

## Nurses' Performance Regarding Nasogastric Tube Feeding in Intensive Care Units

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### Abstract:

**Background:** Nasogastric tube (NGT) feeding is a common practice in Intensive care Units (ICUs). **The aim of study** was to assess nurses' performance regarding nasogastric tube feeding in Intensive Care Units. **Subjects and methods:** A descriptive correlation design was used in this study. **All nurses** (100) in **all ICUs at Zagazig University Hospitals** were included. **Two tools** were used for collecting data, 1) questionnaire sheet to collect knowledge about socio-demographic characteristics of study nurses and questions to assess nurses' knowledge regarding nasogastric tube and feeding administration. 2) Observational checklist to assess nurses' practice regarding NGT insertion and feeding administration. **Results:** the study finding revealed that there was a statistical significant relation between total knowledge and total practice concluded that nurses had unsatisfactory level of knowledge about NGT insertion and feeding, and their level of practice was unsatisfactory. It can be **concluded** that the majority of nurses in intended ICUs did not apply the most recommended nursing practices regarding nasogastric tube insertion and feeding administration. It is **recommended** to provide a training program for all nurses who provide care to critically ill patients in ICUs, periodic evaluation of nurses' practice.

**Key words:** Performance, Nasogastric tube, intensive care units

### Introduction:

Nutrition is a basic physiological need supporting health, recovery from illness, and life itself. Assessing patients' nutritional status is a primary responsibility of nurses, who have direct observation of their patients' dietary intake, weight, and tolerance to prescribed diets. Nutritional assessment, identifying problems related to nutrition, and meeting the needs of patients with altered nutrition are the focus for the enteral nutrition skill set.<sup>(1)</sup>

Physicians have been in-tubing the gastrointestinal tract to allow artificial feeding since ancient times. Today over 275,000 nasogastric tubes are supplied to the National Health Safety (NHS) annually. As with most medical procedures, there are risks to the use of these tubes. Some

complications (eg epistaxis) are common; others (eg oesophageal perforation and pneumothorax) are rare but serious.<sup>(2)</sup>

Enteral feeding is useful for ICU patients through decreasing catabolic response to injury, maintaining bowel mucosal integrity, decreasing translocation of gut bacteria, improving wound healing and reducing septic complications<sup>(3)</sup>.

Nasogastric tubes remain in place for several days or more, many patients complain about nose and throat discomfort. If the tube's diameter is too large or the pressure from the tube is prolonged, tissue irritation or breakdown may occur<sup>(4)</sup>.

**Significance of the study:**

Nasogastric tube feeding is common practice and many tubes are inserted daily without incident. However, there is a small risk that the tube can become misplaced into the lungs during insertion, or move out of the stomach at a later stage.<sup>(5)</sup> The nurses play an important role in all aspects of nasogastric tube feeding. Thus the present study will be carried out in an attempt to help in assessing nurses' performance regarding nasogastric tube feeding in all ICUs at Zagazig University Hospitals.

**Aim of the study:**

The aim of this study was to:  
Assess nurses' performance regarding nasogastric tube feeding in Intensive Care Units

**Objectives:**

- To assess nurses' knowledge regarding insertion of nasogastric tube and feeding administration.
- To assess nurses' practice regarding insertion of nasogastric tube and feeding administration.

**Research questions:**

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

**Subjects and Methods:****Research design:**

A descriptive correlation design was used.

**Setting:**

The present study was conducted at all intensive care units in Zagazig University Hospitals (Internal medicine, Accidents and emergency, New Surgery, Chest, Neuro units).

**Subjects:**

The study sample included all the available nurses working in all ICUs in Zagazig University Hospitals. Total number of sample was 100 female nurses, at different age and years of experience as well as, different qualification.

**Inclusion Criteria:**

- Nurses already dealing with the patients with nasogastric tube.
- Years of experience not less than one year in Intensive Care Unit.

