

# Effect of Implementing Nursing Guidelines on Nurses' Performance Regarding Complications of Nasogastric Tube among Critically ill Patients

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**Abstract: Background:** Nasogastric tube feeding is the most frequently used method of enteral feeding among critically ill patients and it is accompanied by some complications that can lead to increased morbidity and mortality. **The study aim** was to evaluate the effect of implementing nursing guidelines on nurses' performance regarding complications of nasogastric tube among critically-ill patients. **Hypothesis:** Nurses' performance regarding complications of nasogastric tube among critically-ill patients will be improved after implementation of the nursing guidelines than before. **Design:** Quasi- experimental research design was utilized in this study to achieve the aim of this study. **Setting:** The study was carried out in Intensive Care Unit at Benha University Hospital. **Sample:** Convenient sample (60) nurses. **Tools:** Two tools were used, Tool (1): Self-administered questionnaire to assess nurses' knowledge regarding nasogastric tube and its complications, tool (2): Observational checklist to assess nurses' practice during caring for patients with nasogastric tube and its complications. **Results:** The study revealed that the majority of nurses had unsatisfactory knowledge and practice score regarding nasogastric tube pre guidelines implementation (70% and 53.3%) which improved immediately post guidelines implementation (93.3% and 95%) as ( $p \leq 0.001$ ). **Conclusion:** Providing nursing guidelines has been shown to be effective on nurses' performance regarding complications of nasogastric tube among critically ill patients. **Recommendation:** Continuous education and training of nurses regarding complications of nasogastric tube among critically ill patients.

**Key Words:** Nasogastric tube, Nursing Guidelines, Critically ill patients, Nurses' performance.

## I. Introduction

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 mouth, but the digestive system has the ability to digest food, enteral feeding is used (1). Nutritional guidelines have recommended that EN should be started within 24 to 48 hours of patients' admission to the intensive care unit or after the stability of the hemodynamic state, as it benefits the patients by decreasing catabolic response to injury and maintaining bowel mucosal integrity (2).

Nasogastric tube is inserted into the stomach through the nose when the enteral feeding is required for short period less than 4-6 weeks, defined as the delivery of nutrients through the nasal route down the throat, esophagus then into the stomach via a thin and soft feeding tube for providing nutritional support in patients who are unable to ingest food orally because of health issues or those with neurological swallowing disorders, upper GI obstruction, GI dysfunction or malabsorption (3).

Nasogastric tube feeding is usually associated with many complications, particularly if performed without an adequate level of knowledge and practice, such as tube blockage, mal-positioning (tube displacement), irritation and inflammation at nose, nausea, vomiting, pulmonary aspiration, overfeeding, diarrhea, nasopharyngeal and ear infection, electrolyte disturbance and hypo or hyper glycaemia, all these complications decrease patients' comfort, increase morbidity, also increase patients' hospital stay and increase mortality rate (4).

Good nutritional support is a primary nursing role. Therefore, nurses should have adequate knowledge and practice for caring patients with nasogastric tube feeding e.g. knowing indications, contraindications, complications of the use of nasogastric tube, making nutrition assessment, assessing of energy and nutritional requirements, inserting the NGT, confirming its placement, administering feedings, prefeeding readiness assessment, medication administration, tube lavage if required, monitoring or handling complications and tube removal when patient's condition improved (5). So, evidence-based protocols and scientific guidelines are recommended to guide nurses continuously (6).

### **Aim of the Study**

**This study aimed to** evaluate the effect of implementing nursing guidelines on nurses' performance regarding complications of nasogastric tube among critically-ill patients.

**Research Hypothesis:** Nurses' performance regarding complications of nasogastric tube among critically-ill patients will be improved after implementation of the nursing guidelines than before.

## **II. Subjects and Methods**

**Design:** Quasi-experimental study design was used in this study.

**Setting:** The study was carried out in Intensive Care Unit (ICU) at Benha University Hospital.

**Sample:** The sample of this study included all available nurses (60) nurse (convenient sample)

### **-Tools for data collection:**

**Tool I:** Self-administered questionnaire for nurses

It aimed to assess nurses' knowledge regarding nasogastric tube and its complications, adapted from (7) & (8). It consisted of two parts:-.

