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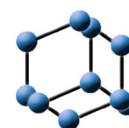
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RESEARCH ARTICLE

Knowledge, Attitudes, and Practices of Nurses and Anesthetic Technicians Regarding the Enhanced Recovery After Surgery (ERAS) Program

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Abstract:

Objectives:

The Enhanced Recovery After Surgery (ERAS) program is a multidisciplinary approach aimed at minimizing postoperative complications, shortening hospital stays, and improving clinical outcomes. The current study assesses the knowledge, attitudes, and practices (KAP) of nurses and anesthesia technicians regarding the ERAS program, which is essential for evaluating their understanding and readiness to implement the program, as well as identifying factors influencing the successful adoption of ERAS in clinical practice.

Methods:

The cross-sectional study involved nurses and anesthesia technicians with at least two months of experience at the University Medical Center in Ho Chi Minh City, Vietnam. A validated questionnaire assessed their KAP regarding the ERAS program. Data were collected *via* electronic surveys during ERAS group meetings and analyzed with Stata 16.0. The Wilcoxon and Kruskal-Wallis tests compared qualitative variables, while Spearman regression identified relationships between quantitative variables.

Results:

Among the 193 nurses and anesthesia technicians, knowledge and attitude scores towards the ERAS program were highly rated, with mean scores of 7.66 ± 1.46 and 40.10 ± 5.24, respectively. Their mean practice score was 6.51 ± 1.26. Age, work experience, and educational level significantly influenced the participant's knowledge, attitudes, and practices. Additionally, there was a positive correlation between attitude and practice ($p < 0.001$).

Conclusion:

This study shows that nurses and anesthesia technicians possess the knowledge and a positive attitude toward the ERAS program; however, their practices remain limited. These results highlight the importance of continuous training and professional development to enhance the effectiveness of ERAS implementation in clinical practice.

Keywords: Anesthetic technicians, Attitudes, Enhanced Recovery After Surgery, Knowledge, Nurse, Practices, Electronic surveys.

1. INTRODUCTION

A multidisciplinary strategy, the Enhanced Recovery After Surgery (ERAS) program aims to reduce postoperative complications, reduce hospital stays, and enhance clinical results [1 - 4]. A group of doctors in Northern Europe created it

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around the beginning of the 1990s [5]. ERAS has become a widespread solution in perioperative patient care. This program emphasizes the necessity of proactive interventions from the preoperative preparation stage through the recovery process, including measures such as minimizing the use of anesthesia, limiting fasting, appropriate pain management, and encouraging early eating and mobilization [6]. The safety of ERAS has been demonstrated by its low rate of adverse effects

without impacting hospital readmission or perioperative mortality [6]. Additionally, evidence showed that ERAS is associated with improved postoperative outcomes, including reduced hospital stays for lung and heart conditions following thoracic surgery [7, 8].

The implementation of ERAS necessitates close multidisciplinary collaboration, with the active participation of nurses and anesthesia technicians being particularly crucial [9]. Nurses and anesthesia technicians play a vital role by contributing to many elements, not only by providing basic care services but also by participating in comprehensive patient management [10]. Their tasks include counseling, health education, monitoring recovery progress, and adjusting care plans as needed. Nurses and anesthesia technicians are central to ensuring adherence to ERAS principles, making them one of the key factors determining the success of ERAS implementation in patients [11]. However, the KAP of nurses and anesthesia technicians regarding ERAS has not been comprehensively assessed. Several studies worldwide have indicated that nurses' and anesthesia technicians' knowledge and positive attitudes are crucial factors for the successful implementation of ERAS protocols [12 - 14].

Currently, limited research in Vietnam has assessed the KAP of nurses and anesthesia technicians regarding the ERAS program. Understanding their KAP can highlight areas for improvement in training and enhance patient care quality. This study aims to evaluate the knowledge, attitudes, and practices of nurses and anesthesia technicians at the University Medical Center Ho Chi Minh City (UMC HCMC) and to identify factors influencing variations in KAP.