**Tools of data collection:**

1. **An Interviewing questionnaire sheet:** was designed by the researcher and included two parts:
  - a) socio demographic characteristics of the nurses include nurses' ages, level of education, years of experience.....etc.
  - b) questions to assess nurses' knowledge regarding insertion of nasogastric tube and feeding administration.
2. **An observational checklist:** was used to assess the nurses' practice
  - a) before, during, and after insertion of nasogastric tube.
  - b) Before, during and after feeding administration.

**Content validity:**

It was established to assure content validity by a panel of 7 experts who revised the tools for clarity; relevance, comprehensiveness, understanding, and ease for implementation and according to their opinion minor modification were applied.

**Pilot study:**

A pilot study was carried out to test feasibility and applicability of the tools. The researcher randomly selected 10 (10%) nurses to participate in the pilot study. Modification was done based on pilot results and the sample which was shared in the pilot

study was excluded from the study sample.

**Field work:**

Field work of this study was executed in six months from December 2011 to May, 2012. Distribution of the questionnaire sheet was done every day at the end of morning shift for nurses working at morning shift and at the beginning of the evening shift. Each nurse was interviewed to fulfill the questionnaire sheet; the time required to complete the questionnaire sheet ranged from 30- 45 minutes. Each nurse was observed at morning and afternoon shift during nasogastric tube insertion and feeding administration three times. The mean (SD) of these observations was done to assess their performance.

**Administrative and ethical considerations:**

An official permission for data collection in Zagazig University Hospitals was obtained from the hospital administrative personnel by the submission of a formal letter from the Dean of the faculty of Nursing.

At the interview, each nurse was informed about the purpose, benefits of the study, and informed that their participation is voluntary and they have right to withdraw from the study at any time without any given reason. In addition, confidentiality, and anonymity of the subjects were assured through coding all data.

**Statistical Design:**

After data were collected it was revised, coded and fed to statistical software SPSS version 16. The given graphs were constructed using Microsoft excel software.

All statistical analysis was done using two tailed tests and alpha error of 0.05. P value equals to or less than 0.05 was considered to be significant.

**Results:**

**Table (1)** indicated the study nurses characteristics. Nearly half of

the nurses (48%) their ages equal 20 years or less than 25 years with the mean age  $25.4 \pm (3.7)$ . More than half of them are married (69%) and had diploma degree (66%). Also, more than one third of nurses (38%) had equal 5 years or less than 10 years of working since graduation with the mean year  $7.4 \pm (3.8)$  years. Also more than one third of them had equal 1 year or less than 5 years of experience of working in ICUs with the mean years  $6.2 \pm (3.7)$ . Moreover, the majority of them attended training course during their work in ICU (82%) and mentioned that they gained benefit from attending this course (96.7%).

**Table (2)** revealed that nearly all of studied nurses had unsatisfactory level of knowledge during insertion of nasogastric tube (99%). Also the majority of them had satisfactory level of knowledge after feeding administration (70%).

**Table (3)** illustrated that nearly all the studied nurses had unsatisfactory level of practice about nasogastric tube insertion (99%) and feeding administration (100%).

**Table (4)** illustrated that all the studied nurses didn't perform hand washing, examine nostrils and select the nostril through which air passes more easily, the majority of them measured NG tube from the tip of the nose to the earlobe and to xiphoid process of sternum, and mark tube length with tape or indelible ink.

**Table (5)** revealed that all the studied nurses didn't perform weight monitoring, check skin turgor, or mucous membrane, provide respiratory suction, patients' positions with head of bed elevated 30- 45 degree, provide privacy, assess gastric residual feeding contents, attach syringe without plunger to clamped feeding tube. Also all of them didn't assess gastric residual volume before feeding.

**Table (6)** showed that there is a statistical significance relationship between total nurses' knowledge regarding nasogastric tube insertion and attended training course ( $P=0.047$ ).

**Table (7)** showed that there was statistical significance relation between total nurses' knowledge regarding feeding administration and their age ( $P=0.022$ ).

