



Prospective Cross-Sectional Questionnaire-Based Survey on Nursing Care for Preoperative Fasting

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Objective: To investigate the level of preoperative fasting knowledge among nursing personnel at a tertiary referral center, the authors designed a questionnaire according to the preoperative fasting guidelines published by the American Society of Anesthesiology in 2017.

Methods: We adopted a cross-sectional, prospective consensual-sampling study design with questionnaires administered to nurses at a tertiary referral center in southern Taiwan. The questionnaires comprised 15 items regarding preoperative fasting knowledge, with higher scores indicating a better understanding of preoperative fasting.

Results: Analysis of 321 valid questionnaires between January and June 2019 showed that clinical nursing staff with university education (5.89 ± 2.57) had a higher average score than those without (4.83 ± 2.13) ($p < 0.005$). Besides, those with working experience over 10 years (6.34 ± 2.74) showed a higher score than those with a shorter experience (5.46 ± 2.40 , $p < 0.01$). Furthermore, anesthesia nursing staff (7.36 ± 2.69) demonstrated a higher score than that of nurses from other units (5.09 ± 2.17 , $p < 0.001$). On the other hand, no significant difference in the mean score was noted between nurses who previously attended courses related to fasting and health education and those who did not.

Conclusion: The results of the current study identified several factors that were significantly associated with a better knowledge of preoperative fasting, suggesting the need for enhancing the concept of preoperative fasting among other nursing staff to improve the overall quality of surgical patient care.

Key words: preoperative fasting, preoperative preparation, in-service education

Introduction

In 1999, the American Society of Anesthesiologists (ASA) published a set of guidelines on fasting before surgery to enhance the qual-

ity and efficiency of anesthetic care, reduce the incidence of aspiration pneumonia, increase patient satisfaction, prevent surgery delays and cancellations as well as reduce the risk of dehydration and hypoglycemia due to excessive fasting.¹ Prolonged fasting before surgery may

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increase the risk of hemodynamic instability during surgery and discomfort before surgery, such as thirst, hunger, and anxiety. This may affect patients' electrolyte balance after surgery. After fasting for 3 – 4 hours, infants and young children are likely to experience inconsolable crying which increases their oral and respiratory secretions that may contribute to respiratory complications after surgery.²

However, the fasting times and specifications at different medical and academic institutions are not always correct or consistent, thereby causing confusion among the patients.³ Studies have demonstrated that many clinical factors may lead to patients undergoing a final fasting period of 12 hours or longer. These include potential delays and changes in surgical scheduling, poor communication between the operating and preparation rooms as well as between the ward and front desk, patients receiving inconsistent fasting guidelines either verbally or in writing, and nursing staff having insufficient knowledge of preoperative fasting.⁴ However, many surgeons and anesthesiologists believe that 6 – 8 hours fast prior to surgery is warranted despite a large body of evidence to the contrary.

Caregivers should consistently update their knowledge regarding the latest evidential developments in clinical practice as well as effectiveness rates and safety of treatments.² Furthermore, nursing staff should provide information and appropriate guidance for patients to alleviate preoperative anxiety, reduce symptoms of physical discomfort, improve recovery of physical function after surgery, and minimize the occurrence of comorbidities. Nevertheless, despite the importance of clinical staff education,⁵ international studies have revealed that nursing staff commonly provide patients with insufficient presurgical fasting recommendations and little education about anesthesia and surgery according to presurgical fasting guidelines.⁶

The aim of this questionnaire-based study

was to explore the effects of basic personal information of nursing staff including education level, medical career seniority, nursing subspecialty, and past attendance of courses related to fasting, and health education before surgery on their knowledge of preoperative fasting.

Materials and Methods

Study design and participants

Between January and June, 2019, a cross-sectional study was designed to collect data through a structured questionnaire. The participants included those who were clinical nursing staff of the Department of Anesthesia and nurses of the Department of Surgery of a tertiary referral hospital. Personnel who were employed within three months before the study period were excluded. This study was reviewed and approved by the institutional Review Board of E-Da Hospital (IRB No. EMRP-107-124). All participants signed an informed consent before being enrolled in the study.

