

## Original Article

# Effect of Educational Program on Nurses' Practice Related to Care Patients Undergoing Nasogastric Tube Feeding

**Prof. Nabila A. Bedier**

Department of Medical Surgical Nursing, Faculty of Nursing, Alexandria University, Egypt

**Dr. Amal Bakr Abo EL-Ata**

Department of Medical Surgical Nursing, Faculty of Nursing, Port Said University, Egypt

**Mariam Sabry Shehab**

Department of Medical Surgical Nursing, Faculty of Nursing, Port Said University, Egypt

**Correspondence:** Mariam Sabry Shehab Department of Medical Surgical Nursing, Faculty of Nursing, Port Said University, Egypt E-mail: samoha201029@yahoo.com

### Abstract

**Background:** Implementing educational program on nurses' caring of patients undergoing nasogastric tube feeding is very important to prevent complications from feeding such as pulmonary aspiration, diarrhea, constipation, tube occlusion, displacement of the tube, abdominal cramping, nausea and vomiting, delayed gastric emptying and serum electrolyte imbalance.

**Aim of this study:** This study was aiming to evaluate effect of educational program on nurses' practice related to care of patients undergoing nasogastric tube feeding. It also aims to design, implement and evaluate an educational program for nurses' caring of patients undergoing nasogastric tube feeding.

**Research design:** A quasi experimental design was used.

**Setting:** The study was conducted in intensive care unit at Al-Azhar university hospital in new Damietta city.

**Subject:** The study involved all available nurses' worked with patients undergoing nasogastric tube feeding in intensive care unit at Al-Azhar university hospital about (30 nurse)..

**Tool of data collection:** Data were collected using nurses' nasogastric tube care performance observation checklist.

**Results:** Total mean practice score regarding caring of patients undergoing nasogastric tube feeding were improved, as good score was  $40.18 \pm 3.30$  pre-program while it reached  $87.09 \pm 14.55$  after implementation of the educational program,  $82.59 \pm 12.97$  after 3 months and  $77.71 \pm 11.54$  after 6 months later.

**Conclusion:** Implementation of educational program for nurses' caring of patients undergoing nasogastric tube feeding significantly improved the nurses' total level of practice.

**Recommendation:** The study recommended continuous educational programs should be planned on regular basis to nurses' about nasogastric tube feeding for enhancing nurses' practice and to achieve high quality of care.

**Key Words:** Educational Program, nurses, Nasogastric, Tube feeding, care, practice, Nutrition.

### Introduction

Clients who are unable to ingest a sufficient amount of food and fluids through oral intake may require alternative feeding methods to ensure maintenance of adequate nutrition. Those methods include both parenteral (intravenous methods) and enteral through (gastrointestinal system). Enteral nutrition is the preferred route of nutrient administration in the critically ill patient. It maintains the integrity of the gut

mucosa and has immunologic advantages over parenteral nutrition. Compared with total parenteral nutrition; the enteral route is safer, more physiologic and less expensive (ASPEN, 2009).

Enteral Nutrition means the infusion of a liquid diet directly into the GI tract (gastrointestinal system) via a nasogastric or enter cutaneous tube. Use of enteral feeding is associated with preservation of gut integrity, barrier and immune

functions and reductions in septic complications (Gillanders, 2007).

Complications from tube feeding includes: nasopharyngeal discomfort and later nasal erosions, abscesses and sinusitis although acute complications such as pharyngeal or esophageal perforation, intracranial or bronchial insertion are uncommon, they may be fatal. Moreover longer use of tube feeding may cause esophagitis, esophageal ulceration and stricture. Therefore fine bore tubes should be used and replaced in the alternate nostril each month. In addition large stiff tubes are particularly unsafe in the presence of varices and insertion of any tube should be avoided for 3 days post-acute variceal bleed (Morton and Goodacre, 2008).

In-service education is one aspect of staff development, ongoing in all health care institution and refers to skill development for the direct care givers (Leinonen, 2006, Rosenkoetter et al., 2007). Staff development refers to the educational activities and functions provided to ensure competent performance and ability and fulfill the expectations of the job (Robinson et al., 2005, Siciliano and Burrage, 2007).