**Table (8)** presented that there was statistical significance relationship between nurses' practice during feeding administration and their age ( $P=0.047$ ), and years of working in ICUs ( $P=0.006$ ).

**Table (9)** clarified that there was a strong positive correlation between nurses' knowledge and their practice regarding feeding administration ( $r=0.76$ ) and also this correlation is statistical significant ( $P=0.000$ ). Also, there was a positive relation between total nurses' knowledge and their practice regarding nasogastric tube, in addition there was a positive relation between total nurses' knowledge regarding nasogastric tube and their practice regarding feeding.

### Discussion:

Caring for patients who require a nasogastric tube is a major nursing responsibility that entails a number of interventions. Patients' outcomes are affected directly by the quality of nursing management, it is necessary that nursing care is based on the best available evidence.<sup>(6)</sup>

The present study reported that the majority of nurses had unsatisfactory level of knowledge regarding nasogastric tube insertion. This might be due to absence of scientific teaching activities in clinical field e.g. (Informal teaching activities) made by direct supervisors in the hospital to refresh the nurses' knowledge. This agrees with Ahmed<sup>(7)</sup>, who revealed that

nurses' knowledge in general was inadequate in both El- Moassat hospital and the main university hospital. These findings disagree with Taha<sup>(8)</sup>, who found that the majority of nurses reported correct answers related to general knowledge about nasogastric tube.

The present study clarified that more than half of the studied nurses had unsatisfactory level of knowledge regarding feeding administration (51%). This may be attributed to insufficient basic information obtained during their basic nursing education. These findings agree with Ahmed<sup>(7)</sup>, who found that nurses' knowledge related to care given during nasogastric tube feeding was unsatisfactory (scores ranged from 25% to approximately 50%). But, these findings disagree with Bourgault, et al.,<sup>(9)</sup> who found that nurses' knowledge about enteral feeding increased after the educational program.

The current study showed that the majority of nurses had unsatisfactory level of practice before and after nasogastric tube insertion, conversely the least of them had satisfactory level of practice during nasogastric tube insertion. This may be due to absence of guidelines to remind them or due to inadequate training courses. These findings disagree with Taha<sup>(8)</sup>, who found that the subjects of his study showed the best performance related to nasogastric tube and Amer<sup>(10)</sup> who illustrated that overall level of performance related to nasogastric tube was satisfactory. Similarly, these findings disagree with Saleh<sup>(11)</sup>, who illustrated that the highest mean score was found before and during nasogastric tube insertion (17.2), while the least mean score was found after insertion (9.7).

Moreover the present study revealed that the majority of studied nurses did not perform hand washing

before nasogastric tube insertion. This may be related to a variety of reasons such as lack of knowledge about the importance of hand hygiene in reducing the spread of infection and how hands become contaminated, lack of understanding of correct hand hygiene technique, irritant contact dermatitis associated with frequent exposure to soap and water. These results agree with Abd El- Aziz <sup>(12)</sup>, who reported that nurses and other health care workers did not always carry out routine hand washing before and after procedure. These findings were not in accordance with Kohn <sup>(13)</sup> who found that hand hygiene compliance before patient contact increased.

Currently abdominal radiographs are regarded as the gold standard for checking the position of a feeding tube.<sup>(14)</sup> While the practice of regularly checking the tube is in the stomach is recommended by Williams and Leslie<sup>(15)</sup>. Also, the confirmation of nasal feeding tubes placement by air insufflations with auscultation over the epigastric area is not the best practice in ICUs and found no evidence to support alternate methods of confirming feeding tube placement other than abdominal X- ray.<sup>(16)</sup>

According to this study, the majority of nurses confirmed placement of the nasogastric tube by air auscultation over epigastric area and didn't do abdominal X-ray or pH measurement. This may be due to the risk of repeated exposure to radiation and high cost too. These findings agree with Albarran, et al., <sup>(17)</sup> who found that the practice of auscultation and injecting air into the tube was the most common method used to check the placement of the nasogastric tube. Radiographs and measuring pH were used less often.