Study instrument and parameters

To determine the degree of knowledge of preoperative fasting among surgical personnel in Taiwan, the authors designed a questionnaire according to the ASA's 2017 preoperative fasting guidelines. The structured questionnaire was developed based on a review of the literature and was validated by three attending anesthesiologists, two senior specialist anesthesiologists, and two surgical specialists with respect to the relevance of the questionnaire content, the questionnaire's appropriateness, and the suitability of phrasing. The content included sociodemographic data as well as presurgical fasting-related items. The questionnaire comprised 15 items: 10 were multiple-choice questions and 5 were yes-no questions (Table 1). The associations of personal information including education level, medical career seniority, nursing subspecialty (anesthesia vs. non-anesthesia), and past attendance of courses

Table 1. Questionnaire content.

I. Multiple-choice items	
(1)	Clear liquid food recommendations state that transoral intake of clear liquid foods should be stopped a few hours before anesthesia; (1) 2 hours; (2) 4 hours; (3) 6 hours; (4) 8 hours.
(2)	Which of the following is not a clear liquid food? (1) pure water; (2) electrolyte drink; (3) milk tea; (4) black coffee.
(3)	Greasy food (e.g., fried foods, meats, and foods with high fat content) recommendations state that transoral intake of greasy foods should be stopped a few hours before anesthesia; (1) 2 hours; (2) 4 hours; (3) 6 hours; (4) 8 hours.
(4)	Nonhuman dairy product (fresh milk or soymilk) recommendations state that transoral intake of nonhuman dairy products should be stopped a few hours before anesthesia; (1) 2 hours; (2) 4 hours; (3) 6 hours; (4) 8 hours.
(5)	Breast milk recommendations state that transoral intake of breast milk should be stopped a few hours before anesthesia; (1) 2 hours; (2) 4 hours; (3) 6 hours; (4) 8 hours.
(6)	Prolonging the fasting period before surgery does not affect patient responses; (1) blood sugar drop; (2) headache; (3) body fluid electrolyte imbalance; (4) reduce the incidence of postoperative nausea and vomiting.
(7)	None of the following are high-risk ethnic groups for aspiration pneumonia; (1) emergency surgery; (2) bowel obstruction; (3) infant; (4) pregnant woman.
(8)	Which of the following comorbidities may present with prolonged fasting? (1) lipolysis results in an increase in free fatty acids in the blood; (2) muscle wasting due to protein dissimulation; (3) postoperative insulin resistance causes blood sugar to rise; (4) increased liver index due to gluconeogenesis.
(9)	If the patient becomes thirsty or hungry 3 hours before surgery, which of the following foods should you recommend to the patient? (1) hamburger; (2) electrolyte drink; (3) milk tea; (4) tell the patient to be patient.
(10)	Light meal recommendations state that transoral intake of light meals should be stopped a few hours before anesthesia; (1) 2 hours; (2) 4 hours; (3) 6 hours; (4) 8 hours.
II. Yes-no questions	
(1)	Numerous clinical studies have verified that fasting before performing surgery is effective in preventing aspiration pneumonia;
(2)	The adverse effects of prolonged fasting before surgery can be minimized through the administration of intravenous nutrition;
(3)	Prolonged fasting before surgery generally leads to hypoglycemia before surgery and hyperglycemia after surgery;
(4)	Routine administration of primperan antiemetic prior to surgery can effectively reduce the incidence of aspiration pneumonia;
(5)	Inhibition of gastric acid secretion through H2 blockers can reduce the severity of aspiration pneumonia after it occurs and should therefore be routinely administered.

related to fasting and health education before surgery with the degree of knowledge regarding preoperative fasting were evaluated.

Definitions

For the current study, clear liquid fluids referred to completely slag-free diet that only contains clear soup without residue, gas production, and stimulation of gastrointestinal motility. Light meals referred to those with reduced oil, sugar, and salt contents to avoid heavy flavors being cooked in the right way (e.g., bread or porridge), while greasy foods were defined as those with a high fat content (e.g., meats or those that are fried).

Each correct answer was given one point

and incorrect response was given 0 point, giving a maximum total score of 15 points. Higher scores indicated a better knowledge of fasting before surgery.

Statistical analysis

Statistical analyses were performed using SPSS statistical software (version 22.0). Values are presented as numbers and percentages. Average values are expressed as means with standard deviations. The significance of difference in education level, medical career seniority and nursing subspecialty were determined with independent t-tests. Logistic regression was conducted for elucidating the effect of the participants' prior attending courses related to

fasting and health education before surgery on their degree of knowledge about preoperative fasting.

