Current Status and Influencing Factors of Nursing Interns' Knowledge, Attitudes, and Practices toward Enhanced Recovery after Surgery

Xin Li[1,a], Yongmei He[1,b,*]

[1]School of Nursing, XiangNan University, 889 Chenzhou Avenue, Chenzhou, China
[a]3129645907@qq.com, [b]hlxyhym@163.com
*Corresponding author

Abstract: To investigate the current status of knowledge, attitudes, and practices regarding the Enhanced Recovery After Surgery (ERAS) among nursing interns and identify its influencing factors. A convenience sampling method was used to select 358 nursing interns from a tertiary hospital in Hunan Province from January to February 2024. The ERAS Knowledge, Attitudes, and Practices Survey Scale was employed to collect data. Multivariate linear regression analysis was conducted to determine the factors influencing these aspects among the nursing interns. The total score of the ERAS Knowledge, Attitudes, and Practices Survey Scale was 99.91 ± 23.056, with sub-scores of 37.6 ± 11.321 for the knowledge dimension, 34.61 ± 9.756 for the attitude dimension, and 27.69 ± 6.496 for the practice dimension. Multivariate linear regression analysis indicated that internship duration, level of education, voluntary choice of the nursing profession, ERAS training experience, and level of ERAS knowledge were significant factors affecting the scores of knowledge, attitudes, and practices among the nursing interns ($P<0.05$). The overall level of ERAS-related knowledge, attitudes, and practices among nursing interns is moderate. It is recommended that the hospital actively provide specialized ERAS training and develop an efficient training platform to enhance the interns' knowledge, attitudes, and practices regarding ERAS.

1. Introduction

Clinical internships are a crucial component of nursing education, serving as an essential process for translating theoretical knowledge into practical skills. They are a key step in training nursing interns to become competent nurses [1]. Enhanced Recovery After Surgery (ERAS) is widely applied in the surgical field and is based on evidence-based medicine. ERAS aims to improve the psychological and physiological well-being of perioperative patients, minimizing stress responses through a multidisciplinary approach involving surgery, nutrition, and nursing. It continuously optimizes perioperative clinical pathways to prevent severe stress reactions and complications, thereby enhancing treatment efficiency and accelerating patient recovery [2-3].

Currently, research on ERAS in the clinical surgical field primarily focuses on case studies and clinical practice surveys, with limited investigations into the knowledge, attitudes, and practices (KAP) of nursing staff concerning ERAS. Specifically, there is a paucity of research on nursing interns' understanding of ERAS [4]. Additionally, some nurses in clinical settings lack adequate knowledge, attitudes, and behaviors concerning ERAS, and certain clinical staff and departments have not yet reached the technical proficiency required for implementing ERAS. Furthermore, some ERAS measures still lack supporting medical evidence, which hinders the clinical promotion of ERAS and leaves nursing interns with limited knowledge about it [5]. Research has shown that nursing staff with a good understanding of ERAS KAP play a crucial role in the successful implementation of ERAS in clinical settings and in promoting disease recovery [6]. This study investigates the current status of nursing interns' knowledge, beliefs, and practices regarding the ERAS concept at a comprehensive hospital in Hunan Province and thoroughly analyzes the factors influencing these aspects. The aim is to provide scientific evidence and practical references for targeted training and education in the future to improve nursing interns' understanding of ERAS.

2. Literature review

Surgical treatment is an important clinical method for precisely removing pathological tissues and repairing affected areas, effectively eliminating the source of discomfort in a short time and achieving disease treatment. However, the psychological and physiological impact of surgery often requires patients to undergo prolonged postoperative rehabilitation, preventing them from quickly returning to their preoperative state. As surgical concepts and techniques have diversified, many clinical practitioners have focused on improving factors that delay patient recovery, aiming to reduce postoperative rehabilitation time and enhance recovery outcomes. Following extensive clinical validation, these optimization measures have been continually refined, forming a comprehensive theoretical framework that has been broadly applied [7].