The present study revealed that the majority of nurses had

unsatisfactory level of practice before, during and after feeding administration. This may be due to shortage of nursing staff to provide high quality nursing care for critically ill patients. The ratio of critical care nursing staff to patients in the intended ICU was 1:2 throughout the three shifts. Also, this could be due to the apparent simplicity of tube feeding procedure which may lead the nurses to underestimate such procedure. It is often being delegated to the most junior staff members who might not have the needed knowledge and expertise to ensure satisfactory outcomes. These findings agree with Seliman <sup>(18)</sup>, who revealed unsatisfactory nursing practices regarding enteral feeding management in the intended ICUs. These results disagree with Amer <sup>(10)</sup>, who illustrated that overall level of performance was significantly improved after program implementation. Performance in the pre-test was 39.3% while after the program implementation; it was (71.7%) and slightly decreased in follow-up test (70.2%), similar to Ahmed (1997) <sup>(7)</sup>, who found that the nurses' practice during nasogastric tube feeding was satisfactory (score ranged from 62.5% to 80%).

Concerning patients' positions, it was recommended by Kenny and Goodman <sup>(19)</sup>, in the evidence based practice protocols for enteral tube feeding that head of patient's beds should be maintained at 30- 45 ° at all times during feeding and for 30- 60 minutes after feeding. The current study demonstrated that the majority of nurses did not position the patient in semi- fowler position before feeding. This may be due to lack of knowledge and awareness about the risk of supine position that may cause aspiration. This may reflect the importance of semi- fowler position oral hygiene and suctioning before feeding. These

findings disagree with Seliman<sup>(18)</sup> who found that the majority of critical nurses maintained height of bed elevation of at least 30- 45° during enteral feeding.

The results of this study illustrated that the majority of nurses didn't perform respiratory suction and oral hygiene before feeding. These results disagree with Fitch et al.,<sup>(20)</sup> who found that oral care provided in their study was performed by nurses and differed from routine oral care in several ways.

The researcher observed that the majority of nurses didn't check nasogastric tube (NGT) position before feeding. This may be attributed to the fact that nurses do not give much attention or consideration to the importance of checking NGT position or it may be due to lack of knowledge and skills about checking NGT position before feeding.

During the present study it was noted that the majority of nurses did not check GRV. This may be attributed to lack of awareness of the importance of this procedure, lack of time because the critical care nurses may be responsible for many nursing procedures for more than one patient at the same time, and the lack of guidelines or feeding protocols in the ICU. This result is consistent with Bleichner, et al.,<sup>(21)</sup> who showed that the majority of ICU nurses never checked GRV before every enteral feeding.

Lastly, the interrelationships among the various study outcomes, namely knowledge and performance were investigated in the current study. Analysis of data revealed that there was a statistical significance relationship between nurses' knowledge about nasogastric tube insertion and their training. This may be attributed to the importance of effective training program for

improving nurses' knowledge. This finding agrees with Abdeen<sup>(22)</sup>, who found that trained nurses had satisfactory level of knowledge. These results disagree with Saleh<sup>(11)</sup>, who found that there is no significant difference between trained and non trained nurses with regard to their knowledge about studied invasive procedures, As well as Mohamed<sup>(23)</sup> who revealed that there was no statistically significant relation between nurses' knowledge about studied chemotherapeutic agents and their age nor their years of experience and experience with chemotherapy.

The present study revealed that there was a statistical significance relation between nurses' knowledge regarding feeding and their ages. These findings agree with Abd El-Aziz<sup>(12)</sup> who found that there was statistically significant correlation between total score of nurses' knowledge and their age. On the contrary, the current study findings were inconsistent with Ahmed<sup>(24)</sup> and Gad Allah<sup>(25)</sup>, who found that there was no statistical significance relation between nurses' level of knowledge and their age. Similarly, Abd El- Lateef<sup>(26)</sup> stated that the factor of age did not affect the level of nurses' knowledge.