Results

Eligible questionnaires for analysis

The participants anonymously completed the questionnaires after signing an informed consent form. Of a total of 325 questionnaires retrieved, four were deemed invalid because of incomplete information ($n = 4$). Finally, 321 questionnaires were considered eligible for the current study. Detailed information is provided in Table 2.

Correlation between past attendances of courses related to fasting and health education before surgery

The results of the questionnaire revealed that only 77 (24.0%) participants (average score: 6.08 ± 2.87) had attended courses related to fasting and health education before surgery. By comparison, 244 (76.0%) subjects who had not attended such courses had an average score of 5.57 ± 2.40 . However, there was no statistically significant difference between the two groups with respect to the proportion of their correct answers. The notably lower rate of correct answers than the norm indicated that clinical nursing staff maintained the traditional belief in the necessity of preoperative fasting for eight hours regardless of their prior attendance of related education courses.

Associations of education level, medical career seniority, and nursing subspecialty with knowledge of preoperative fasting

Regarding education level, most participants (263, 81.9%) had an education above the university level and their average questionnaire score was 5.89 ± 2.57 . In contrast, those with an education below the university level had a mean score of 4.83 ± 2.13 . Statistical analyses revealed a significantly higher score among

Table 2. Basic attributes of caregivers ($n = 321$).

Variable	n	%
Position		
Anesthesia caregiver	86	26.8
Non-anesthesia care provider	235	73.2
Education level		
Specialist or below	58	18
College or above	263	82
Working experience		
Less than a decade	236	74.8
Over a decade	81	25.2
Attended preoperative fasting course		
No	244	76
Yes	77	24

participants with an education at the university level than that in those with a lower education level ($p < 0.005$). Despite the low rate of correct answers in both groups, our finding suggested that clinical nursing staff with higher education levels had significantly better knowledge of fasting prior to surgery.

In respect of medical career seniority, the results revealed that the majority of participants ($n = 236$, 73.5%) had worked in the medical field for less than 10 years. Compared to the average score of those who had working experience in the medical field for more than 10 years (6.34 ± 2.74), the subjects with relevant experience of less than 10 years had a significantly lower average score (5.46 ± 2.40 , $p < 0.01$).

Focusing on nursing subspecialties, most subjects ($n = 235$, 73.2%) were non-anesthesia nursing staff. Our analysis demonstrated that their average questionnaire score (5.09 ± 2.17) was significantly lower than that of the anesthesia nursing staff (7.36 ± 2.69 , $p < 0.001$).

These results indicated that clinical caregivers responded correctly to less than half of the items regarding fasting policies and fasting time before surgery. The rate of correct answers was significantly higher in those with a higher education level, a higher seniority in their medical career, and among anesthesia nursing staff than in the general clinical nursing staff.

Discussion

In the present study, the preoperative fasting knowledge questionnaire was mostly designed according to the ASA (2017) guidelines for preoperative fasting, with higher scores indicating a higher number of correct answers. The subjects' mean score for preoperative fasting knowledge (5.69 ± 2.52) in the questionnaire was lower than the mean value (7.5 points) (Table 3), indicating that most of the included caregivers' knowledge regarding preoperative fasting was inadequate and incorrect. Similar results have been reported in international studies. Mohan et al.⁷ reported that although most nursing staff are aware of preoperative fasting guidelines and that anesthesiologists are concerned with the patient's preoperative fasting status, the nursing staff had little knowledge regarding preoperative fasting. One of the reasons for the failure of anesthetic nurses to follow ASA guidelines on preoperative fasting is their lack of relevant knowledge.¹

Our literature review showed no previous study focusing on the impact of characteristics of nursing staff on the degree of their preoperative fasting knowledge. In this study, a higher education level and medical career seniority as

well as the nursing subspecialty of anesthesia were associated with significantly higher mean scores. In the analysis, especially the proportion of nurses with at least a bachelor's degree in nursing and more experienced nurses⁸ was associated with higher professional levels.⁹ One possible explanation for the better average score among anesthesia nursing staff compared to that of nurses of other subspecialties may be the fact the preoperative fasting falls within the scope of anesthesia care. The lack of knowledge on preoperative fasting among non-anesthesia care providers may be improved by education through the implementation of onsite⁷ or on-line¹⁰ learning programs.

