tube (n=80)

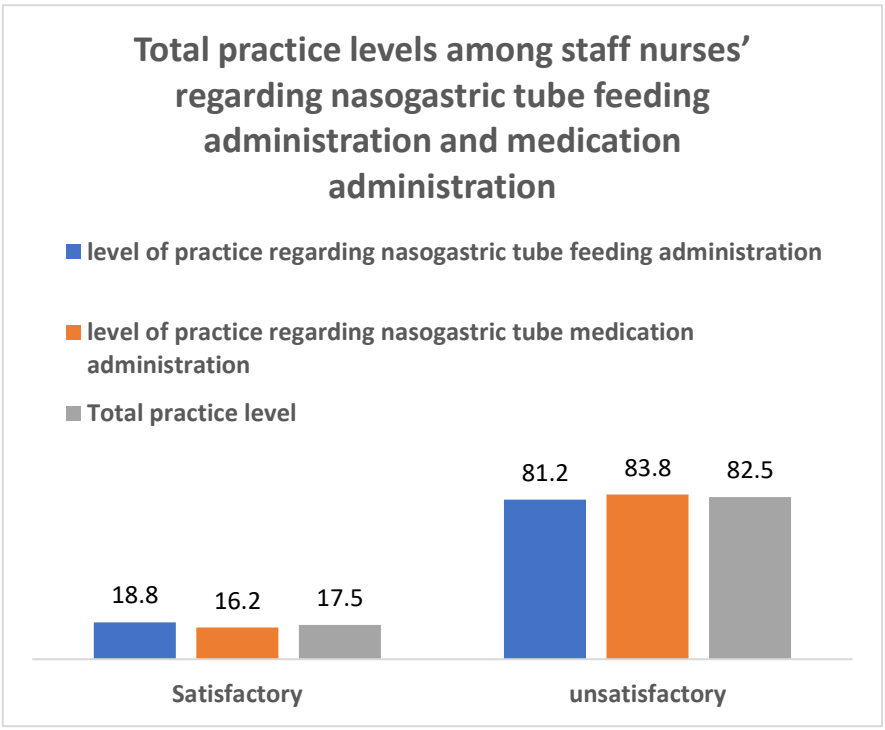

Figure 2: Total practice levels among staff nurses regarding nasogastric tube feeding administration and medication administration (80)

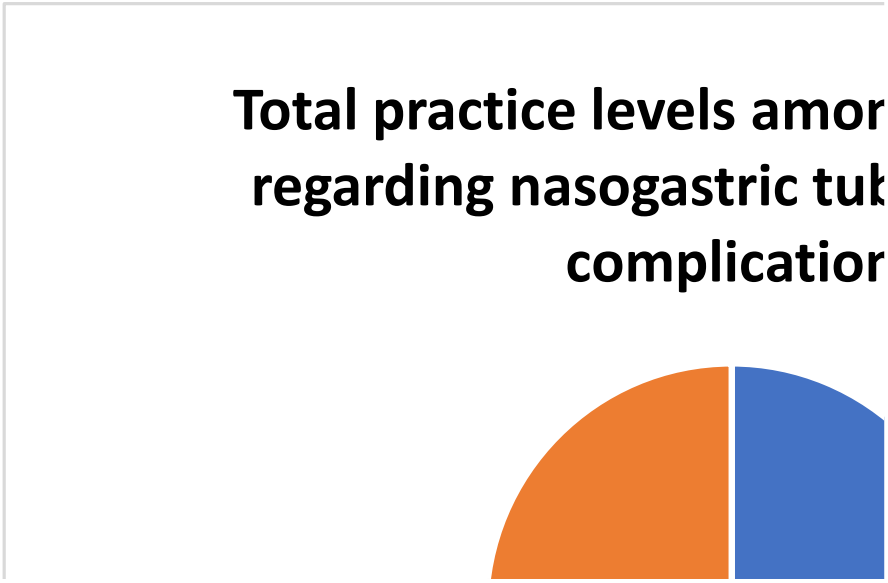

Figure 3: Total practice levels among staff nurses regarding nasogastric tube mechanical complications (80)

Table 4: Correlation between total level of knowledge and total practice among staff nurses regarding nasogastric tube use among patients in critical care units (n=80).