In 1994, the Engelman team optimized various perioperative elements, proposing the concept of Fast-track Surgery (FTS) [8]. Their data showed that these optimized measures reduced the intensive care unit stay by about 20% for coronary artery bypass patients. Simultaneously, Professor Henrik Kehlet included patients undergoing colon resection in a trial involving multimodal perioperative management, reducing the postoperative hospital stay from an extended period to just two days and significantly lowering the incidence of postoperative complications [9-10]. This marked a significant breakthrough in the surgical field and laid the foundation for the development of ERAS.

In 2001, Henrik Kehlet introduced the ERAS concept to replace FTS, emphasizing the importance of minimizing patient stress and enhancing postoperative recovery rather than focusing solely on shortening hospital stay [11]. In 2005, Europe released its first ERAS management guidelines for colon surgery [12], which have been continually revised, expanded, and applied to other diseases. With its unique advantages, the ERAS concept has gained recognition among medical professionals familiar with it, and more departments are adopting this concept over traditional management models. In 2007, China began promoting the ERAS concept [13], and it has gradually spread across multiple hospitals. Expert consensus and guidelines have been issued in several surgical fields, providing strong guidance for ERAS implementation in China [14]. The ERAS concept has been widely acknowledged for its positive clinical outcomes in China. Over 20 years of application and development have deeply integrated the ERAS concept into all aspects of perioperative care, gaining acceptance among clinical healthcare workers. This acceptance is largely due to the expansion of surgical types, from initial applications in cardiac surgery to a variety of departments and surgical types. Additionally, the publication of several important guidelines and consensus statements has further standardized and guided the development of this

field. The application of ERAS has promoted high-quality hospital development, increased operational efficiency, and improved patient satisfaction, reflecting the hospital's commitment to societal well-being.

3. Methods

3.1. Participants

A convenience sampling method was employed to select 358 nursing interns from a tertiary hospital in Hunan Province between January and February 2024. A total of 360 questionnaires were distributed using the Questionnaire Star online platform, with 358 returned, resulting in an effective response rate of 99%. The inclusion criteria were as follows: (1) full-time nursing students from medical university; (2) internship duration of at least 8 months; and (3) informed consent and voluntary participation in this study. The exclusion criteria included nursing interns who suspended their internship or were absent for extended periods for various reasons. The study was conducted in strict accordance with the Helsinki Declaration. The study protocol was approved by the Ethics Committee of Xiangnan University.

3.2. Research Instruments

3.2.1. General Information Questionnaire

The general information questionnaire was designed by the researchers and included eight items: gender, age, internship duration, level of education, place of origin, voluntary choice of the nursing profession, ERAS training experience, and level of ERAS knowledge.

3.2.2. ERAS Knowledge, Attitudes, and Practices Survey Scale

The ERAS Knowledge, Attitudes, and Practices Survey Scale, developed by Hu et al. [15], comprises three subscales: knowledge (11 items), attitudes (11 items), and behaviors (9 items), totaling 31 items. The scale uses a Likert 5-point scoring system, ranging from "strongly disagree" (1 point) to "strongly agree" (5 points), with a total score range of 31 to 155. Higher scores indicate a higher level of knowledge, attitudes, and practices related to ERAS. The overall internal consistency coefficient (Cronbach's α) of the instrument is 0.809, with subscale coefficients of 0.772 for knowledge, 0.826 for attitudes, and 0.713 for behaviors, demonstrating good reliability.

3.3. Statistical Analysis

Data analysis were performed using SPSS 26.0 statistical software. For continuous variables that passed the normality test, results were expressed as mean ± standard deviation. For comparative analysis, an independent sample t-test was used for comparisons between two groups, while analysis of variance (ANOVA) was used for differences among three or more groups. Multiple linear regression analysis was employed to explore the factors influencing nursing interns' knowledge, beliefs, and practices related to ERAS. The significance level was set at $\alpha = 0.05$.