The study proposes the following hypotheses: (1) Knowledge of the ERAS program varies by demographic and professional factors, such as age, years of experience, and educational background; (2) Attitudes toward ERAS are positively influenced by factors like professional experience and educational attainment, with those having more experience and higher qualifications exhibiting more favorable attitudes; and (3) ERAS practice levels are associated with both knowledge and attitudes, as well as factors like work experience and departmental role within the hospital.

2. MATERIALS AND METHODS

2.1. Study Setting and Participants

This cross-sectional study was conducted in preparation for the implementation of an ERAS program for lobectomy surgery. The study was carried out at the UMC in 2022. Participants were nurses and anesthesia technicians who had been working for at least two months and consented to participate in the study. The focus was on nurses and anesthesia technicians who are part of the ERAS program team for lung cancer surgery.

2.2. Data Collection Tools

A validated questionnaire was used to assess the knowledge, attitudes, and practices of nurses and anesthesia technicians regarding the ERAS program. The content validity of the questionnaire was confirmed with an I-CVI ranging from 0.8 to 1.0, an S-CVI from 0.99 to 1.0, Cohen's Kappa from 0.76 to 1.0, and internal consistency reliability with a Cronbach's Alpha coefficient of 0.81 for the entire scale. The questionnaire consisted of three sections: 12 questions on knowledge, 10 questions on attitudes, and 10 questions on practices [15].

2.3. Data Collection Methods

The survey was conducted during ERAS team meetings through the completion of an electronic survey form.

2.4. Variables

Personal characteristics collected included age, gender, department/unit, professional qualifications, years of service at the hospital, and job position. Knowledge scores were calculated by summing the scores of individual questions (each correct answer was equivalent to 1 point), with a total score range of 0 to 12. Attitude scores were calculated similarly, with a range from 0 to 50; practice scores ranged from 0 to 10.

2.5. Data Analysis

Data were collected and cleaned using Microsoft Excel 2019 and analyzed using Stata 16.0. Descriptive statistics included frequency and percentage for qualitative variables and mean, standard deviation, median, and interquartile range for quantitative variables. For outcome variables with non-normal distribution, the Wilcoxon and Kruskal-Wallis tests were used to evaluate associations with qualitative independent variables. Spearman regression was used to determine the relationship between two quantitative variables. Statistical significance was set at $p < 0.05$.

2.6. Ethical Considerations

Ethical approval was obtained from the university ethics committee. Informed consent was obtained from all participants, ensuring their anonymity and right to withdraw from the study at any time.

3. RESULTS

3.1. General Characteristics of the Study Participants

A total of 193 participants were included in the study, resulting in a high response rate of 96.5% from the 200 individuals invited. The majority of the participants were female (83.4%), with a mean age of 31.5 years, and most were in the 25-35 age group (59%). Instrument nurses and anesthesia technicians in the operating room accounted for similar proportions (28.5%-29.5%), while outpatient clinic nurses accounted for only 1.6%. The majority held a university degree (90.7%), and 42.5% had 5-10 years of experience. The primary role was clinical nurse (78.3%) Table **1**.

3.2. Knowledge, Attitudes, and Practices of Nurses and Anesthesia Technicians regarding the ERAS Program and Related Factors

The knowledge, attitudes, and practice scores of nurses and anesthesia technicians regarding the ERAS program are shown in Table **2**. The median scores for knowledge, attitudes, and practices were 8 (7-8), 41 (36-45), and 7 (6-7), respectively.

Table **3** presents the factors related to nurses' and

anesthesia technicians' knowledge and attitudes regarding the ERAS program. Statistically significant differences in knowledge and attitude scores were observed based on age groups. The under-25 age group had lower knowledge scores by 1 point (p = 0.040) and lower attitude scores by 3-4 points (p = 0.004) compared to other age groups. Work position and years of experience also showed significant differences, with outpatient clinic nurses having lower knowledge scores (p =

0.019) and the lowest attitude scores observed in thoracic surgery nurses (p < 0.001).

Table **4** shows factors related to nurses' and anesthesia technicians' ERAS practice scores (n = 193). Higher practice scores were recorded at the university level and above compared to the group below the university (p = 0.015). There was a strong positive correlation between attitude scores and practice scores of nurses (p < 0.001).