**Part one:** Nurses' demographic data, this part concerned with assessment of nurses' demographic characteristics. It composed of five questions related to age, sex, educational level, years of experiences and training courses.

**Part two:** Nurses' knowledge, this part designed to assess nurses' knowledge regarding basic concepts of nasogastric tube, indications, contraindications, feeding administration, medication administration and complications. It composed of 39 multiple choice questions.

The score distributed as: one mark for each correct answer and zero for incorrect answer

**Tool II:** Observational Checklist for nurses' practice

It aimed to assess nurses' practice during caring for patients with nasogastric tube and its complications. It consisted of two parts:-

**Part one:** Aimed to assess routine nursing care as: Nasogastric tube feeding administration and medication administration, adapted from (9), (10) & (11).

**Part two:** Aimed to assess nursing care during nasogastric tube complications as mechanical, infectious and metabolic complications, adapted from (12) & (13)

The score distributed as: one mark for each step correctly done, and zero for incorrectly done & not done

**Content validity:** The tools were reviewed by a panel of five experts from medical surgical nursing field at faculty of nursing Benha University to test the relevance, clarity of tools' content, comprehension, understanding, applicability and necessary modification was done accordingly.

**Tool reliability**

The reliability for self-administered questionnaire that used to assess nurses' knowledge = 0.970, reliability for observational checklist that used to assess nurses' practice = 0.99.

**Pilot study:**

A pilot study was conducted on **10%** (7 nurses) of all nurses that were included in the study from the total number of nurses (70) in order to test the clarity and applicability of the tools.

**Field work:**

After the study protocol has been approved, an official permission was taken from the director of Benha University hospital after explanation of the purpose of the study.

Preparatory phase included reviewing the recent related literatures of various aspects of the study using books, periodicals, magazines and internet...etc.in order to develop the data collection tool and nursing guidelines.

Assessment phase: Assessment of the nurses' knowledge through self-administered questionnaire (Tool I) and assessment of the nurses' practical skills through observational checklist (Tool II)

Planning phase: The guidelines developed by the researcher according to nurses' needs and deficiencies in their performance, teaching materials was prepared e.g. discussion, demonstration and booklet that helped in covering theoretical and practical information.

Implementation phase: The researcher gave the guidelines booklet to nurses immediately after data collection

Evaluation phase: The post test for nurses' knowledge through self-administered questionnaire (Tool I) and practice through observational checklist (Tool II) was done after giving the nursing guidelines to them

### III. Results

**Table (1)** demonstrates that, 66.7% of the studied nurses' age was less than 25 years with a mean age of  $23.82 \pm 2.20$  years, while 86.7% of them were females. Regarding educational level, 90.0% of the studied nurses graduated from technical institute of nursing. As regard nurses' years of experience, 76.7 % of the studied nurses had less than 5 years of experience. In addition, 83.3% of the studied nurses didn't attend any training courses regarding nasogastric tube care and its complications.

**Table (2)** clarifies that mean score of studied nurses' total knowledge about nasogastric tube was improved from  $14.6833 \pm 5.85848$  pre guidelines implementation to  $36.6833 \pm 2.04601$  post guidelines implementation. In addition, there were highly statistical differences between mean score of studied nurses' knowledge regarding nasogastric tube care pre guidelines implementation as compared to post guidelines implementation ( $p < 0.001$ ).

**Table (3)** clarifies that mean score of studied nurses' total practice about nasogastric tube was improved from  $131.2833 \pm 12.85920$  pre guidelines implementation to  $271.5667 \pm 8.19749$  post guidelines implementation. In addition, there were highly statistical differences between their mean scores of all total practice about nasogastric tube pre guidelines implementation as compared to post guidelines implementation ( $p < 0.001$ ).

**Figure (1)** demonstrates that 70% of studied nurses had unsatisfactory total knowledge score about nasogastric tube in pre guidelines implementation, while 93.3% of them had satisfactory total knowledge score in post guidelines implementation.

**Figure (2)** demonstrates that 53.3% of studied nurses had unsatisfactory total practice score about nasogastric tube in pre guidelines implementation, while 95% of them had satisfactory total practice score in post guidelines implementation.