Continuing education include programs and activities designed for improving specific on the job skills (in-service or staff developments), for providing contents related to professional practice, for increasing personal or professional growth, and for increasing individual professional awareness. Programs or activities designed to improve or add a specific on the job skills primarily benefit the employee who may be willing to subsidize these activities (Johns, 2005, and Jackson, 2007).

### **Aim**

This study's aim was to evaluate effect of educational program on nurses' practice related to care of patients undergoing nasogastric tube feeding.

### **Research Questions:**

1. What is the practice of nurses' related to care of patients undergoing nasogastric tube feeding?
2. What is the effect of an educational program on nurses' practice related to care of patients undergoing nasogastric tube feeding?

### **Subjects and Methods**

**Study Design:** A quasi experimental design was used in this study.

#### **Study Settings**

The present study was conducted in intensive care unit at Al-Azhar university hospital in new Damietta city.

#### **Study Population**

All available nurses' worked with patients undergoing nasogastric tube feeding in intensive care unit at Al-Azhar university hospital about (30 nurse) were included.

#### **Tool of Data Collection**

Data were collected by using the following tool:

Nurses' nasogastric tube care performance (observational checklist). It was developed by Ahmed (1997) and was adopted and modified by the researcher to assess nurses performance related to care of patients undergoing nasogastric tube feeding. It consisted of two columns ;( done and not done). It consisted of 55 steps representing the following areas:

**A-** Before feeding (33 steps) related to check physician order, hand washing, equipment's, feeding preparation, patient's assessments, patient's preparation for tube feeding and environmental preparation.

**B-** During feeding (13 steps) related to confirm tube placement, record gastric residual feeding, feeding using syringe and feeding using feeding bag.

**C-** After feeding (9 steps) related to after care and recording.

#### **Administrative Design**

Before conduction of the study, an official letter was sent from the faculty of nursing to the selected area of the study.

The director of each setting was contacted and informed in order to obtain permission to include the nurses' on the present research.

#### **Ethical Considerations**

Purpose and expected outcomes of the study were explained to each study subject. They were secured that all the gathered data will be used for the research purpose only, the study is harmless and their

approval to participate is a prerequisite to be included in the study. Each subject was assured that they can quit/withdraw whenever they want.

### **Operational Design**

The operational design of the current study included the preparatory phase, content validity, pilot study and field work.

#### **Preparatory phase**

Development of the training program based on Shehab master thesis (2011), result of assessment of nurses' practice related to care of patients undergoing nasogastric tube feeding, identified needs in assessment phase and review of related literature. Contents of the program included: procedure and precautions when giving medications, procedure of feeding by syringe and procedure of feeding by using feeding bag and care of patients after feeding. Then the researcher designed a plan for a training program implementation. This plan included twelve sessions to be implemented in twelve week. One session / week for (30) minutes to be repeated (3) times for each group. With (15) minutes break between each group. Permission for conducting the study was taken from the head of nurse of critical care unit at Al-Azhar university hospitals after explaining the purpose, the time and the place of the study.

#### **Pilot Study**

The pilot study was carried out after the development of the tool and before starting the data collection in order to test the clarity, feasibility, applicability and time required. It is carried out on 10% of the total sample size. It was conducted over a period of a week. After obtaining the results of pilot study, ambiguous items were omitted, required modifications as the manner of writing questions, arrangement of choices, sequences of questions were done and the final form was completed. Those included in the pilot study were excluded later from the sample.

#### **Field Work**

At the beginning; studied nurses divided into 3 groups (10 nurses each) then each group was gathered at the conference room separately for about half hours. During this meeting the researcher: Explain the purpose of the study and Give each nurse handout includes procedure steps to facilitate remembers steps about care of patients undergoing nasogastric tube feeding.

The program was presented in clear and concise form using different teaching methods as demonstration and re- demonstration. The nurses were instructed to observe the researcher carefully during the demonstration of feeding procedure because every one of them will re-demonstrate the procedure in front of the researcher and they will be evaluated by the researcher. The researcher demonstrates all the procedure steps on patient in front of the nurses while discussing with them the rational and the precaution for each step. At the end of the researcher's demonstration, nurses were asked about any unclear steps which needed repetitions or explanation before re-demonstration.