Correlations				
		Total practice	Total attitude	Total knowledge
Total practice	Pearson Correlation		0.863**	0.937**
	Sig. (2-tailed)		0.000	0.000
	N		80	80
Total attitude	Pearson Correlation	0.863**		0.809**
	Sig. (2-tailed)	0.000		0.000
	N	80		80
Total knowledge	Pearson Correlation	0.937**	0.809**	
	Sig. (2-tailed)	0.000	0.000	
	N	80	80	
**. Correlation is significant at the 0.01 level (2-tailed).				

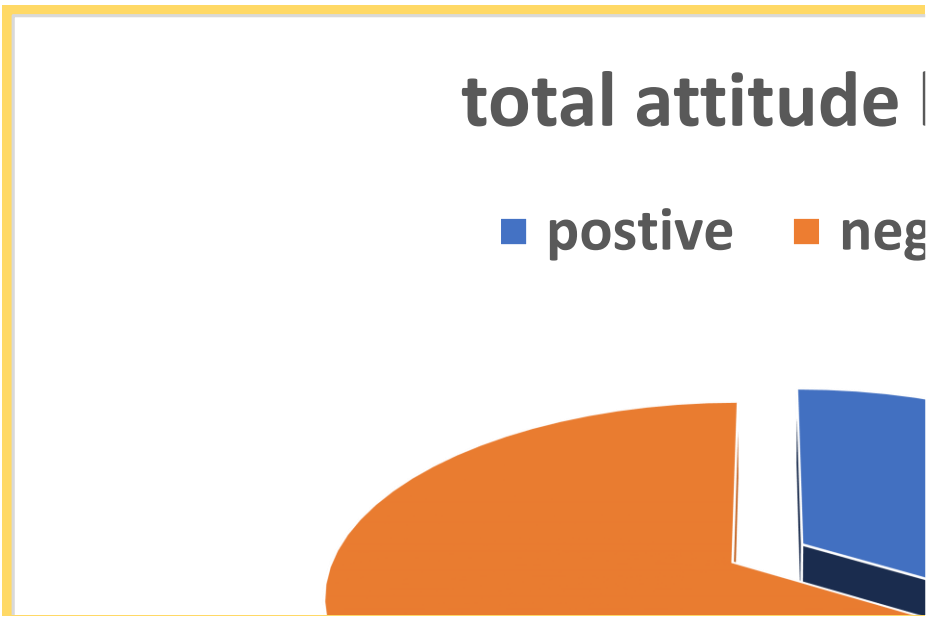

Figure 4: Total attitude level of studied nurses' level of attitude regarding feeding and administration of medications via nasogastric tube (n=80)

Discussion

The human body needs adequate nutrition of various food compositions for cellular function, metabolism, growth, activities, reproduction, health maintenance, and recovery from illness or injury, in critically ill patients who are not able to feed through the mouth, but the digestive system can digest food, enteral feeding is used. Nutrition is one of the most important principles in treating many diseases and directly intervenes in pathophysiological changes and critical results of the disease. Most patients including ICU inpatients fail to intake the required nutrition like normal people. Since these patients are exposed to critical conditions and life-threatening diseases and unable to self-care, particularly in oral intake ***(Attia et al., 2020).***

Concerning nurses' level of knowledge regarding basic concepts of nasogastric tubes, more than half of the studied staff nurses have a satisfactory level of knowledge regarding the first organ of the gut in the human body. This might be due to the essential anatomy of the digestive system so, staff nurses had satisfactory levels. This result was supported with ***Hadera et al., (2022)*** and indicated near half of the staff had a satisfactory level regarding the first organ of the gut in the human body.