The present study clarified that there was a statistical significance relationship between nurses' practice during feeding administration and their ages and years of working. These results agree with Saleh<sup>(11)</sup> who found highly statistically significant in practice of I.V. administration among bachelor degree nurses. This result may be related to the relation between practice and years of working, the more years of working and experience, the higher level of practice and skills. On the contrary, these findings disagree with Ahmed<sup>(25)</sup> and Tantawy<sup>(27)</sup>, who showed that there was no statistical significant relation

between nurses' performance and ages. In the same line Gad Allah <sup>(25)</sup> found that there was no statistical significant correlation between age or years of experience and their level of practice.

The present study showed that there was a strong positive correlation between nurses' knowledge and their practice regarding feeding administration and the relation is statistically significant. This has explained as knowledge and its application in clinical practice are most valuable for retention. So, knowledge alone without practice has no effect. Moreover, new techniques based on, improving nurses' knowledge through nursing care standard could enhance their knowledge and consequently improve their performance. These results lined with Ahmed <sup>(24)</sup>, who found highly significant difference between nurses' level of knowledge and level of practice. In the same line, Mohamed <sup>(23)</sup> revealed that there was positive correlation between nurses' knowledge, and their practice regarding studied chemotherapeutic agents and highly statistically significant. In addition, Saleh <sup>(11)</sup> and Amer <sup>(10)</sup> found that there was a positive correlation between nurses' knowledge and their performance. On the contrary, Abd El- Aziz <sup>(12)</sup> found that there is no statistical significant correlation between nurses' level of knowledge and practice.

The studied nurses had unsatisfactory level of knowledge and practice regarding nasogastric tube and feeding.

### **Conclusion:**

According to the results and discussion of the present study, it can be concluded that the majority of nurses in intended ICUs did not apply the most recommended nursing practices regarding nasogastric tube insertion and feeding administration.

### **Recommendations:**

Based on the results of the present study the following recommendations are suggested:

- Evaluation of nurses' work practice and technique should be carried out during nasogastric tube insertion or feeding administration.
- Periodic evaluation and validation of the training given and training programs should be included both theoretical and practical.
- Knowledge and competence of nursing staff should be periodically evaluated, documented and up to date if necessary.
- Booklet about nasogastric tube insertion and feeding administration should be available for nurses in ICUs.

**Table (1): Socio demographic characteristics of studied nurses included in the study (N= 100)**

<b>Socio demographic &amp; work related data</b>	<b>No (n=100)</b>	<b>%</b>
<b>Age (years):</b>		
20-	48	48
25-	38	38
30-37	14	14
<b>Mean (SD)</b>	<b>25.4 (3.7)</b>	
<b>Unit:</b>		
ER anaesthesia	60	60
Chest ICU	3	3
Neuro ICU	10	10
Internal medicine ICU	18	18
New ICU	9	9
<b>Marital status:</b>		
Single	30	30
Married	69	69
Widowed	1	1
<b>Qualification :</b>		
Secondary school diploma	66	66
Health institute diploma	21	21
Nursing Bachelor	13	13
<b>Work duration (years) from graduation:</b>		
1-	26	26
5-	38	38
10-18	36	36
<b>Mean (SD)</b>	<b>7.4 (3.8)</b>	
<b>Experience (years) Working in ICUs:</b>		
1-	36	36
5-	35	35
10-18	29	29
<b>Mean (SD)</b>	<b>6.2 (3.7)</b>	
<b>Training :</b>		
Yes	61	61
No	39	39
<b>Time of training (n=61)</b>		
Before joining the care unit	11	18
During joining the care unit	50	82
<b>Useful training (n=61):</b>		
Yes	59	96.7
No	2	3.3



**Table (2): Distribution of nurses' level of knowledge regarding insertion of nasogastric tube and feeding administration (N = 100)**