The demonstrator (the nurse who perform the procedure) was asked to evaluate her performance (self-evaluation) Feedback about the procedure performance was given to teach the nurse immediately after re-demonstration. Each nurse observed during re-demonstrating the procedure two timed on different patients under the researcher's supervision until she mastered it. After 3 and 6 month after implementation of the program the nurses' evaluations were done using the same technique was used in first evaluation and same tool.

### **Statistical Design**

The collected data organized, tabulated and statistically analyzed using statistical package for social science (SPSS) version 16 for windows, running on IBM compatible computer. Qualitative data (categorical data) were expressed as relative frequency (number) and percent distribution, and for comparison between groups, the Chi square ( $X^2$ ) or Mann-Whitney test ( $Z$ ) was calculated. Quantitative data were expressed as mean  $\pm$  SD, and for comparison between two means, the student ( $t$ ) test was calculated. For interpretation of results, the  $p$  value  $\leq 0.05$  was considered significant

### **Results**

Table (1) shows the socio-demographic characteristics of studied nurses. Most of the studied nurses had 20 years and less than 30 years (76.7%). As regard graduation about two third of them had secondary diploma (63.3%). As regard years of experience about half of them had more than four years of experience (56.7%). All of the studied nurses did not have any previous training course about nasogastric tube

feeding while only (3.3%) of them had protocol about nasogastric tube feeding in studied critical care units.

Table (2) Demonstrates the difference in nurse's satisfactory practice total score related to nasogastric tube feeding preparation throughout the program intervention. Most of the studied nurse had statistically significant satisfactory total level of practice and all items of nasogastric tube feeding at  $P < 0.001$ . This level of practice tended to decline in the second follow up compared to immediately post and first follow-up but still statistically significant than the pre-program at  $p < 0.001$ .

Also about less than two third of the studied nurse (63.0%) had satisfactory level of practice immediately post in the area of assessing patients receiving tube feeding tended to decline first and second follow-up (53.3%, 43.3% respectively) compared with immediately post. In contrast the majority of the studied nurses' had total satisfactory level of practice in the area of prepare patients immediately post (96.7%) and with continuous improvement immediately post, first and second follow-up in relation to prepare the environment (96.7%). Moreover studied nurses had satisfactory total level of practice. This level of practice tended to decline in compared to first and second follow up but still satisfactory significant.

Table (3) Demonstrates the difference in nurses' satisfactory practice total score related to conduction of nasogastric tube feeding throughout the program intervention. About three quadrants (76.7%) of the studied nurse had statistically level of practice immediately post in the area of confirming tube placement tended to decline in first and second follow-up to be (66.7%, 63.3% respectively). Also most of the studied nurse's achieved high level of statistically significant improvement in the area of record gastric residual feeding immediately post and first follow-up (86.7%, 83.3% respectively) tended to decline second follow-up to (63.3%). Moreover this table show that, a statistical significant difference were found between total nurses satisfactory practices total score related to pre conduction of nasogastric tube feeding and immediately post, first follow up and second follow up at  $P < 0.001$

Table, (4) show difference in nurses' satisfactory practice total score as regard intermittent feeding (using syringe) throughout the program

intervention. High statistically significant improvement in the total score of nurse's practice as regard intermittent feeding throughout the program intervention immediately post, first and second follow-up at  $P < 0.05$ . also this table show that no significant difference were found between pre intermittent feeding using syringe post and follow up program intervention nurses level of practice related to attach 50-60 ml syringe without plunger, don't let the syringe empty while introducing the feeding, rinse the feeding tube before all feeding has run and Clamp the tube immediately after the water is instilled at  $P < 0.05$ .

Table, (5) show the difference in nurses' satisfactory practice total score as regard intermittent feeding (using feeding bag) throughout the program intervention. There was no statistically significant difference in nurses' practice total score regarding intermittent feeding (using feeding bag) throughout the program intervention. All the studied nurse achieved highly level of satisfaction before program, immediately post, first follow-up and second follow-up (100%).

Table, (6) demonstrates the difference in nurses' satisfactory practice total score after feeding. The majority of the studied nurse had statistically significant satisfactory level of practice related to care after feeding in immediately post, first, and second follow-up (96.7%) compared with pre-program level  $P < 0.001$ . Moreover three quadrant of the studied nurse's (76.7%) had statistically significant level of practice related to recording any problems arise during or after feeding  $P < 0.001$ . This percentage tended to decline in first and second follow-up to be (66.7%, 56.7% respectively). This table also shows significant improvement of nurse's total score after feeding throughout the program intervention at  $p < 0.001$ .

