

The Effect of Training Intervention on Nurses' Performance in Execution of Drug and Food Delivery via Nasogastric Tube

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ABSTRACT

Introduction: The safety of a patient who receives nutritional support by tube feeding depends on nursing care and proper implementation of method and detection by the nurse in case of potential damage threatening the patient. Serious and fatal complications can occur if these considerations are not enacted correctly.

Aim: The study was conducted to determine the effect of training intervention on nurses' performance in execution of drug and food orders using a Nasogastric Tube (NGT).

Materials and Methods: The present quasi-experimental study was carried out with experimental and control groups by observing 240 cases of executing drug and food orders. The sample consisted of 60 nurses (30 in each group). The experimental group was divided into three groups containing

10 nurses each. Training session of about one and a half-hour was held for each of the three groups. Nurse's performance was observed by the researchers using an active participation method. Then, data were analysed using SPSS version 21.0 with descriptive (mean and standard deviation) and analytical (independent t-test) statistical tests.

Results: Findings showed that there was no statistically significant difference among the nurses' performances before intervention. Training implementation improved the performance level of nurses in the experimental group from 10.05 ± 1.47 before intervention to 13.40 ± 1.94 after intervention ($p=0.01$).

Conclusion: With respect to the effectiveness of training intervention based on training in small groups, implementation of this intervention is recommended to improve the performance of nurses.

Keywords: Education, Gastric feeding tube, Nursing care, Nutritional support, Patient

INTRODUCTION

Nutrition is an essential component of health and is essential for survival, normal growth and development, maintaining and repairing tissue, cellular metabolism, organ function, energy, and maintaining body temperature. When the patient is not able to feed orally, the best method is the enteral method or tube feeding in which nutrients are administered through a tube [1].

When the swallowing ability of a patient is not efficient, nurses use an enteral feeding tube to give nutrients to the patient [2-4]. This method has been considered very safe for giving food and medicine to patients who have swallowing disability and, when the patient is at risk for aspiration, this method is one of the best methods to give food to the patient [5]. Provision of food and medication through tubes require certain skills such as correct medicine preparation, tube flushing, and evaluation of potential drug side effects [6], for which nurses should be trained.

Proper drug administration using feeding tubes requires knowledge of the various forms of existing drugs in the market, the possibility of using drugs via feeding tubes or lack of thereof, and correct use of related techniques. Some forms of the drug can be crushed and administered through a feeding tube [7], but crushed tablets are a common cause of feeding tube obstruction that causes blockage in 8.3% of cases [8-10]. On the other hand, potential drug interactions or drug and food interactions can harm the patient. Therefore, healthcare teams should be aware and continuously assess possible interactions between medicines and nutrients [11]. Some studies have shown that nurses had different knowledge and skills regarding NGT feeding [12-14].

Considering the large number of patients who need NGT, one of the important responsibilities of nurse is administering drugs and taking care of the tube [5]. Thus, foundational knowledge must be provided to nurses through training. One of the methods to increase knowledge and improve skills is training. Training in small groups is an

effective method of training along with critical thinking and problem solving [15]. Training in small groups is deliberate and systematic dialogue by a limited number of individuals with interpersonal relations and common goals [16]. This training method provides an opportunity for individuals to discuss their ideas and experiences about common issues, and trainees have many opportunities to think, analyse, and evaluate new knowledge and solve clinical problems, which can increase their critical thinking [17,18].

The present research was carried out with the objective of determining the effect of training in small groups of nurses on their performance in execution of drug and food orders using NGT with respect to the importance of nutrition through NGT.

MATERIALS AND METHODS

This quasi-experimental study was carried out with experimental and control groups by observing 240 cases of executing drug and food orders. The sample consisted of 60 nurses (30 in each group) in Ilam, Iran. This study was conducted from April 2015 to October 2015. The behaviour of each nurse in provision of food and drugs through NGT was observed four times (two times before intervention and two times after intervention) and during different shifts (morning, afternoon, and evening). The inclusion criterion was having a bachelor's or master's degree, and exclusion criteria were having experience in pharmaceutical and nutrition executive management training courses through NGT in the last six months and desire to withdraw from the study.

Data gathering tools consisted of a questionnaire related to demographic characteristics of participants including age, gender, work shift, employment status, and a second part consisted of the NGT checklist [Appendix-1]. The checklist consisted of 18 questions, and each question was given a score based on responses of Yes (one) or No (zero); the maximum score was 18, and the minimum was zero.