As regards nurses' level of knowledge regarding indications for the use of the nasogastric tube, less than two-thirds of staff nurses had an unsatisfactory level of knowledge regarding indications for the use of the nasogastric tube. This might be due to the absence of scientific teaching activities in the clinical field e.g. (Informal teaching activities) made by direct supervisors in the hospital to refresh the nurses' knowledge. This result supported with ***Mohammed et al., (2023)*** who indicated that more than two-thirds of staff had an unsatisfactory level of knowledge regarding indications of nasogastric tubes.

As total knowledge levels among staff nurses regarding feeding and administration of medications via nasogastric tube. The present study presented that three-quarters of the studied staff nurses had an unsatisfactory level of knowledge regarding feeding and administration of medications via nasogastric tube.

This might be due to reasons for lack of knowledge insufficient scholastic training, explicitly in connection to medication, which does not deliver items identified to medication administration techniques, and lack of cooperation among multidisciplinary health team providers (nurses- physician- clinical pharmacist). Also, lack of nursing policies or

standard guidelines for medication delivery through nasogastric tubes; and the negative attitude of nurses whereby new information learned at workshops was not readily applied in clinical practice.

A similar study finding with ***Abdelrahman et al., (2020)*** revealed that nearly three-quarters of staff had an unsatisfactory level of knowledge regarding feeding and administration of medications via nasogastric tube. In disagreement with ***Moustafa et al., (2018)*** and presented that the majority of nurses under study had a satisfactory level of knowledge among staff nurses regarding feeding and administration of medications via nasogastric tube.

Regarding the total practice levels among staff nurses regarding nasogastric tube feeding administration and medication administration. The present study revealed that the majority of the studied staff nurses have an unsatisfactory level of practice regarding feeding and administration of medications via nasogastric tube. While less than a fifth of them have a satisfactory level of knowledge regarding feeding and administration of medications via nasogastric tube.

This could be due to a lack of knowledge insufficient scholastic training, explicitly in connection to medication, which does not deliver items identified to medication administration techniques, and a lack of cooperation among multidisciplinary health team providers (nurses- physician- clinical pharmacist). And also a lack of nursing policies or standard guidelines for medication delivery through the nasogastric tube.

This result was supported with ***(Radwan, 2020)*** who conducted a study entitled "Assessment of Nurses' Knowledge and Practice about Medications Administration via Nasogastric Tube at Emergency HospitalL" and reported that the majority of nurses had an unsatisfactory level of knowledge regarding feeding and administration of medications via nasogastric tube.

Regarding total practice levels among staff nurses regarding nasogastric tube mechanical complications. The present study revealed that shows that more than two-thirds of the studied staff nurses have an unsatisfactory practice level regarding nasogastric tube mechanical complications.

This could be due to supervisors are not enthusiastic about evaluating nursing needs, identifying weaknesses, and determining which training courses are necessary. This result was supported with ***(Kaltenmeier, 2020)*** who conducted a study entitled "Efficacy of a Nasogastric Tube Educational Intervention for Nursing Staff" and reported that the majority of nurses had unsatisfactory practice levels regarding nasogastric tube mechanical complications.

Regarding the correlation between total level of knowledge, total practice, and total attitude among staff nurses regarding nasogastric tube use among patients in critical care units. The present study revealed that there was a highly significant positive correlation between total level of knowledge, total practice, and total attitude among staff nurses regarding nasogastric tube use among patients in critical care units.

These results may be due to the high knowledge help in doing the best practice and excellence attitude. This result was in disagreement with ***(Hamdan et al., 2022)*** who conducted a study entitled "Palestinian nurses' knowledge, attitudes, and practices regarding enteral nutrition" and reported that there was a high statistically significant negative correlation between studied nurses' total knowledge score, total practice score and attitude level.

Regarding the total attitude level of studied nurses level of attitude regarding feeding and administration of medications via nasogastric tube. The present study revealed that two-thirds of staff nurses had a negative attitude regarding feeding and administration of medications via nasogastric tube. This could be due to nurses not having sufficient knowledge so their attitudes were negative regarding feeding and administration of medications via nasogastric tube.