4. Results

4.1. Current Status of ERAS Knowledge, Attitudes, and Practices Among Nursing Interns

The survey results indicate that nursing interns have a moderate level of ERAS-related

knowledge, attitudes, and practices. Detailed analysis results are presented in Table 1.

Table 1: Current Status of Knowledge, Attitudes, and Practices among Nursing Interns

	Minimum value	Maximal value	Score (Mean±SD)	Scoring rate (%)
Knowledge	12	50	37.6±11.321	68.4
Attitude	11	47	34.61±9.756	62.9
Practice	9	37	27.69±6.496	61.5
KAP	40	128	99.91±23.056	64.5

4.2. Univariate Analysis of Factors Influencing ERAS Knowledge, Attitudes, and Practices among Nursing Interns

Table 2: Univariate Analysis of Factors Influencing Knowledge, Attitudes, and Practices among Nursing Interns

Variables	N	Knowledge	Attitude	Practice	KAP
Gender					
Male	183	37.03±11.524	34.44±9.783	28.02±6.037	99.49±21.967
Female	175	38.2±11.106	34.8±9.753	27.34±6.945	100.34±24.198
t/P		0.975/0.330	-0.351/0.726	0.989/0.324	-0.349/0.728
Age					
18-22	133	35.18±11.67	32.49±10.67	26.78±7.025	94.45±25.1
22-25	137	38.82±11.005	35.18±9.408	27.37±6.687	101.38±22.557
25-30	88	39.36±10.747	36.94±8.158	29.56±4.842	105.86±18.581
F/P		5.018/0.007	6.063/0.003	5.217/0.006	7.18/0.001
Internship duration					
8-9	126	35.29±12.177	33.26±10.168	26.33±7.31	94.87±25.341
10-11	164	37.71±11.031	34.68±9.888	28.01±6.154	100.41±22.617
≥12	68	41.63±9.145	36.96±8.209	29.44±5.115	108.03±16.572
F/P		7.196/0.001	3.212/0.041	5.592/0.004	7.527/0.001
Level of education					
Diploma	40	33.95±12.85	30.5±11.88	25.03±8.322	89.48±28.537
Bachelor	245	37.39±11.204	34.53±9.649	27.89±6.301	99.81±22.988
Graduate	73	40.32±10.277	37.15±8.003	28.48±5.701	105.95±17.502
F/P		4.298/0.014	6.209/0.002	4.09/0.018	6.815/0.001
Place of origin					
City	193	37.99±11.485	35.15±9.631	28.29±6.122	101.43±22.604
Rural	165	37.15±11.145	33.99±9.893	26.99±6.861	98.13±23.518
t/P		0.698/0.486	1.124/0.262	1.898/0.059	1.353/0.177
Voluntary choice of the nursing profession					
Yes	253	38.53±10.904	36.04±9.092	28.17±6.25	102.74±21.278
No	105	35.36±12.028	31.19±10.473	26.54±6.953	93.1±25.717
t/P		2.430/0.016	4.386/<0.001	2.163/0.031	3.664/<0.001
ERAS training experience					
Yes	257	38.65±10.629	35.3±9.469	28.28±6.113	102.23±21.828
No	101	34.93±12.582	32.88±10.299	26.2±7.203	94.01±25.082
t/P		2.828/0.005	2.118/0.035	2.749/0.006	3.07/0.002
Level of ERAS knowledge					
Unfamiliar	81	34.37±12.736	33.1±12.258	25.64±7.274	93.11±28.423
Moderately familiar	105	36.7±11.307	33.61±10.313	27.84±6.197	98.15±23.535
Highly familiar	172	39.67±10.207	35.94±7.762	28.56±6.102	104.18±18.784

| | | F/P | | 6.720/0.001 | 3.164/0.043 | 5.758/0.003 | 7.005/0.001 |

Univariate analysis revealed statistically significant differences in the ERAS KAP scores of nursing interns based on age, internship duration, level of education, voluntary choice of the nursing profession, ERAS training experience, and level of ERAS knowledge ($P<0.05$). However, there were no statistically significant differences in the ERAS KAP scores concerning gender or place of origin ($P>0.05$). Detailed results are provided in Table 2.