**Table (4)** shows that, there was high significant statistical relation between studied nurses' total knowledge score and training courses regarding nasogastric tube care during pre-guidelines implementation as ( $p < 0.001$ ), as well as their total knowledge score and their educational level during pre-guidelines implementation as ( $p < 0.05$ ). While there was no significant statistical relation between studied nurses' total knowledge score and their demographic characteristics regarding age, sex and their years of experience pre as well as post guidelines implementation as ( $p > 0.05$ ).

**Table (5)** shows that there was high significant statistical relation between studied nurses' total practice score and their demographic characteristics regarding age and training courses regarding nasogastric tube care during pre-guidelines implementation as ( $p < 0.001$ ), as well as their total practice score, their educational level and their years of experience pre-guidelines implementation as ( $p < 0.05$ ). While there was no significant statistical relation between studied nurses' total practice score and their sex pre-guidelines implementation as well as their practice score and their demographic characteristics regarding age, sex, educational level, their years of experience and training courses regarding nasogastric tube care post guidelines implementation as ( $p > 0.05$ ).

**Table (6)** shows that there was high significant statistical positive correlation between studied nurses' total knowledge score and total practice score regarding nasogastric tube pre and post guidelines implementation as ( $p < 0.001$ ).

**Table (1):** Distribution of the studied nurses regarding their demographic characteristics (n= 60)

Variable	No=60	%
<b>Age in years</b>		
<25	40	66.7
25-<35	20	33.3

Mean $\pm$ SD	23.82 $\pm$ 2.20		
<b>Sex</b>			
Female		52	86.7
Male		8	13.3
<b>Educational level</b>			
Technical institute of nursing		54	90.0
Bachelor of nursing		6	10.0
<b>Years of experience</b>			
< 5		46	76.7
5-10		14	23.3
<b>Training courses regarding NGT care</b>			
No		50	83.3
Yes		10	16.7

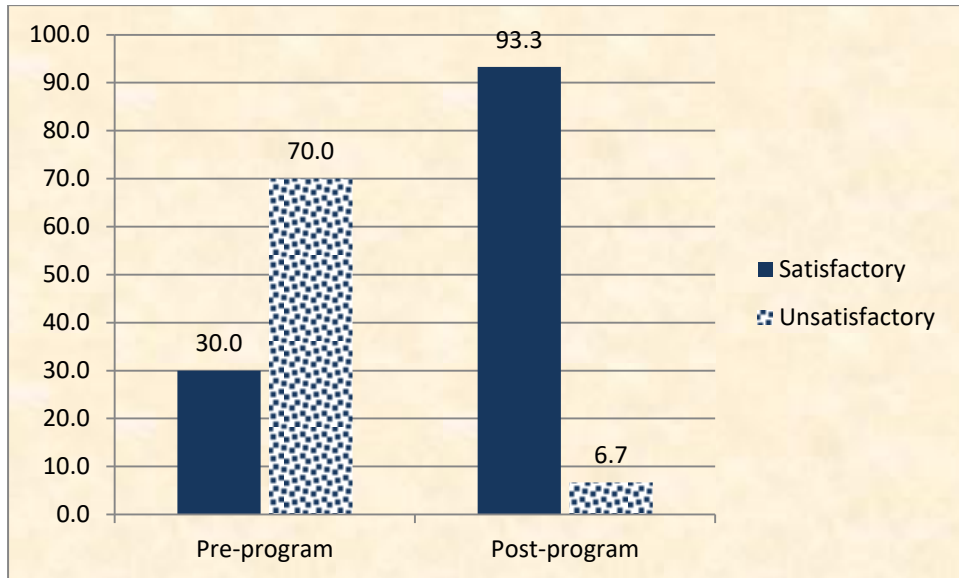
**Table (2):** Mean and standard deviation of studied nurses' knowledge score about nasogastric tube pre and post guidelines implementation (n=60)