This result was supported with **Abdelrahman et al.,(2020)** and reported that most of nurses had a negative attitude regarding care patients with nasogastric tubes. Also, this result disagreed with **Mahmoud., (2018)** who conducted a study entitled "Nurses' Performance Regarding Nasogastric Tube Feeding Among Critically Ill Patients", and revealed that nearly half of the studied staff had a positive attitude regarding feeding and

administration of medications via nasogastric tube.

Conclusion

In the light of the present study findings, it can be concluded that three-quarters of studied nurses had an unsatisfactory level of knowledge, and one-quarter of them had a satisfactory level of knowledge regarding feeding and administration of medications via nasogastric tube. While less than three-quarters had an unsatisfactory practice level and less than one-third of them had a satisfactory practice level regarding feeding and administration of medications via nasogastric and nursing care during nasogastric tube complications tube. Also, two-thirds of nurses had negative attitudes and more than one-third had positive attitudes regarding feeding and administration of medications via nasogastric tube. There was a highly significant positive correlation between total level of knowledge, total practice, and total attitude among staff nurses regarding nasogastric tube use among patients in critical care units.

Recommendations

In light of the findings of the current study the following recommendations are suggested:

1. In-service training programs must be developed based on nurses' performance regarding the care of patients with nasogastric tubes in critical care units.

2-Knowledge and competence of nursing staff should be periodically evaluated, documented and up to date if necessary.

3-Ongoing monitoring of staff nurses' practice by head and charge nurses when caring for patients with nasogastric tube and provision of guidance to correct poor practices.

4- Further research is needed to investigate factors affecting Nurses ' performance regarding the care of patients with nasogastric tubes.

References

Abdelrahman, H., Mohammed, S., & Mohammed Attia, S. (2020). Assessment of Nurses' Knowledge and Practices About Medications Administration Via Nasogastric Tube At Emergency Hospital. Mansoura Nursing Journal, 7(1), 1–18. https://doi.org/10.21608/mnj.2020.175750

Abdullah, M., Mohammed, W., & Ismail, M. (2014). Nurses' knowledge and practices about administration of medications via nasogastric tube among critically ill patients. Journal of Education and Practice, 5(1), 147-159.

Abo Elezz, H. M., Adly, R. M., & Tantawi, H. R. (2021). Assessment of Nursing Performance toward Enteral Feeding at Pediatric Critical Care Units. Egyptian Journal of Health Care, 12(4), 1159–1178. https://doi.org/10.21608/ejhc.2021.206587

Attia, F. M., Mahmoud, M. H., & Abo El - Fadl, N. M. (2021). Effect of Implementing Nursing Guidelines on Nurses' Performance Regarding Complications of Nasogastric Tube among Critically ill Patients. Journal of Nursing Science - Benha University, 2(2), 586–600.

Babapour, S., K., Esmaeili, R.,Esteki, T.,Naderiravesh, N., Pourhoseingholi, M. , A., & Marzangu, S. ,M, H. (2016). Nurses ' Practice about Performance of Nasogastric Tube Feeding in Intensive Care Unit. International Journal of Advanced Biotechnology and Research, 7(4). http://www.bipublication.com

Cooper, K., Gosnell, K., (2018). Foundations and Adult Health Nursing. Elsevier Health Sciences 8th Edition p355

Elay, G., Tanriverdi, M., Kadioglu, M., Bahar, I., & Demirkiran, O. (2020). The needs of the families whose relatives are being treated in intensive care units and the perspective of health personnel**.**

Hadera, T., Worku, T., & Tuli, W. (2022). Nurses' Knowledge, Practice, and Associated Factors with Enteral Nutrition in Adult Intensive Care Units of Public Hospitals. Ethiopian Journal of Health Sciences, 32(2), 423–432. https://doi.org/10.4314/ejhs.v32i2.23