Table 1. The general characteristics of nurses participating in the study (n = 193).

Characteristics	Frequency	Percentage (%)
Gender		
Male	32	16.6
Female	161	83.4
Age (Mean ± SD)	31.5 ± 6.5	
Age group		
< 25	37	19.2
25-35	114	59.0
> 35	42	21.8
Unit/department		
Thoracic surgery department	22	11.4
Recovery room	56	29.0
Outpatient clinic	3	1.6
Operating room – Instrument nurse	57	29.5
Operating room – Anesthesia technician	55	28.5
Professional qualifications		
Vocational training	7	3.6
College	8	4.2
University	175	90.7
Postgraduate	3	1.5
Years of experience (Mean ± SD)	7.6 ± 5.8	
< 5 years	60	31.1
5-10 years	82	42.5
> 10 years	51	26.4
Job position		
Administrative nurse	24	12.4
Clinical nurse	151	78.3
Nursing team leader	18	9.3

Table 2. Knowledge, attitudes, and practices scores of nurses and anesthesia technicians regarding the ERAS program (n = 193).

Aspect	Mean ± SD	Median (IQR)
Knowledge	7.66 ± 1.46	8 (7-8)
Attitude	40.10 ± 5.24	41 (36-45)
Practice	6.51 ± 1.26	7 (6-7)

Table 3. Factors related to nurses's and anesthesia technicians's knowledge and attitudes regarding the ERAS program (n = 193).

Characteristics	Knowledge score (Median, IQR)	p-value	Attitude score (Median, IQR)	p-value
Gender				
Male	8 (6-8)	0.471[#]	42 (39.5-45.5)	0.066[#]

(Table 5) contd.....

Characteristics	Knowledge score (Median, IQR)	p-value	Attitude score (Median, IQR)	p-value
Female	8 (7-9)		40 (36-44)	
Age group				
< 25	7 (6-8)	**0.040**[##]	38 (35-42)	**0.004**[##]
25-35	8 (7-8)		41 (37-46)	
> 35	8 (8-9)		42 (38-46)	
Unit/department				
Thoracic surgery	8 (7-8)	**0.019**[##]	37.5 (34-41)	**< 0.001**[##]
Recovery room	8 (7-9)		40 (36-42.5)	
Outpatient clinic	5 (3-5)		38 (35-43)	
Operating room – instrument nurse	8 (8-8)		45 (42-46)	
Operating room – anesthesia technician	8 (6-8)		39 (36-42)	
Professional qualifications				
Vocational training, college	8 (6-8)	0.116[#]	46 (38-46)	0.058[#]
University/Postgraduate	8 (7-9)		41 (36-44)	
Years of experience				
< 5 years	7 (6-8)	**0.006**[##]	38 (35-42)	**< 0.001**[##]
5-10 years	8 (7-9)		42 (37-46)	
> 10 years	8 (7-9)		42 (37-46)	
Job position				
Administrative nurse	8 (6-9)	0.972[##]	38 (35-44)	0.457[##]
Clinical nurse	8 (7-9)		41 (37-45)	
Nursing team leader	8 (7-8)		41.5 (38-43)	

Wilcoxon test; ## Kruskal-Wallis test

Table 4. Factors related to nurses' and anesthesia technicians' ERAS practice scores (n = 193).

Characteristics	Practice score (Median, IQR)	p-value
Gender		
Male	7 (6-7)	0.285[#]
Female	7 (6-7)	
Age group		
< 25	7 (6-7)	0.789[##]
25-35	7 (6-7)	
> 35	7 (7-7)	
Unit/Department		
Thoracic surgery department	7 (7-7)	0.496[##]
Recovery room	7 (6-7)	
Outpatient clinic	6 (4-7)	
Operating room – Instrument nurse	7 (7-7)	
Operating room – Anesthesia technician	7 (6-7)	
Professional qualifications		
Vocational training/College	6 (5-7)	**0.015**[#]
University/Postgraduate	7 (7-7)	
Years of experience		
< 5 years	7 (6-7)	0.871[##]
5-10 years	7 (6-7)	
> 10 years	7 (7-7)	
Job position		
Administrative nurse	7 (7-7)	0.996[##]
Clinical nurse	7 (6-7)	
Head nurse	7 (7-7)	
Knowledge score	r = -0.038	0.600[a]
Attitude score	r = 0.98	**<0.001**[a]