In-service training can also enhance caregivers' knowledge regarding preoperative fasting. The literature indicates that additional preoperative fasting education training can enhance understandings of preoperative fasting guidelines.¹¹ On-the-job education for caregivers is essential in several aspects, as demonstrated in a survey conducted by the Society of American Gastrointestinal Endoscopy and Endoscopic Surgeons (SAGES), which targeted enhanced recovery pathways. The survey revealed that 46.6% of surgeons viewed caregiver education as a barrier to the implementation of enhanced postsurgical resilience.¹² Clinical nursing staff must undergo 2

Table 3. Differences in nursing staff attributes and knowledge of fasting prior to surgery ($n = 321$).

Variable	Independent sample t-test			Logistic regression		
	n (%)	Mean \pm SD	<i>p</i> value	AOR	95% CI	<i>p</i> value
Attended preoperative fasting course						
Yes	77 (24.0)	6.08 \pm 2.87	0.127	1.377	0.70 – 2.72	0.357
No	244 (76.0)	5.57 \pm 2.40		Ref		
Education level						
Specialist or below	58 (18.1)	4.83 \pm 2.13	0.004**	Ref		
College or above	263 (81.9)	5.89 \pm 2.57		1.789	0.73 – 4.39	0.204
Working experience						
Less than 10 years	236 (73.5)	5.46 \pm 2.40	0.006**	Ref		
10 years or more	85 (26.5)	6.34 \pm 2.74		1.145	0.61 – 2.16	0.675
Nursing subspecialty						
Anesthesia caregiver	86 (26.8)	7.36 \pm 2.69	< 0.001**	7.486	3.99 – 14.05	< 0.001**
Non-anesthesia care provider	235 (73.2)	5.09 \pm 2.17		Ref		

** $p < 0.001$

to 4 years of education after completing their school-based learning to obtain nursing certification. Moreover, modern science and technology have led to new theories and knowledge with which all clinicians need to stay updated through continuing medical education. In-service training in the workplace can further improve nursing skills and service quality through actual practice.

In addition to updating knowledge regarding fasting prior to surgery, communication training among caregivers about giving instructions should be enhanced to prevent inconsistencies between oral and written guidelines.¹² Similar concerns regarding caregiver coordination were reported in a study exploring preoperative fasting in pediatric patients. In that study, of all the pediatric surgery patients who unnecessarily fasted for 120 minutes, up to 81% (n = 18) were due to ineffective coordination among ward nursing staff.⁴ One study noted that complete agreement rarely occurs between preoperative fasting guidelines, preoperative fasting reminders provided for the patients, and education for team members regarding treatment.⁸ That study highlighted that excessive fasting could be prevented through efficient communication regarding preoperative fasting not only between treatment teams but also between clinicians and patients or families.

Besides enhancing the knowledge of preoperative fasting among nursing staff, literature has shown the importance of delivering accurate instructions to patients or families not only to reinforce the relationship between clinicians and patients but also to prevent excessive fasting¹³ that could substantially impair the quality of surgical care.

Conclusion

The results of the current study showed that a higher level of education, a longer working experience, and the specialty of an-

esthesia were factors associated with a better knowledge of preoperative fasting, suggesting the need for enhancing the concept of preoperative fasting among other nursing populations to improve the overall quality of surgical patient care.

Author Contributions

Study Design, Ya-Ling Tsai and Chen-Fuh Lam; Data Collection, Ya-Ling Tsai; Statistical Analysis, Ya-Ling Tsai; Data Interpretation, Ya-Ling Tsai and Chen-Fuh Lam; Manuscript Preparation, Li-Ren Yeh, Hsiu-Jung Lin and Shu-Ching Chang; Literature Search, Ya-Ling Tsai. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki, and was approved by the Human Trial Committee of E-Da Medical Foundation E-Da Hospital to ensure the approval of the Ethics Committee of the subjects. IRB case number: EMRP-107-124 and January 7, 2019.

Informed Consent Statement

Written informed consent has been obtained from the patients to publish this paper.

Data Availability Statement

Not applicable.

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Conflicts of Interest

The authors declare no conflict of interest.

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