For evaluation, the performance of nurses was divided into three categories: excellent (13-18), medium (7-12), and weak (0-6). These items measure the process of medication and food administration by nurses from beginning to end. This checklist was created by the researchers and prepared using library information such as reference books and checklists related to nursing services of the Nursing Organisation of Iran. The content validity of the checklist was determined using opinions of 10 nursing professors with the Content Validity Index (CVI 0.98), and its reliability was determined using test-retest among 10 nurses by observing their drug provision process ($r=0.94$). These 10 nurses were included in the other 60 nurses.

The researchers observed the performance of nurses in all shifts (morning, afternoon, and evening) during the week. Before observations, it was explained to the nurses that their performance would be analysed in total and that the researchers would avoid disclosing their names, wards, or hospitals. Observing the performance of a nurse required 10 to 60 minutes depending on the type of drug, food, and intended ward. The researchers would only record any mistake made by nurses in feeding tube method, and no intervention was carried out at the time of feeding through NGT. Before intervention sessions, researchers attempted to reduce the sensitivity of nurses to their presence by being present in the ward in the preceding days.

Nurses were divided into experimental and control groups after observations. Then, the experimental group was divided into three small groups containing 10 individuals, and training was provided in 4 sessions for each group in a total of 12 sessions; the sessions were held weekly. The control group did not receive any training. Training sessions lasted between half an hour and one hour. During the session, the nurses presented their beliefs and experiences while listening to and thinking about the subject. A researcher played the role of team leader while providing the training and presented his opinions. Contents were summarised at the end of each session, and the title of the next session was determined. Training about recognition of a variety of pharmaceutical forms, preparation of drugs for gavage, washing feeding tubes in case of necessity, and common interactions between foods and medicine were provided in the training sessions [14].

The checklist was completed again by researchers through observation after one month, and the behaviour of each nurse in provision of food and drugs through the NGT was observed twice by two researchers.

STATISTICAL ANALYSIS

Data were analysed using SPSS version 21.0 and descriptive (mean and standard deviation) and analytical (independent t-test) statistical tests.

Data were subjected to statistical analysis using mean, standard error and Student t-test etc., p -value <0.05 was accepted as significant.

RESULTS

The behaviour of 60 nurses in two groups: control ($n=30$) and experiment ($n=30$) were observed a total of 240 times (120 times before intervention and 120 times after). Findings showed that there was no statistically significant difference between demographic characteristics of experimental and control groups [Table/Fig-1].

According to the checklist scoring, nurses' performance scores were considered excellent (13-18), medium (7-12), and weak (0-6). The [Table/Fig-2] shows, scores of nurses' performance in experimental (10.05 ± 1.47) and control (10.60 ± 1.35) groups were medium before intervention. After intervention, scores of nurse's performance in the control group (10.71 ± 1.20) remained medium, but they reached the excellent level in the experimental group (13.40 ± 1.94). There was

no statistically significant difference between performance scores of experimental and control groups before intervention ($p=0.86$), but those of the experimental group significantly increased after the intervention ($p=0.01$).

Variables	Experimental n (%)	Control n (%)	p-value
Gender			
Female	19 (63.3)	18 (60)	0.6
Male	11 (36.7)	12 (40)	
Level of education			
Undergraduate	22 (73.3)	24 (80)	0.23
State of employment			
Obligated	6 (20)	7 (23.3)	0.95
Contracted	9 (30)	9 (30)	
Subcontracted	3 (10)	3 (10)	
Planned human resource	12 (40)	11 (36.7)	
Work time			
Morning	12 (40)	12 (40)	0.78
Evening	13 (43.34)	12 (40)	
Night	5 (16.66)	6 (20)	
Age (years)	27.37 (3.90)	28.10 (4.02)	0.36
Work experience (years)	4.17 (1.68)	3.90 (1.90)	0.11

[Table/Fig-1]: Demographic characteristics of research samples.

Outcome measure	Group	Before		After	
		Mean (SD)	p-value	Mean (SD)	p-value
Scores of performance	Experimental	10.05 (1.47)	0.86	13.40 (1.94)	0.01
	Control	10.60 (1.35)		10.71 (1.20)	

[Table/Fig-2]: Comparison of the experimental and control groups before and after intervention.

*The significant p-value cut-off is $p=0.05$

DISCUSSION

The findings of this study showed that performance scores of nurses in the field of nutrition through NGT was at a medium level. The reasons for this can be lack of involvement of pharmacists in clinical rounds [19,20], inadequate knowledge of nurses in the field of nutrition using NGTs [3], workload of nurses, high rate of patients under care [21,22], lack of interaction and collaboration between physicians and nurses [14].