Nurses' knowledge	Pre		Post		t test	p-value
	Mean	$\pm$ SD	Mean	$\pm$ SD		
Definition of nasogastric tube	2.4667	1.25505	4.6667	.62887	13.249	.000**
Purpose and indications of nasogastric tube insertion	.8333	.37582	1.9167	.27872	19.813	.000**
Contraindications of nasogastric tube insertion	.6667	.85701	1.8667	.34280	10.813	.000**
Preparation and feeding administration through nasogastric tube	3.0833	.99646	10.4333	.99774	48.396	.000**
Medication administration through nasogastric tube	.3667	.68807	2.0000	.00000	18.387	.000**
Complications related to nasogastric tube	7.2667	3.30827	15.8000	1.29928	22.961	.000**
Total knowledge	14.6833	5.85848	36.6833	2.04601	36.817	.000**

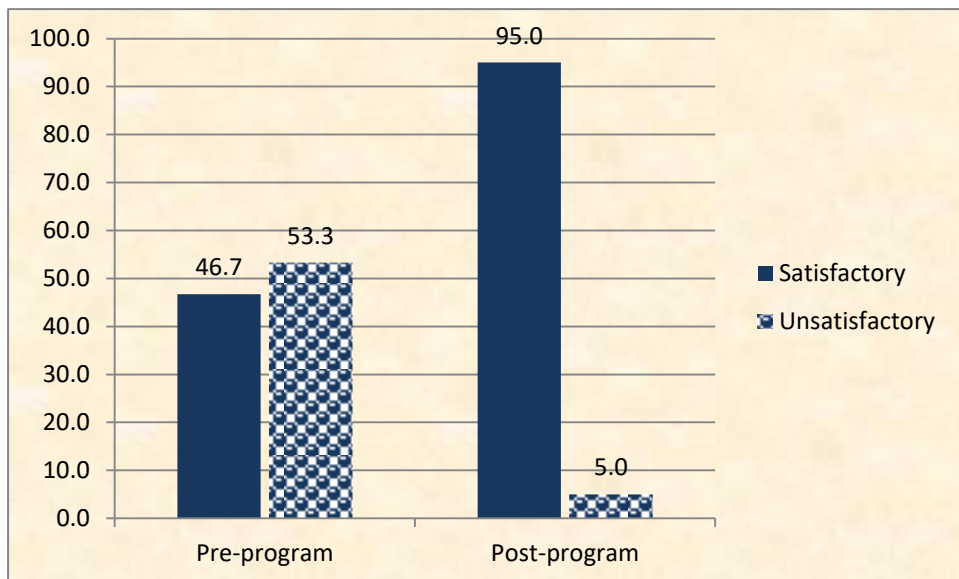
**Table (3):** Mean and standard deviation of studied nurses' total practice about nasogastric tube pre and post guidelines implementation (n=60)

Practice about nasogastric tube	Pre		Post		t test	p-value
	Mean	$\pm$ SD	Mean	$\pm$ SD		
Total practice	131.2833	12.85920	271.5667	8.19749	108.041	.000**

**Figure (1):** Percentage distribution of studied nurses' knowledge score about nasogastric tube pre and post guidelines implementation



**Figure (2):** Percentage distribution of studied nurses' total practice score about nasogastric tube pre and post guidelines implementation



**Table (4):** Relation between studied nurses' total knowledge score and their demographic characteristics (n=60)

Demographic characteristics	Nurses' total knowledge											
	Pre				X <sup>2</sup>	p-value	Post				X <sup>2</sup>	p-value
	Un satisfied (n=42)		Satisfied (n=18)				Un satisfied (n=4)		Satisfied (n=56)			
	No	%	No	%	No	%	No	%				
<b>Age</b>												
<25	31	73.8	9	50.0	3.21	0.073	4	100.0	36	64.3	2.14	0.143
25- <35	11	26.2	9	50.0			0	0.0	20	35.7		
<b>Sex</b>												
Female	36	85.7	16	88.9	0.11	0.74	3	75.0	49	87.5	0.5	0.477
Male	6	14.3	2	11.1			1	25.0	7	12.5		
<b>Educational level</b>												
Technical institute of nursing	41	97.6	13	72.2	9.03	0.003*	4	100.0	50	89.3	0.47	0.49
Bachelor of Nursing	1	2.4	5	27.8			0	0.0	6	10.7		
<b>Years of experience</b>												
< 5	32	76.2	14	77.8	0.018	0.894	4	100.0	42	75.0	1.304	0.253
5-10	10	23.8	4	22.2			0	0.0	14	25.0		
<b>Training courses regarding NGT care</b>												
No	40	95.2	10	55.6	14.28	.000**	4	100.0	46	82.1	0.85	0.355
Yes	2	4.8	8	44.4			0	0.0	10	17.9		