Wilcoxon test; ## Kruskal-Wallis test; a Spearman's rank correlation test

4. DISCUSSION

Our study aimed to assess the knowledge, attitude, and practices (KAP) of nurses and anesthesia technicians regarding the Enhanced Recovery After Surgery (ERAS) program at the University Medical Center Ho Chi Minh City, Vietnam. The key findings indicated that the scores for knowledge, attitude, and practices were 8/12, 41/50, and 7/10, respectively. Additionally, our results revealed that age, work experience, education level, and workplace were factors influencing the KAP of nurses. Older nurses and those working in thoracic surgery or as scrub nurses had higher knowledge and attitude scores compared to their younger counterparts and those working in outpatient clinics. Furthermore, ERAS practices were better implemented by nurses with higher education levels and more positive attitudes.

4.1. General Characteristics of the Study Participants

We recruited 193 nurses and anesthesia technicians for our study, with a mean age of 31.5 ± 6.5 years. The majority (59%) were aged between 25 and 35 years. Notably, female participants predominated, accounting for 83.4% of the sample. Previous studies have reported similar age ranges, from approximately 22 to 58 years, with a significantly higher proportion of females compared to males [13, 14]. This indicates that the nurses and anesthesia technicians in our study are within the prime working age group, with 5-10 years of work experience being highly prevalent. Furthermore, the focus on female participants and suitable age groups may reflect the nursing profession's nature, predominantly involving women who frequently engage in healthcare activities. Education level was also a significant factor, with 90.7% of nurses holding a university degree. According to Ljungqvist et al. [1, 16], the success of ERAS depends heavily on the comprehensive knowledge and upbeat dispositions of healthcare personnel.

4.2. Mean Scores of Nurses' and Anesthesia Technicians' Knowledge and Attitudes toward the ERAS Program

The mean knowledge score of the nurses and anesthesia technicians was 7.66 ± 1.46, indicating a fairly good understanding of the ERAS program. Their attitude was also very positive, with a mean score of 40.10 ± 5.24. Regarding practice, the nurses and anesthesia technicians had a mean score of 6.51 ± 1.26, suggesting a moderate level of adherence to ERAS. Compared to the study by Nguyen Thi Hong Minh et al. [15], which reported a mean knowledge score of 9.02 ± 1.71, an attitude score of 40.42 ± 4.71, and a practice score of 6.92 ± 2.92, our results show a significant discrepancy in the knowledge aspect. This difference could be attributed to the characteristics of the study participants and their varying work experiences. The studies by Mithany [6], Ljungqvist [1], and Nelson [10] also assert that a positive attitude is crucial for nurses' willingness to accept and implement ERAS protocols in daily practice. Overall, although the knowledge and attitude scores are moderately positive, translating these into clinical practice faces many challenges due to barriers such as unfamiliarity with new protocols or lack of coordination and multidisciplinary collaboration [17]. Liu et al. [18] also demonstrated that nurses who had undergone standardized training in ERAS guidelines had higher KAP scores. Therefore, continuous training and support to ensure effective implementation of ERAS protocols by nurses and anesthesia technicians is crucial.

4.3. Factors Related to the Practice of the ERAS Program

Additionally, this study found a number of factors impacting the KAP of anesthesia technicians and nurses with reference to ERAS. Age, department, and years of experience significantly affected scores. Specifically, nurses and anesthesia technicians under 25 years of age had lower knowledge and attitude scores compared to other age groups ($p = 0.040$ and $p = 0.004$, respectively). Nurses working in outpatient clinics had the lowest knowledge and attitude scores ($p = 0.019$ and $p < 0.001$). Ljungqvist suggests that younger nurses or those working in outpatient clinics may have less exposure to surgical cases and postoperative procedures, thus having fewer opportunities to practice, leading to an incomplete understanding and attitude towards new medical protocols. Wu et al.'s study [19] also showed statistically significant differences in total KAP scores related to gender, years of work, technical title, job position, and training duration ($p < 0.05$). This aligns with our findings, emphasizing that years of work and job positions are associated with attitude scores.