Items	Nurses knowledge			
	Unsatisfactory		Satisfactory	
	No	%	No	%
<b>NG tube insertion</b>				
• Knowledge before insertion	50	50.0	50	50.0
• Knowledge during insertion	99	<b>99.0</b>	1	1.0
• Knowledge after insertion	68	68.0	32	32.0
• Overall insertion knowledge	90	90.0	10	10.0
<b>NG tube feeding</b>				
• Knowledge before feeding	45	45.0	55	55.0
• Knowledge during feeding	58	58.0	42	42.0
• Knowledge after feeding	30	30.0	70	<b>70.0</b>
• Overall feeding knowledge	51	51.0	49	49.0
<b>Grand total knowledge</b>	82	82.0	18	18.0

**Table 3: Distribution of nurses' level of practice regarding nasogastric tube insertion and feeding administration (N=100)**

Items	Nurses practice			
	Unsatisfactory		Satisfactory	
	No	%	No	%
<b>NG tube insertion</b>				
• Practice before tube insertion	100	100	0	0.0
• Practice during tube insertion	40	40.0	60	60.0
• Practice after tube insertion	67	67.0	33	33.0
• Overall tube insertion practice	99	<b>99.0</b>	1	1.0
<b>NG tube feeding</b>				
• Practice before tube feeding	100	100.0	0	0.0
• Practice during tube feeding	62	62.0	38	38.0
• Practice after tube feeding	91	91.0	9	9.0
• Overall tube feeding practice	100	<b>100.0</b>	0	0.0
<b>Grand total practice</b>	100	100.0	0	0.0

**Table (4): Distribution of nurses' level of practice before nasogastric tube insertion (N = 100)**

Before insertion	Practice			
	Unsatisfactory		Satisfactory	
	No	%	No	%
1- Review client's medical record. Check physician's order.	0	0.0	100	100.0
2- Prepare equipment and bring it to bedside and arranged:				
2-1 Nasogastric tube of appropriate size	0	0.0	100	100.0
2-2 Small basin filled with ice or warm water	91	91.0	9	9.0
2-3 Water- soluble lubricant	0	0.0	100	100.0
2-4 Tongue blade	100	100.0	0	0.0
2-5 Stethoscope	45	45.0	55	55.0
2-6 Non allergenic tape	0	0.0	100	100.0
2-7 Glass of water with straw	99	99.0	1	1.0
2-8 Suction apparatus ( if ordered)	24	24.0	76	76.0
2-9 Bath towel	78	78.0	22	22.0
2-10 Syringe (60 ml)	24	24.0	76	76.0
2-11 Disposable gloves	14	14.0	86	86.0
3- Wash hands	100	100.0	0	0.0
4- Provide privacy	99	99.0	1	1.0
5- Prepare the tube:				
5-1 Plastic tube: places in warm water for 10 min	94	94.0	6	6.0
5-2 Rubber tube: Places in basin of ice for 10 min	89	89.0	11	11.0
6- Explain the procedure to the patient if conscious	54	54.0	46	46.0
7- Assist the patient to high fowler's position, or semi- fowler position for conscious patient & side lying position for unconscious patient	12	12.0	88	88.0
8- Examine nostrils and select the nostril through which air passes more easily	100	100.0	0	0.0
9- Place towel over client's chest	94	94.0	6	6.0
10- Measures NG tube from the tip of the nose to the earlobe and to xiphoid process of sternum	94	94.0	6	6.0
11- Mark tube length with tape or indelible ink	94	94.0	6	6.0
12- Cut adhesive tape 10 cm long	34	34.0	66	66.0