Table, (7) shows the difference in the total score of nurses' practice about nasogastric tube feeding throughout the program intervention. A highest statistically significant improvement were found in nurse's practice, between the immediate post-test and the first follow up pre-program level were ( $P < 0.001$ ). Also no statistical significant improvements were found between immediately post, first follow up, post and second follow up and between first and second follow up were ( $P = 0.77, 0.40, 0.58$  respectively).

Table, (8) shows no statistical significance difference was found between nurses' total knowledge and their level of education, age and years of experience.

**Table (1): Distribution of the studied nurses according to their socio -demographic characteristics (No=30)**

Items		N	%
Age	< 20 years	7	23.3
	20 to 30 years	23	76.7
Social state	Unmarried	8	26.7
	Married	22	73.3
Graduation	Bachelor	3	10.0
	technical health institute	8	26.7
	secondary diploma	19	63.3
Experience	< 2 years	11	36.7
	2 to 4 years	2	6.7
	> 4 years	17	56.7
Had training	None	30	100.0%
Protocol of care	Yes	1	3.3
	No	29	96.7

**Table (2): Difference in nurse's satisfactory practice total score related to nasogastric tube feeding pre nasogastric preparation throughout the program intervention (No=30)**

Items Of Care	Before Program		Immediately After		3 Months After		6 Months After		X <sup>2</sup>	p
	n.	%	n.	%			n.	%		
Check physician order	30	100.0%	30	100.0%	30	100.0%	30	100.0%	A	
Wash hands	4	13.3%	26	86.7%	24	80.0%	22	73.3%	44.21	<0.001**
Prepare the equipment's	0	0.0%	24	80.0%	23	76.7%	23	76.7%	56.09	<0.001**
Explain the procedure to the patient	0	0.0%	27	90.0%	23	76.7%	21	70.0%	60.53	<0.001**
<b>Total</b>	<b>0</b>	<b>0.0%</b>	<b>28</b>	<b>93.3%</b>	<b>26</b>	<b>86.7%</b>	<b>26</b>	<b>86.7%</b>	<b>80.40</b>	<b>&lt;0.001**</b>
Assess the patient in tube feeding	0	0.0%	19	63.3%	16	53.3%	13	43.3%	29.16	<0.001**
Prepare patient for feeding	7	23.3%	29	96.7%	26	86.7%	25	83.3%	49.94	<0.001**
Prepare the environment	16	53.3%	29	96.7%	29	96.7%	29	96.7%	34.73	<0.001**
<b>Total</b>	<b>0</b>	<b>0.0%</b>	<b>28</b>	<b>93.3%</b>	<b>26</b>	<b>86.7%</b>	<b>26</b>	<b>86.7%</b>	<b>80.40</b>	<b>&lt;0.001**</b>

**Table (3): Difference in nurse's satisfactory practice total score related to conduction of nasogastric tube feeding throughout the program intervention (No=30)**

ITEMS OF CARE		BEFORE PROGRAM		IMMEDIATELY AFTER		3 MONTHS AFTER		6 MONTHS AFTER		X <sup>2</sup>	p
		n	%	n.	%	n.	%	n.	%		
Confirm tube placement through	total	0	0.0%	23	76.7%	20	66.7%	19	63.3%	43.91	<0.001*
Record gastric residual feeding contents	total	0	0.0%	26	86.7%	25	83.3%	19	63.3%	59.93	<0.001*
Total		0	0.0%	26	86.7%	25	83.3%	17	56.7%	58.91	<0.001*

**Table (4): Difference in nurse's satisfactory practice total score as regard intermittent feeding(using syringe) throughout the program intervention (No=30)**