**Table (5):** Relation between studied nurses' total practice score and their demographic characteristics (n=60)

Demographic characteristics	Nurses' total practice											
	Pre				X <sup>2</sup>	p-value	Post				X <sup>2</sup>	p-value
	Un satisfied (n=32)		satisfied (n=28)				Un satisfied (n=3)		Satisfied (n=57)			
	No	%	No	%	No	%	No	%				
<b>Age</b>												
<25	28	87.5	12	42.9	13.39	.000**	3	100.0	37	64.9	1.57	0.209
25- <35	4	12.5	16	57.1			0	0.0	20	35.1		
<b>Sex</b>												
Female	28	87.5	24	85.7	0.04	0.839	3	100.0	49	86.0	0.48	0.486
Male	4	12.5	4	14.3			0	0.0	8	14.0		

Educational level												
Technical institute of nursing	32	100.0	22	78.6	7.61	.006*	3	100.0	51	89.5	0.35	0.554
Bachelor of Nursing	0	0.0	6	21.4			0	0.0	6	10.5		
Years of experience												
< 5	28	87.5	18	64.3	4.49	.034*	3	100.0	43	75.4	0.96	0.327
5-10	4	12.5	10	35.7			0	0.0	14	24.6		
Training courses regarding NGT care												
No	32	100.0	18	64.3	13.71	.000**	3	100.0	47	82.5	0.63	0.427
Yes	0	0.0	10	35.7			0	0.0	10	17.5		

**Table (6):** Correlation between studied nurses' total knowledge score and total practice score regarding nasogastric tube pre and post guidelines implementation (n=60).

Total practice	Total Knowledge			
	Pre		Post	
	r	p-value	r	p-value
	0.88	0.000**	0.73	0.000**

#### IV. Discussion

Inserting nasogastric tube is very important to give essential nutrients required to body growth, maintain GIT function, avoid malnutrition and dehydration. If the NGT is not monitored regularly by nurses and giving good routine care and proper care during complications, it can lead to serious harm including aspiration pneumonia, infection, gastrointestinal disorders, mechanical and metabolic complications (14).

The results of the present study revealed that two thirds of the studied nurses' age was less than 25 years old. These results agreed with (15) in his study entitled "Nurses' practice about performance of nasogastric tube feeding in intensive care unit" whose results revealed that half of the nurses' age was less than 30 years old.

As regard to sex, the current study revealed that most of nurses were females. This result is compatible with (16) in their study entitled "Improving Nurse Skill of Medication Administration via Enteral Feeding Tube" whose results revealed that all of the nurses' samples were females.

As regard to educational level, the current study revealed that the majority of the studied nurses had technical institute of nursing. This result agreed with (17) in his study entitled "Nurses' Performance Regarding Nasogastric Tube Feeding Among Critically Ill Patients" whose results revealed that, near half of the nurses under study were having technical institute degree.

As regard to nurses' years of experience, the current study revealed that three quarters of the studied nurses had less than 5 years of experience. This result was inconsistent with (18) in



their study entitled "Current status and influencing factors of barriers to enteral feeding of critically ill patients: A multicenter study" whose results revealed that half of nurses had 6-10 years of experience.

Finally regarding attendance of training courses regarding nasogastric tube care, the current study revealed that the majority of nurses didn't attend any training courses regarding nasogastric tube care. This result agreed with (19) in their study entitled "Assessment of nurses' knowledge and performance regarding feeding patients with nasogastric tube in Ismailia General Hospital" whose results revealed that the nearly one third only of studied samples had training courses regarding nasogastric tube care.