**Table 5: Distribution of nurses' level of practice before feeding administration (N= 100)**

Before feeding administering	Practice			
	Unsatisfactory		Satisfactory	
	No	%	No	%
1. Check the written order for amount, concentration, type and frequency of tube feeding on patient's chart.	0	0.0	100	100.0
2. Prepare feeding equipment and bring it to bed side.	0	0.0	100	100.0
3. Explain the procedure to the patient	0	0.0	100	100.0
4. Wash hands with anti microbial soap	28	28.0	72	72.0
5-1 Auscultate for bowel sounds ( over epigastric and gastric area )	93	93.0	7	7.0
5-2 Auscultate for lung sounds (both anterior and posterior aspect of the chest)	0	0.0	100	100.0
5-3 Monitor weight, check skin turgor, and mucous membrane	100	100.0	0	0.0
5-4 Monitor urine glucose and acetone every 8 h.	73	73.0	27	27.0
6-1 Provide respiratory suction ( if needed)	100	100.0	0	0.0
6-2 Provide mouth care	92	92.0	8	8.0
6-3 Offer nasal care	94	94.0	6	6.0
6-4 Position patient with head of bed elevated 30- 45 degree	100	100.0	0	0.0
7- Provide privacy	100	100.0	0	0.0
8- Confirm tube placement	83	83.0	17	17.0
9- Assess gastric residual feeding contents:	100	100.0	0	0.0
9-1 Wear gloves				
9-2 Attach syringe to clamped feeding tube	91	91.0	9	9.0
9-3 Unclamp the feeding tube	17	17.0	83	83.0
9-4 Aspirate all gastric contents and put them in measuring container	94	94.0	6	6.0
9-5 Clamp the feeding tube	91	91.0	9	9.0
9-6 Measure the amount being aspirated	36	36.0	64	64.0
9-7 Attach syringe without plunger to clamped feeding tube	100	100.0	0	0.0
9-8 Unclamp the feeding tube	94	94.0	6	6.0
9-9 Reinstall the aspirates into the stomach	91	91.0	9	9.0
9-10 Flush the feeding tube before feeding with 10 cc water	80	80.0	20	20.0

**Table (6): Relation between total nurses' level of knowledge regarding nasogastric tube insertion and their work duration, years of experience, and their training (N= 100)**

				Overall intubation knowledge		X <sup>2</sup>	P		
Work conditions				Unsatisfactory				Satisfactory	
				No	%			No	%
Work duration (years) from graduation						2.9	0.279^		
▪ 1-				24	92.3	2	7.7		
▪ 5-				36	94.7	2	5.3		
▪ 10-18				30	83.3	6	16.7		
Experience (years) working in ICUs						5.8	0.067^		
▪ 1-				33	91.7	3	8.3		
▪ 5-				34	97.1	1	2.9		
▪ 10-18				23	79.3	6	20.7		
Training						3.9	0.047*		
▪ Yes				52	85.2	9	14.8		
▪ No				38	97.4	1	2.6		
Time of training						0.34	0.559		
▪ Before working in ICU				10	90.9	1	9.1		
▪ During working in ICU				42	84.0	8	16.0		

<sup>^</sup> P value based on Mont Carlo exact probability

\* P &lt; 0.05 (significant)

**Table (7): Relation between total nurses' level of knowledge regarding feeding administration and their socio demographic characteristics (N= 100)**

Socio demographic data		Overall feeding knowledge				X <sup>2</sup>	P
		Unsatisfactory		Satisfactory			
		No	%	No	%		
Unit							
▪	ER anaesthesia	31	51.7	29	48.3	3.2	0.528^
▪	Chest ICU	2	66.7	1	33.3		
▪	Nuro ICU	7	70.0	3	30.0		
▪	Internal medicine ICU	8	44.4	10	55.6		
▪	New ICU	3	33.3	6	66.7		
Age							
▪	20-	20	41.7	28	58.3	7.6	0.022*
▪	25-	26	68.4	12	31.6		
▪	30-37	5	35.7	9	64.3		
Marital status							
▪	Single	17	56.7	13	43.3	1.5	0.470^
▪	Married	34	49.3	35	50.7		
▪	Widowed	0	0.0	1	100		
Qualification							
▪	Diploma degree	34	51.5	32	48.5	1.1	0.565
▪	Associate degree	12	57.1	9	42.9		
▪	Bachelor degree	5	38.5	8	61.5		
Work duration ( years) from graduation							
▪	1-	12	46.2	14	53.8	0.56	0.756
▪	5-	19	50.0	19	50.0		
▪	10-18	20	55.6	16	44.4		
Experience ( years) working in ICUs							
▪	1-	18	50.0	18	50.0	0.98	0.611
▪	5-	20	57.1	15	42.9		
▪	10-18	13	44.8	16	55.2		
Training							
▪	Yes	30	49.2	31	50.8	0.21	0.649
▪	No	21	53.8	18	46.2		
Time of training							
▪	Before working in ICU	3	27.3	8	72.7	2.6	0.108
▪	During working in ICU	27	54.0	23	46.0		
Useful training							
▪	Yes	28	47.5	31	52.5	-	0.247 <sup>!</sup>
▪	No	2	100	0	0.0		