Hamdan, M., Zidan, S., Badrasawi, M., Shweikeh, H., Al-Masri, R., & Al-Khateeb, R. (2022). Palestinian nurses' knowledge, attitudes, and practices regarding enteral nutrition: Cross-sectional study. Applied Nursing Research, 63(November 2021), 151545. https://doi.org/10.1016/j.apnr.2021.151545

Kadamani, I., Itani, M., Zahran, E., & Taha, N. (2014). Incidence of aspiration and gastrointestinal complications in critically ill patients using continuous versus bolus infusion of enteral nutrition: a pseudo-randomised controlled trial. *Australian Critical Care*, *27*(4), 188-193.

Kaltenmeier, C. (2020). Efficacy of a Nasogastric Tube Educational Intervention for Nursing Staff. The American Surgeon, 88, 93–97.

Vadivelu, N., Kodumudi, G., Leffert, L. R., Pierson, D. C., Rein, L. K., Silverman, M. S., Cornett, E. M., & Kaye, A. D. (2023). Evolving Therapeutic Roles of Nasogastric Tubes: Current Concepts in Clinical Practice. Advances in Therapy, 40(3), 828–843. https://doi.org/10.1007/s12325-022-02406-9

Metwaly, E. A., Mohammed, E. ,Hamad, & Abd -Elaziz, M. , M. (2013). Nurses' Performance Regarding Nasogastric Tube Feeding Zagazig Nursing. Zagazig Nursing Journal, 9(1).

Mohammed, H. A., & Othman, W. N. (2018). Effect of gravity feeding versus bolus feeding technique on gastrointestinal disturbance among stroke patients. *IOSR J Nurs Health Sci*, *7*, 42-48.

Mahmoud, A. M. (2018). Nurses' Performance Regarding Nasogastric Tube Feeding Among Critically Ill Patients. *IOSR Journal of Nursing and Health Science (IOSR-JNHS) e-ISSN*, 2320-1959.

Margrate, M., Khan, S., Mukhtar, F., & Asmat, K. (2020). Knowledge and Practices among Nurses of Tertiary Care Hospitals , Lahore Regarding Nasogastric Tube Feeding in Adult Patients. Saudi Journal of Medical and Pharmaceutical Sciences, 4929(July 2018), 3–7. https://doi.org/10.21276/sjmps.2018.4.7.13

Mohamed, M., F Abdullah, K., & Khalifa, A. (2022). Nurses' Performance regarding the Care of Patients with Multiple Sclerosis Relapse: A Suggested Guideline. Egyptian Journal of Health Care, 13(4), 1206-1219.

Mohammed, S. M. M., Salem, G. M. M., & Almushah, R. A. (2022). Pediatric Nurses' Knowledge and Practices of Nasogastric Tube Placement and Verification: A Cross-sectional Study. Nutrition, 115, 112136. https://doi.org/10.1016/j.nut.2023.112136

Moustafa, H., Mohamed, H., & Mahmoud, A. (2018). Nurses ' Performance Regarding Nasogastric Tube Feeding Among Critically Ill Patients. Journal of Nursing and Health Science, 7(1), 30–36. https://doi.org/10.9790/1959-0701033036

Radwan, S. (2020). Assessment of Nurses' Knowledge and Practice about Medications Administration via Nasogastric Tube at Emergency Hospital". Mansoura Nursing Journal (MNJ) Vol.6., 7(1).

Willihnganz ,M., Clayton B, D., (2016). Basic Pharmacology for Nurses. 17th ed . Indian: Elsevier Health Science; ISBN 978032355061. 492.

Zeb, A., Hassan Karim, Idrees, M., Bibi, S., Rehman, S., & Ali, S. (2022). Pamphlet as a Teaching Tool for Improving Nurse's Knowledge Regarding Nasogastric Tube Feeding. Journal of Farkhanda Institute of Nursing And Public Health (JFINPH), 2(1), 21–25. https://doi.org/10.37762/jfinph.30