	BEFORE PROGRAM		IMMEDIATELY AFTER		3 MONTHS AFTER		6 MONTHS AFTER		X <sup>2</sup>	p
	n.	%	n.	%	n.	%	n.	%		
Attach 50-60 ml syringe without plunger	30	100.0%	30	100.0%	30	100.0%	30	100.0%	a	
Instill the feeding to feeding barrel	27	90.0%	30	100.0%	30	100.0%	30	100.0%	9.23	0.026**
Permit the feeding to flow in slowly	2	6.7%	25	83.3%	22	73.3%	19	63.3%	43.16	<0.001**
Don't let the syringe empty while introducing feeding	30	100.0%	30	100.0%	30	100.0%	30	100.0%	a	
Rinse the feeding tube before all feeding has run	27	90.0%	29	96.7%	29	96.7%	27	90.0%	2.14	0.54
Clamp the tube immediately after the water is instilled	28	93.3%	30	100.0%	29	96.7%	29	96.7%	2.06	0.55
Clamp tube and cover its end	19	63.3%	30	100.0%	29	96.7%	26	86.7%	21.34	<0.001**
Pin feeding tube to patient's gown	0	.0%	28	93.3%	24	80.0%	19	63.3%	63.57	<0.001**
Total	26	86.7%	30	100.0%	30	100.0%	29	96.7%	8.97	0.030*

**Table (5): Difference in nurse's satisfactory practice total score as regard intermittent feeding (using feeding bag) throughout the program intervention (No=30)**

	BEFORE PORGRAM		IMMEDIATELY AFTER		3 MONTHS AFTER		6 MONTHS AFTER		X <sup>2</sup>	p
	n.	%	n.	%	n.	%	n.	%		
Hang the bag from an infusion pole about 30 cm above tube's insertion	30	100.0	30	100.0	30	100.0	30	100.0	a	
Clamp the tube and add the formula to the bag	30	100.0	30	100.0	30	100.0	30	100.0	a	
Open the clamp, run formula, and re-clamp	30	100.0	30	100.0	30	100.0	30	100.0	a	
Attach the bag to NGT	30	100.0	30	100.0	30	100.0	30	100.0	a	
Regulate drip by adjusting the clamp or secure the tube in feeding pump	30	100.0	30	100.0	30	100.0	30	100.0	a	

**Table (6): Difference in nurse's satisfactory practice total score after feeding throughout the program intervention (No=30)**

	BEFORE PORGRAM		IMMEDIATELY AFTER		3 MONTHS AFTER		6 MONTHS AFTER		X <sup>2</sup>	p
	n.	%	n.	%	n.	%	n.	%		
Care after feeding	21	70.0%	29	96.7%	29	96.7%	29	96.7%	17.77	<0.001**
Record (time, amount & type) of feeding	30	100.0%	30	100.0%	30	100.0%	30	100.0%	a	
Recording any problem arises during or after feeding	4	13.3%	23	76.7%	20	66.7%	17	56.7%	28.12	<0.001**
Total	4	13.3%	24	80.0%	23	76.7%	24	80.0%	41.35	<0.001**

**Table (7): Differences in the total score of nurse's practice about NGT feeding throughout the program intervention (No=30)**

	BEFORE PROGRAM		IMMEDIATELY AFTER		3 MONTHS AFTER		6 MONTHS AFTER		X <sup>2</sup>	p
	N.	%	N.	%	N.	%	N.	%		
<b>Satisfied (≥ 75%)</b>	0	0.0%	22	73.3%	21	70.0%	19	63.3%	43.38	<0.001*
<b>Dissatisfied (&lt;75%)</b>	30	100.0%	8	26.7%	9	30.0%	11	36.7%		
<b>Mean ±SD</b>	40.18±3.30		87.09±14.55		82.59±12.97		77.71±11.54		105.67	<0.001*
<b>Post_pre</b>	Z = 5.84 , p < 0.001**									
<b>F3_pre</b>	Z = 5.63, p < 0.001**									
<b>F6-Pre</b>	Z = 5.22, p < 0.001**									
<b>F3_post</b>	Z = 0.28 , p = 0.77(NS)									
<b>F6- Post</b>	Z = 0.82 , p = 0.40(NS)									
<b>F6_F3</b>	Z = 0.54 , p = 0.58(NS)									

**Table (8): Comparison between nurse's mean score and standard deviation of the studied nurses in relation to care of patients with NGT feeding throughout the program intervention according to their (education, age & years of experience) (No=30)**