Nonetheless, our study is more specific in identifying that nurses and anesthesia technicians under 25, with less than 5 years of experience, and those working in the surgical department have lower attitude scores. Along with that, nurses and anesthesia technicians with less than 5 years of experience had lower knowledge scores compared to those with $5 - 10$ years of experience ($p = 0.006$). A study on surgical nurses in abdominal surgery noted that knowledge of ERAS varied by gender, age, education level, years of work experience, years of specialized practice, ERAS training experience, surgical department, and type of hospital ($p < 0.05$) [20]. This highlights the importance of ongoing training and professional development throughout a nurse's and anesthesia technician's career, as emphasized in Aiken et al.'s study [21].

On the other hand, our study results demonstrate a strong positive correlation between attitude scores and practice scores among nurses and anesthesia technicians ($p < 0.001$). This indicates that those with more positive attitudes tend to perform ERAS skills and procedures more effectively. In contrast, Liu et al.'s study [18] found a weak yet statistically significant correlation between knowledge and attitude or between knowledge and practice. They did not observe a correlation between attitude and practice scores as we did, highlighting that factors influencing clinical practice among nurses and anesthesia technicians are complex. Despite high levels of knowledge, inappropriate attitudes can hinder the effective performance of clinical skills and fail to meet the required standards.

Despite the relatively high knowledge and attitude scores in this study, limited ERAS practices among nurses and anesthesia technicians could be attributed to constraints in training opportunities and resource availability. Without adequate access to hands-on training or institutional support,

the application of ERAS protocols may be inconsistent. Future efforts to strengthen ERAS practice adoption should address these barriers by enhancing training programs and ensuring sufficient resources are available, thus enabling healthcare providers to implement ERAS protocols in clinical settings [22] effectively.

In addition, establishing dedicated educational programs and forming ERAS-focused working groups could facilitate regular monitoring and continuous improvement of ERAS practices. These working groups would allow for ongoing evaluation, adjustment of protocols as needed, and support for healthcare staff in overcoming challenges, ensuring more consistent and effective ERAS implementation [10, 23].

4.4. Strengths and Limitations of the Study

Our current findings provide a crucial foundation for developing training programs and improving patient care processes at the UMC HCMC, Vietnam. A significant strength of this study is our identification of the level of understanding and readiness to implement ERAS guidelines, as well as the factors influencing the successful application of ERAS in clinical practice, based on a validated and highly reliable KAP assessment tool. Along with that, these results can be generalized to other hospitals within the Vietnamese healthcare system, particularly those with similar structures and scales. This study has several limitations. First, the cross-sectional design precludes establishing causal relationships between variables. Second, the use of self-assessment in measuring knowledge, attitudes, and practices may introduce information bias due to factors such as social desirability and potential lack of honesty from participants. Additionally, while the questionnaire method provided a convenient and standardized approach to assess practices, it lacked the objectivity that could be achieved through direct observation or practical checklists. As suggested, future studies would benefit from incorporating observational methods or retrospective analyses of clinical cases to obtain a more accurate measure of useful skills. These limitations should be taken into account when interpreting the results, and we hope to address them in subsequent research.

While this study gives a quantitative perspective on KAP, future research should consider incorporating open-ended questions or qualitative methodologies, such as interviews, to capture more nuanced findings. These approaches can help explore deeper factors influencing attitudes and practices, offering a richer understanding of healthcare providers' experiences with ERAS implementation.

CONCLUSION

Our study highlights the crucial role of nurses and anesthesia technicians in the successful implementation of the ERAS program. By addressing identified gaps in knowledge, attitudes, and practices, our findings can serve as scientific evidence for subsequent studies aimed at enhancing the overall effectiveness of ERAS protocols. This can lead to reduced complications, shorter hospital stays, and cost savings in treatment. Consequently, it results in better patient outcomes and more efficient healthcare delivery.