The study revealed that there was an improvement in mean scores of studied nurses' total knowledge regarding nasogastric tube care post guidelines implementation compared to pre guidelines implementation. This finding consisted with (20) in their study entitled "Efficacy of Safety Measures and Discharge Planning Guidelines on Nurses for Enteral Nutrition of Comatose Patients" who stated that there was statistically significant difference were noted and a general improvement in mean nurses' knowledge results of nasogastric tube care from pre- to post-intervention.

The current study also revealed that there was high statistical significant improvement in mean scores of all total practice regarding nasogastric tube care and its complications post guidelines implementation compared to pre guidelines implementation. This finding supported by (21) in their study entitled "Effect of Educational Nursing Guidelines Regarding Enteral Feeding on Nurses' Knowledge and Practices at Critical Care Units" who stated that there was a highly statistical significant difference in mean scores of all total practice regarding nasogastric tube pre and post implementation of educational guidelines.

The study revealed that post guidelines implementation the majority of studied nurses had satisfactory level of knowledge score regarding nasogastric tube and its complications. This finding supported by (22) in their study entitled "Implementing an educational program to improve critical care nurses' enteral nutritional support" who stated that most nurses had unsatisfactory knowledge level regarding nasogastric tube pre intervention guidelines however; post-intervention there was a significant improvement in nurses' knowledge level.

The study also revealed that more than half of studied nurses had unsatisfactory level of practice score regarding nasogastric tube and its complications pre guidelines implementation; while post guidelines implementation, there was an improvement in total nurses' practices score. This finding was supported by (23) in their study entitled "The effects of systematic educational interventions about nasogastric tube feeding on caregivers' knowledge and skills and the incidence of feeding complications" who noted that most nurses had a pre-intervention level of unsatisfactory practice regarding nasogastric tube care. However, the majority of nurses had a level of good practice after implementation of the guidelines.

Regarding the relation between studied nurses' total knowledge score and their demographic characteristics, the current study showed that there was statistical significant relation between studied nurses' total knowledge score and their educational level as well as training courses regarding nasogastric tube care pre-guidelines implementation. These findings agreed with (20) in their study entitled "Efficacy of Safety Measures and Discharge Planning Guidelines on Nurses for Enteral Nutrition of Comatose Patients" whose result showed that there was significant relation between nurses' knowledge and their demographic characteristics

regarding training courses about nasogastric tube care and their educational level during pre-guidelines implementation.

Regarding the relation between studied nurses' total practice score and their demographic characteristics, the current study showed that there was statistical significant relation between studied nurses' total practice score and their demographic characteristics regarding age, their educational level, their years of experience and training courses about nasogastric tube care pre-guidelines implementation. These finding disagreed with (24) in their study entitled "Effect of Educational Program on Nurses' Practice Related to Care of Patients Undergoing Nasogastric Tube Feeding" whose result showed that there was no statistical significance difference between nurses' practice and their age groups and educational level preprogram implementation.

The study revealed that there was high statistical significant positive correlation between studied nurses' total knowledge score and total practice score pre and post guidelines implementation. This finding agreed with (25) in their study entitled "Improvement of enteral nutrition in intensive care unit patients by a nurse-driven feeding protocol" whose result showed that there was statistically significance positive correlation between total nurses' knowledge and total practice score regarding nasogastric tube care pre and post feeding protocol implementation.

### **Conclusions**

Based on the findings of the current study, it can be concluded that:

-The majority of the studied nurses had unsatisfactory level of performance (knowledge and practice) regarding complications of nasogastric tube among critically ill patients pre guidelines implementation, while the majority of the studied nurses had high statistically significant improvement in their performance post guidelines implementation that supported the study hypothesis.

- The current study showed that there were high statistical significant positive correlation between studied nurses' total knowledge score and total practice score pre and post guidelines implementation as ( $p < 0.001$ ).

### **Recommendations**

In the light of the findings obtained from the current study the following recommendations can be suggested:

#### **A- Recommendations for the nurses :**

- Continuous training courses for nurses about nasogastric tube care and its complications among critically ill patients.
- Continuous evaluation for nurses' performance regarding complications of nasogastric tube among critically ill patients.

#### **B- Recommendations for further researchers :**

- Replication of the study using a larger probability sample from different geographical areas to attain more generalizable results.
- Providing educational program for nurses about complications of nasogastric tube among critically ill patients.

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