In both control and experimental groups, nurses' performance was moderate. Poor knowledge, need for retraining, or weak skills can affect nurses' performance. A study by Marshall AP and West SH, revealed that nurses play a major role in appropriate management of NGT, but there were different nursing skills, and knowledge was insufficient in relation to the type of feeding [12]. In a study by Zhu LL et al., 60% of the nurses did not have enough knowledge about dosage forms; 30% did not have enough knowledge about the possibility of crushing or opening the drugs, and 80% got all prescription drugs to patients via NGT at the same time with the same syringe [13]. Hazrati-Marangloo A et al., showed that nurses' knowledge about nasogastric feeding was poor and that most nurses did not have appropriate performance [14]. Dashti-Khavidaki S et al., showed that more than 50% of the nurses did not have enough knowledge about oral dosage forms and implementation of drug orders regarding feeding tubes [7].

In the present study, training intervention improved the performance of nurses in the experimental group from moderate to excellent, this result is consistent with those of previous studies. In the study of Hazrati-Marangloo A et al., knowledge and performance of the intervention group changed optimally after education so that 97.1% of the nurses were promoted to a good level [14]. The study of Van

den Bemt P et al., examined the impact of a multidisciplinary program on reducing errors in medication orders by using NGT. Educational intervention included setting up a database for oral dosage forms, the precise job training for nurses, day visit by pharmacy technician, and labelling drugs with a "Don't crush" image. The results of this study showed that the educational program led to a significant reduction in tube feeding obstruction, and medication errors as reported by each nurse [6]. In the study by Dashti-Khavidaki S et al., implementing an educational program increased nurse's knowledge about food and drug orders and interactions [7].

Results of the present study indicated that the training intervention improved nursing performance but cannot resolve all errors in medication orders for food and drugs. In the study by Hazrati-Marangloo A et al., some checklist items did not change before and after the training program. One of the causes that can be mentioned is the prescription of solid drugs in medical orders. Nurses are not involved with the prescription of drugs; it is the primary responsibility of the physician [14].

LIMITATION

The sample size was small and recruited from a hospital in a small city; hence, the findings could not be generalised to all treatment centers.

CONCLUSION

Training intervention could improve nurses' performance regarding NGT feeding. Thus, it can be appropriate and useful in improving the quality of care for the patients. It is recommended to consider training interventions as effective, convenient, and cheap in all nursing care.