AUTHORS' CONTRIBUTIONS

It is hereby acknowledged that all authors have accepted responsibility for the manuscript's content and consented to its submission. They have meticulously reviewed all results and unanimously approved the final version of the manuscript.

LIST OF ABBREVIATIONS

ERAS	=	Enhanced Recovery After Surgery
KAP	=	Knowledge, Attitudes, and Practices
UMC	=	University Medical Center
HCMC	=	Ho Chi Minh City
SD	=	Standard Deviation
IQR	=	Interquartile Range

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the Ethics Committee in Biomedical Research of the University of Medicine and Pharmacy at Ho Chi Minh City on February 21st, 2022 (Approval number: 2294-DHYD).

HUMAN AND ANIMAL RIGHTS

All procedures performed in studies involving human participants were in accordance with the ethical standards of institutional and/or research committees and with the 1975 Declaration of Helsinki, as revised in 2013.

CONSENT FOR PUBLICATION

Informed consent was obtained from all participants, ensuring their anonymity and right to withdraw from the study at any time.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The raw data supporting the findings of this study are available upon reasonable request from the corresponding author [T.V].

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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REFERENCES

[1]   Ljungqvist O, Scott M, Fearon KC. Enhanced recovery after surgery. JAMA Surg 2017; 152(3): 292-8.
[http://dx.doi.org/10.1001/jamasurg.2016.4952] [PMID: 28097305]

[2]   Tat Bang H, Thu TTA, Nghia VH, Huyen TK, Thanh Vy T, Tap NV. Efficacy of enhanced recovery after surgery program for patients undergoing lobectomy for lung cancer: A scoping review and single-center initial result in Vietnam. Cureus 2023; 15(8): e44084.
[http://dx.doi.org/10.7759/cureus.44084] [PMID: 37753048]

[3]   Dimitropoulos K, Pisters LL, Papandreou CN, *et al.* The impact of enhanced recovery after surgery protocol implementation on postoperative pain management in the era of opioid crisis: The postchemotherapy open RPLND experience. Curr Cancer Drug Targets 2023; 23(11): 910-6.
[http://dx.doi.org/10.2174/1568009623666230426093255]   [PMID: 37170984]

[4]   Yang R, Tao W, Chen YY, Zhang BH, Tang JM, Zhong S, *et al.* Enhanced recovery after surgery programs versus traditional perioperative care in laparoscopic hepatectomy: A meta-analysis. Int J Surg 2016; 36: 274-82.
[http://dx.doi.org/10.1016/j.ijsu.2016.11.017]

[5]   Kehlet H. Multimodal approach to control postoperative pathophysiology and rehabilitation. Br J Anaesth 1997; 78(5): 606-17.
[http://dx.doi.org/10.1093/bja/78.5.606] [PMID: 9175983]

[6]   Mithany RH, Daniel N, Shahid MH, *et al.* Revolutionizing surgical care: The power of enhanced recovery after surgery (ERAS). Cureus 2023; 15(11): e48795.
[http://dx.doi.org/10.7759/cureus.48795] [PMID: 38024087]

[7]   Van Haren RM, Mehran RJ, Mena GE, *et al.* Enhanced recovery decreases pulmonary and cardiac complications after thoracotomy for lung cancer. Ann Thorac Surg 2018; 106(1): 272-9.
[http://dx.doi.org/10.1016/j.athoracsur.2018.01.088]   [PMID: 29530770]

[8]   Demir ZA, Marczin N. ERAS in cardiac surgery: Wishful thinking or reality. Turk J Anaesthesiol Reanim 2023; 51(5): 370-3.
[http://dx.doi.org/10.4274/TJAR.2023.231238] [PMID: 37876162]

[9]   Wainwright TW, Jakobsen DH, Kehlet H. The current and future role of nurses within enhanced recovery after surgery pathways. Br J Nurs 2022; 31(12): 656-9.
[http://dx.doi.org/10.12968/bjon.2022.31.12.656] [PMID: 35736850]

[10]   Nelson G. Nursing role central to successful implementation of enhanced recovery after surgery. Asia Pac J Oncol Nurs 2022; 9(7): 100112.
[http://dx.doi.org/10.1016/j.apjon.2022.100112] [PMID: 35937709]