\* P &lt; 0.05 significant

! P value based on Fisher exact probability

<sup>^</sup> P value based on Mont Carlo exact probability

**Table 8: Relation between nurses' level of practice during feeding administration and their socio demographic characteristics (N= 100)**

Socio demographic data	Practice during tube feeding				X <sup>2</sup>	P	
	Unsatisfactory		Satisfactory				
	No	%	No	%			
<b>Unit:</b>						2.6	0.629 <sup>^</sup>
▪ ER anaesthesia	37	61.7	23	38.3			
▪ Chest ICU	2	66.7	1	33.3			
▪ Nuro ICU	8	80.0	2	20.0			
▪ Internal medicine ICU	11	61.1	7	38.9			
▪ New ICU	4	44.4	5	55.6			
<b>Age:</b>						10.4	<b>0.006*</b>
▪ 20-	25	52.1	23	47.9			
▪ 25-	31	81.6	7	18.4			
▪ 30-37	6	42.9	8	57.1			
<b>Marital status:</b>						1.8	0.412 <sup>^</sup>
▪ Single	18	60.0	12	40.0			
▪ Married	44	63.8	25	36.2			
▪ Widowed	0	0.0	1	100			
<b>Qualification:</b>						3.3	0.194
▪ Diploma degree	45	68.2	21	31.8			
▪ Associate degree	11	52.4	10	47.6			
▪ Bachelor degree	6	46.2	7	53.8			
<b>Work duration(years) from graduation:</b>						6.1	0.047*
▪ 1-	11	42.3	15	57.7			
▪ 5-	25	65.8	13	34.2			
▪ 10-18	26	72.2	10	27.8			
<b>Experience (years) working in ICUs:</b>						3.4	0.179
▪ 1-	18	50.0	18	50.0			
▪ 5-	24	68.6	11	31.4			
▪ 10-18	20	69.0	9	31.0			
<b>Training:</b>						0.006	0.939
▪ Yes	38	62.3	23	37.7			
▪ No	24	61.5	15	38.5			
<b>Time of training:</b>						-	0.919 <sup>!</sup>
▪ Before working in ICU	7	63.6	4	36.4			
▪ During working in ICU	31	62.0	19	38.0			
<b>Useful training</b>						-	0.336 <sup>!</sup>
▪ Yes	36	61.0	23	39.0			
▪ No	2	100	0	0.0			

\* P &lt; 0.05 significant

! P value based on Fisher exact probability

<sup>^</sup> P value based on Mont Carlo exact probability

**Table 9: Correlation co efficient between total nurses' level of knowledge and their level of practice regarding nasogastric tube insertion and feeding administration (N= 100)**

Items	Items					
	Overall intubation knowledge		Overall tube insertion practice		Overall feeding knowledge	
	r	P	r	P	r	P
▪ Overall intubation knowledge	1					
▪ Overall tube insertion practice	-0.42	0.000*	1			
▪ Overall feeding knowledge	0.56	0.000*	-0.40	0.000*	1	
▪ Overall feeding practice	0.51	0.000*	-0.28	0.005*	0.76	0.000*

*r*: correlation co efficient

\*  $P < 0.05$  (significant)

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