REFERENCES

- [1] Brunner LS, Suddarth DS, O'Connell Smeltzer SC. Brunner and Suddarth's textbook of medical-surgical nursing. 11th ed. Philadelphia, PA: Lippincott Williams and Wilkins, 2010.
- [2] Linjakumpu T, Hartikainen S, Klaukka T, Veijola J, Kivelä SL, Isoaho R. Use of medications and polypharmacy are increasing among the elderly. *Journal of Clinical Epidemiology*. 2002;55(8):809-17.
- [3] Mota MLS, Barbosa IV, Studart RMB, Melo EM, Lima FET, Mariano FA. Evaluation of intensivist-nurses knowledge concerning medication administration through nasogastric and enteral tubes. *Revista Latino-Americana De Enfermagem*. 2010;18(5):888-94.
- [4] Phillips NM, Endacott R. Medication administration via enteral tubes: a survey of nurses' practices. *Journal of Advanced Nursing*. 2011;67(12):2586-92.
- [5] Heydrich J, Heineck I, Bueno D. Observation of preparation and administration of drugs by nursing assistants in patients with enteral feeding tube. *Brazilian Journal of Pharmaceutical Sciences*. 2009;45(1):117-20.
- [6] Van den Bemt P, Cusell M, Overbeeke P, Trommelen M, Van Dooren D, Ophorst W, et al. Quality improvement of oral medication administration in patients with enteral feeding tubes. *Quality and Safety in Health Care*. 2006;15(1):44-47.
- [7] Dashti-Khavidaki S, Badri S, Eftekhazadeh SZ, Keshkar A, Khalili H. The role of clinical pharmacist to improve medication administration through enteral feeding tubes by nurses. *International Journal of Clinical Pharmacy*. 2012;34(5):757-64.
- [8] Seifert CF, Johnston BA. A nationwide survey of long-term care facilities to determine the characteristics of medication administration through enteral feeding catheters. *Nutrition in Clinical Practice*. 2005;20(3):354-62.
- [9] Belknap DC, Seifert C, Petermann M. Administration of medications through enteral feeding catheters. *American Journal of Critical Care*. 1997;6(5):382-92.
- [10] Matsuba CS, De Gutiérrez MG, Whitaker IY. Development and evaluation of standardized protocol to prevent nasoenteral tube obstruction in cardiac patients requiring enteral nutrition with restricted fluid volumes. *Journal of Clinical Nursing*. 2007;16(10):1872-77.
- [11] Williams NT. Medication administration through enteral feeding tubes. *American Journal of Health-System Pharmacy*. 2008;65(24):2347-57.
- [12] Marshall AP, West SH. Enteral feeding in the critically ill: are nursing practices contributing to hypocaloric feeding? *Intensive and Critical Care Nursing*. 2006;22(2):95-105.
- [13] Zhu LL, Xu LC, Wang HQ, Jin JF, Wang HF, Zhou Q. Appropriateness of administration of nasogastric medication and preliminary intervention. *Therapeutics & Clinical Risk Management*. 2012;(8):393-401.
- [14] Hazrati-Marangloo A, Radfar M, Mohammadpour Y, Sheikhi N. The effectiveness of small group teaching on the nurses' performance of food-drug administration through enteral feeding tube in intensive care unit patients hospitalized in Imam Khomeini hospital in 2014. *Journal of Urmia Nursing and Midwifery Faculty*. 2016;14(2):128-35.
- [15] Safari M, Salsali M, Ghofranipour F. The effect of nurse's education with method group discussion on the quality of nursing care in patients with myocardial infarction. *Annals of Military and Health Sciences Research*. 2004;2(4):437-41.
- [16] Fischer RL, Jacobs SL, Herbert WN. Small-group discussion versus lecture format for third-year students in obstetrics and gynecology. *Obstetrics and Gynecology*. 2004;104(2):349-53.
- [17] Sanasuttipun W, Tungjairob V, Musiksukont S, Lerthamatawe W, Chanwatana B. Effectiveness of small group discussion on critical thinking, self directed learning, and learning satisfaction of Thai nursing students. *J Nurs Sci*. 2009;27(3):8-16.
- [18] Guenter P. Safe practices for enteral nutrition in critically ill patients. *Critical Care Nursing Clinics of North America*. 2010;22(2):197-208.
- [19] Emami S, Hamishehkar H, Mahmoodpoor A, Mashayekhi S, Asgharian P. Errors of oral medication administration in a patient with enteral feeding tube. *Journal of Research In Pharmacy Practice*. 2012;1(1):37.
- [20] Leape LL, Cullen DJ, Clapp MD, Burdick E, Demonaco HJ, Erickson JI, et al. Pharmacist participation on physician rounds and adverse drug events in the intensive care unit. *JAMA*. 1999;282(3):267-70.
- [21] Bizhani M, Kouhpayeh SA, Abadi R, Tavacool Z. Effective factors on the Incidence of medication errors from the nursing staff perspective in various department of Fasa Hospital. *Journal of Fasa University of Medical Sciences*. 2013;3(1):88-93.
- [22] Boogar R. Role of workload, sleep, mental health and individual factors in occurrence of nursing errors. *Journal of Gorgan University of Medical Sciences*. 2013;15(3):103-09.

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APPENDIX I

Checklist of nurse's performance in NGT feeding			
Serial No.	Items	Yes	No
1.	He/she washes his/her hands before starting the feeding.		
2.	He/she tightens the tube to the patient's nose with a piece of tape to prevent displacement.		
3.	He/she puts the patient in fowler's or semi-fowler's position.		
4.	He/she ensures the NGT stays in the correct location.		
5.	He/she controls food temperature.		
6.	He/she closes the NGT by pressing his/her finger before attaching the syringe to the tube to prevent entry of air to stomach.		
7.	He/she gavages 30 mL water before food or drug gavage.		
8.	He/she clamps the tube and attaches the tip of the syringe containing food materials to the NGT.		
9.	He/she holds the syringe upright so the food will enter the stomach by gravity.		
10.	He/she inserts food gently into the NGT.		
11.	He/she gavages 50 mL of water after food or drug gavage to wash the NGT.		
12.	He/she puts the patient in semi-fowler's position for at least half an hour.		
13.	He/she stops the gavage and calls the doctor if the patient doesn't tolerate the gavage.		
14.	He/she measures and records amount, time of gavage, and intolerance of the patient.		
15.	He/she avoids drug wastage while crushing.		
16.	He/she washes the mortar after each application.		
17.	He/she cares for the mouth routinely.		
18.	He/she records the patient's response during all stages of gavage.		