Level of education		Bachelor	Technical institute	Secondary diploma	F	P
		Mean ± SD	Mean ± SD	Mean ± SD		
<b>Total practice</b>	Before	41.35±4.66	39.35±4.39	40.35±2.66	0.45	0.64(NS)
	Immediately	76.54±24.66	85.18±17.25	89.57±11.45	1.14	0.33(NS)
	3 months	73.45±23.59	82.87±15.61	83.91±9.93	0.83	0.44(NS)
	6 months	72.22±22.52	76.15±14.79	79.23±8.03	0.56	0.57(NS)
<b>Their age</b>		<b>&lt; 20 years</b>	<b>20 to 30 years</b>	<b>t</b>	<b>P</b>	
<b>Total practice</b>	Before	40.21±3.65	40.17±3.27	0.024	0.98(NS)	
	Immediately	84.12±16.59	88.00±14.15	0.61	0.54(NS)	
	3 months	80.95±15.10	83.09±12.58	0.37	0.71(NS)	
	6 months	74.86±14.33	78.58±10.78	0.74	0.46(NS)	
<b>Years of experience</b>		<b>&lt; 2 years</b>	<b>2 to 4 years</b>	<b>&gt; 4 years</b>	<b>F</b>	<b>P</b>
<b>Total practice</b>	Before	40.40±4.28	37.96±3.92	40.30±2.58	0.47	0.63(NS)
	Immediately	85.01±16.36	98.14±0.00	87.14±14.08	0.67	0.51(NS)
	3 months	82.32±14.82	95.37±1.30	81.26±12.05	1.06	0.35(NS)
	6 months	77.10±14.42	85.18±2.61	77.23±10.18	0.43	0.65(NS)

## Discussion

The present study included 30 nurses, all of them were females. Most of them were 20 years and less than 30 years. Also the majority of nurses had secondary degree of education (diploma). This result agreed with Sobeh, (2010) who studied effect of educational program about the care of mechanically ventilated patients on the knowledge and skills performance of nurse's performance in intensive care units of hospitals in Port Said city. Also the majority of the studied nurses had more than 4 years of experience.

Regarding training program, it was found that all of the studied nurses did not had any training program or written protocol related to care of nasogastric tube feeding patients. Thus reflect a bad care was introduced to the patients before programs. This findings were supported by Madigam et al., (2007), Grigges, (2005), and Kwekkeboom et al., (2006) who stressed that training programs were required to target the specific needs of nursing staff working at different care settings. On the same line Happel, (2005) stated that quality should begin with education and end with education.

Concerning practice done before feeding it was found that prepare the environment occupied the first rank of improvement with the highest percentage weight while prepare patient for feeding occupied the second rank, explain procedure to the patient occupied the third rank, record gastric residual feeding content and washing hands occupied the fourth rank, explain procedure to the pt. occupied the fifth rank, confirming tube placement occupied the sixth rank, while the last rank was occupied by general assessments. Because it is difficult to weight all patients in the unit daily this is due that; most patient in I.C.U unit in a critical case.

The improvement of nurses' practice as a result of implementing an educational or training program was well recognized and supported by many researches around the world. In study concerned with medications' administration via enteral feeding tubes, Kenny & Goodman (2010) pointed out that there was improvement in all practices of enteral feeding and medications administration after the conduction of the program.

Also it was observed from the results of this study that; the improvement in some items of

nurse's practice before feeding tended to decline post 6 months after the program implementation such as explain procedure to the patients, prepare equipment's, assess patient, receive tube feeding, confirming tube placement and record gastric residual content. This result reflects the need of nurse's practice reinforcement the importance of continuous training program.

Concerning nurse's conduction of nasogastric tube feeding throughout the program intervention during and after feeding the results indicated that; there were statistically significant improvement in all items of care immediately, post 3 months and 6months after the program implementation in both methods of feeding used (syringe and feeding bag) and care after feeding with slightly decline in the items related to recording gastric residual feeding content and recording any problem during and after feeding post 6 month after the program implementation. This is due to that; most nurses believed that; both tow items not important in caring of patients undergoing nasogastric tube feeding.

Moreover the results of the current study showed statistically significant improvement in nurses practice total score regarding caring of patients undergoing nasogastric tube feeding and this improvement was tended to decline but sustainable immediately, post 3 month and 6 month after the program implementation compared to pre-test

Theses finding were supported by El-Dosoky, (2008) and El-Ezaby, (2004) who concluded after implementation of teaching training program that; there were statistically significant improvement in nurse's practice immediately after program implementation and throughout the first follow up phase. This improvement tended to decline in the second follow up phase.