[11]   Hübner M, Addor V, Slieker J, Griesser AC, Lécureux E, Blanc C, *et al.* The impact of an enhanced recovery pathway on nursing workload: A retrospective cohort study. Int J Surg 2015; 24: 45-50.
[http://dx.doi.org/10.1016/j.ijsu.2015.10.025]

[12]   Cohen R, Gooberman-Hill R. Staff experiences of enhanced recovery after surgery: Systematic review of qualitative studies. BMJ Open 2019; 9(2): e022259.
[http://dx.doi.org/10.1136/bmjopen-2018-022259] [PMID: 30760511]

[13]   Wu X, Liang X, Li Y, Zheng R. Development and testing of the knowledge–attitudes–practices questionnaire for nurses on the perioperative pulmonary rehabilitation of patients with lung cancer. Asia Pac J Oncol Nurs 2024; 11(4): 100387.
[http://dx.doi.org/10.1016/j.apjon.2024.100387] [PMID: 38495645]

[14]   Doruker NC, Oden TN, Korkmaz FD. Determination of knowledge and attitudes of cardiac surgery nurses regarding the enhanced recovery after surgery protocol. J Perianesth Nurs 2023; 38(5): 710-6.
[http://dx.doi.org/10.1016/j.jopan.2022.11.005]

[15]   Nguyen THM, Tran TTT, Tran TBT, Nguyen TBN, Nguyen TTH, Nguyen TAN, *et al.* Validity and reliability of nurses' knowledge, attitudes, and practices regarding enhanced recovery after surgery (ERAS) questionnaire. Vietnam J Med 2023; 527(1)

[16]   Ljungqvist O, Francis N, Urman R. Enhanced recovery after surgery a complete guide to optimizing outcomes: A complete guide to optimizing outcomes. In: Enhanced Recovery After Surgery. Springer 2020.

[17]   Kahokehr A, Sammour T, Zargar-Shoshtari K, Thompson L, Hill AG. Implementation of ERAS and how to overcome the barriers. Int J Surg 2009; 7(1): 16-9.
[http://dx.doi.org/10.1016/j.ijsu.2008.11.004]

[18]   Liu KX, Lv M, Liu XS, Wang HQ, Chen ZM, Xu HZ. Knowledge, attitudes and practices of enhanced recovery after surgery among paediatric surgical nurses in China: A Cross□Sectional study. Nurs Open 2023; 10(3): 1830-9.
[http://dx.doi.org/10.1002/nop2.1443] [PMID: 36314846]

[19]   Zhenzhen W, Rui Z, Yan C, Hongyan L. Current status and influencing factors of knowledge-attitudes-practice about pulmonary rehabilitation among respiratory nurses in tertiary medical institution of Ningxia. J Ningxia Med Univ 2021; 43: 423-8.

[20]   Xue B, Yu H, Luo X. Knowledge of enhanced recovery after surgery and influencing factors among abdominal surgical nurses: A multi-center cross-sectional study. Contemp Nurse 2022; 58(4): 330-42.
[http://dx.doi.org/10.1080/10376178.2022.2112723]   [PMID: 35965486]

[21]   Aiken LH, Sloane DM, Bruyneel L, *et al.* Nurse staffing and education and hospital mortality in nine European countries: A retrospective observational study. Lancet 2014; 383(9931): 1824-30.
[http://dx.doi.org/10.1016/S0140-6736(13)62631-8]   [PMID: 24581683]

[22]   Francis NK, Walker T, Carter F, *et al.* Consensus on training and implementation of enhanced recovery after surgery: A delphi study. World J Surg 2018; 42(7): 1919-28.
[http://dx.doi.org/10.1007/s00268-017-4436-2] [PMID: 29302724]

[23]   Salenger R, Morton-Bailey V, Grant M, Gregory A, Williams JB, Engelman DT. Cardiac enhanced recovery after surgery: A guide to team building and successful implementation. Semin Thorac Cardiovasc Surg 2020; 32(2): 187-96.
[http://dx.doi.org/10.1053/j.semtcvs.2020.02.029] [PMID: 32120008]