From the results of this study it was observed that there is no improvement in the point of abdominal x-ray either immediately or post 3 and 6 months after the program implementation. This is due to unavailability of doing such procedure because it was coaster than hospital resources. Also to the condition of the patients were not allowed to move from the unit.

Moreover Metheny, (2006, 2007) mentioned that X-ray confirmation of correct placement of any NGT to be used for feeding or medication administration remains "gold standard". Also

Rauen, (2008) said; X-ray examination is the most accurate method to determine feeding tube placement.

Regarding level of education it was found that; there was no statistical significance difference was found between nurses' total practice and their level of education. This results may due to most of the studied nurses were in the same age group and most of them were diploma nurse.

These results disagree with Shahin et al., (2012), Mohamed & Wafa, (2011) and Penland, (2010). All of them found that; there was statistical significance relation between nurses' practice and educational level of participant.

Moreover the results revealed diploma nurses' had the highest percentage in their score of practice immediately post program and pre-program level. This results is returned to that diploma nurses' in this unit were responsible for offering care to patients (practical role), but nurses with bachelor responsible for the administrative role in the unit.

Regarding the age of participant, the results reveal that although no statistical significance difference was found between nurses' practice and their age groups. Nurses of age category of 20 and less than 30 years had the highest percentage in their score of practice immediately post program and pre-program level.

The results agree with Mohamed & Wafa, (2011) who reported that there were no significant statistically differences between practice score and age of participants. Also this finding was in agreement with Penland, (2010) who found no significant relations between the nurses' practice about nutrition and their age in a study aimed to assess the relationship between nurse nutritional practices in preventing unintentional weight loss in nursing home residents.

Regarding years of experience the results of the current study showed nurses with 2-4 years of experience had the highest percentage in their score of practice between immediately post programs and pre-program level

The results were contradicted with Mohamed & Wafa, (2011) who found positive statistically correlation between practice and year of experience. The findings were also contradicted with Suchitra and Lakshmi, (2007). The study aimed to evaluate the impact of education on

practices regarding nosocomial infections among various categories of health care workers. The study reported that years of experience in the hospital significantly correlated to increased, attitudes and practices among the various categories of staff.

Also these results agree with El-Dosoky, (2008) who reported that there were no statistically significance relation was found between nurses' practice and their age, experience and working areas.

## Conclusion

In the light of the current study, it can be concluded that, the educational program provided for nurses' working in I.C.U unit at Al-Azhar University hospital significantly increased the level of their practice related to care of patients undergoing nasogastric tube feeding.

## Recommendations

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

- Continuous educational programs (in-service education and workshops) should be planned on regular basis to nurses working on I.C.U about nasogastric tube feeding for enhancing nurses' practice to achieve high quality of care and this programs should made on free days so they don't interfere with nurse clinical work schedule.
- Upgrading nurses' practice about caring of patient's undergoing nasogastric tube feeding through encourage nurses attend national and international workshop about caring of nasogastric tube feeding.

## References

- Ahmed, W.N. (1997): Assessment of nurse's knowledge and practice in relation to nasogastric tube feeding. Master degree. Faculty of Nursing, Alexandria University, P.P. 81-91.
- ASPEN Board of Directors and the Clinical Guidelines Task Force. (2009): Guidelines for the use of parenteral and enteral nutrition in adult and pediatric patient. Section VIII: Access for administration of nutritional support. JPEN, 26 (1Supp1): 33SA-35SA.
- El-dosoky, E.I. (2008): Assessment of nurse knowledge and practice about measure to prevent deep venous thrombosis among hospitalized patient in general hospitals of Port Said hospital. Unpublished Master Thesis. Faculty of Nursing, Suez Canal University, Egypt.

- El-Ezaby, H.H. (2004): Effect of a Training Program Developed for Nurses about Universal Precaution for Infection control in Health Care Centers in Port Said. Unpublished Doctorate Thesis, Faculty of Nursing, Suez Canal University, Egypt.
- Gillanders, Lyn., and NZDA. (2007): Clinical Handbook ( 8<sup>th</sup> Edition). Wellington.
- Griggs, R. (2005): ROTC Training Teaches Nursing Students Critical Thinking Skills. *Nurse-Educ.*, 30 (1): p.p. 37-39.
- Happell, B. (2005): Education For Life: The Evaluation Of An Innovative Approach To Facilitate Ongoing. Accessed at 20-3-2011.
- Jackson, S.E. (2007): The Influence of Managed Care on U.S. Baccalaureate Nursing Education Programs. *Journal- Of - Nursing- Education*, 45 (2):p.p.67-74.
- Johns, R.A (2005): Prioritizing To Safeguard the Integrity of Nurse Education. *Nurs. Times*, 101 (34): p.p.26-27.
- Kenny, D., & Goodman, P. (2010): Care of the Patient with Enteral Tube Feeding: An Evidence-Based Practice Protocol. *Nursing Research*, 59 (1): 22-31.
- Kwekkeboom. K.L., Vahl, C., and Eland, J. (2006): Impact Of Volunteer Companion Program On Nursing Student's Knowledge And Concerns Related To Palliative Care. *J. Palliat- Med.*, 9(1): p.p. 90-99.
- Leinonen, S.J. (2006): International Nursing Exchange Program. *Journal- Of- Continuing-Education -In-Nursing*, 37(1):p.p.16-20.
- Madigam, S. M., Fleming, P., McCann, S., Wright, M.E., Nac Auley, D. (2007): "Primary care and General Practitioners Involvement in Enteral Tube Feeding At Home: A qualitative study". *BMC Fam Practi*, May 15th.
- Metheny, N.A. (2006): Preventing Respiratory Complication of Tube Feeding: Evidence-Based Practice, *American Journal of Critical –Care nurses*, 15(4):360-369.
- Metheny, N.A. (2007): Letters to the editor. Confirmation of nasogastric tube placement. *American Journal of Critical –Care*, 16(1):19.
- Mohamed, S., and Wafa, A. (2011): The effects of an educational program on nurse's knowledge and practice related to hepatitis c virus: a pretest and posttest quasi experimental design. *Australian Journal of Basic and Applied Sciences*, 5(11): 564-570.
- Morton, K.H., and Goodacre, L. (2008): An exploration of the impact of home enteral tube feeding on the eating habits of the partners of adults receiving home enteral tube feeding. *Journal of Human Nutrient Diet*. 15, 21(4). P. 397.
- Penland, K. (2010): The relationship between nurse nutrition knowledge and unintentional weight loss in nursing home residents. *Dissertations of the University of Arizona*: 1-142.
- Rauen, C. (2008): Seven evidence based practice habits: putting some sacred cows out of posture, *Crit Care Nurs*, 28(2): 98.
- Robinson, K., Sportsman, S., Eschiti, V.S., Bradshaw, p., and Bol, T. (2005): Preparing Faculty and Students For An International Nursing Education Experience. *Journal-Of- Continuing- Education- in Nursing*, 37(1): p.p.21-29.
- Rosenkoetter, M.M., Bradshaw, M., Kiernan, B.S., and Bowcutt, M.A. (2007): Nurse Scholars Programs. *J. Nurs. Edu*, 44(9): p.p. 426-431.
- Shahin, M., Mohamed, W., and Sayd, M. (2012): Nurses Knowledge and Practices Regarding Enteral Nutrition at the Critical Care Department of Al- Manial University Hospital in Egypt: Impact of a Designed Instructional Program. *Journal of American Science*, 8 (11). 397- 404.
- Shehab, M. (2011): Assessment the Nurses Performance in Providing Care to Patients Undergoing Nasogastric Tube in Suez Canal University Hospital. Master degree. Faculty of Nursing. Suez Canal University.
- Siciliano, P., and Burrage, R. (2007): Chronic Pain inthe Elderly: A Continuing Education Program For Certified Nursing Assistant. *Geriatr. Nurs.*, 26(4): p.p. 252-258.
- Sobeh, D. (2010): Effect of an Educational Program about the care of Mechanically Ventilated Patients on the Knowledge and Skills performance of Nurses in Intensive Care Units of the hospitals in port –Said City. Doctorate degree. Faculty of Nursing. Port Said University.
- Suchitra, J., & Lakshmi, D. (2007): Impact of education on knowledge, attitudes and practices among various categories of health care workers on nosocomial infections. *Indian Journal of Medical Microbiology*, 25:181-187