4.3. Multivariate Regression Analysis of Factors Influencing ERAS Knowledge, Attitudes, and Practices among Nursing Interns

A multivariate linear regression analysis was conducted with the interns' age, internship duration, education level, voluntary choice of the nursing profession, ERAS training experience, and level of ERAS knowledge as independent variables and their ERAS KAP scores as the dependent variable (value assignment rules: Age: 18-22=1, 22-25=2, 25-30=3; Internship duration: 8-9=1, 10-11=2, ≥12=3; Level of education: Diploma=1, Bachelor=2; Graduate=3, Voluntary choice of the nursing profession: yes=1, no=2; ERAS training experience: yes=1, no=2; Level of ERAS knowledge: Familiar=1, Moderately familiar=2, Highly familiar=3.) The regression analysis indicated that internship duration, education level, voluntary choice of the nursing profession, ERAS training experience, and level of ERAS knowledge were significant factors influencing the ERAS KAP scores of nursing interns ($P<0.05$). These factors accounted for 14.2% of the total variance explained (F=10.826, P<0.01, R=0.395, R^2=0.156; adjusted R^2=0.142), as shown in Table 3.

Table 3: Multivariate Linear Regression Analysis of Factors Influencing Knowledge, Attitudes, and Practices among Nursing Interns

	b	SE	b'	t	p
Constant	81.939	7.583		10.806	0.000
Internship duration	3.550	1.777	0.111	1.998	0.047
Level of education	6.233	2.135	0.150	2.920	0.004
Voluntary choice of the nursing profession	-8.905	2.503	-0.176	-3.558	<0.001
ERAS training experience	-5.694	2.557	-0.111	-2.226	0.027
Level of ERAS knowledge	5.379	1.416	0.187	3.799	<0.001

5. Discussions

5.1. Current Status and Strategies for Improving ERAS KAP Score among Nursing Interns

The total score of the ERAS Knowledge, Attitudes, and Practices Survey Scale was 99.91±23.056, indicating that ERAS KAP sore among nursing interns at a moderate level. This is consistent with the findings of Li et al. [16] on the KAP regarding ERAS among ophthalmology nurses. The sub-dimensions of knowledge, attitude and behavior scored 37.6±11.321, 34.61±9.756, 27.69±6.496, respectively. The dimension of behavior is the lowest among the three dimensions, this suggests that nursing interns need to improve their ability to translate theory into practice. Previous studies suggest that clinical staff often adopt an overly cautious approach to ERAS practices due to a lack of specific, detailed guidelines, affecting adherence and implementation efficiency [17]. Therefore, there is an urgent need to develop an ERAS nursing model tailored to the actual conditions and patient characteristics in China and to implement standardized ERAS nursing procedures in clinical settings. This aims to enhance the confidence and determination of nursing interns in executing ERAS measures, improve nursing quality through standardized operations, and

ensure better patient care. Future work should focus on optimizing procedures, strengthening institutional management, and deepening interdisciplinary collaboration to foster continuous improvement and development [18].

5.2. Factors Influencing ERAS Knowledge, Attitudes, and Practices among Nursing Interns

Regression analysis indicates that internship duration, education level, voluntary choice of the nursing profession, ERAS training experience, and ERAS knowledge are significant factors affecting the knowledge, attitudes, and practices (KAP) scores among nursing interns regarding Enhanced Recovery After Surgery (ERAS). The results reveal statistically significant differences in scores across age, internship duration, educational level, voluntary choice of the nursing profession, ERAS training experience, and level of ERAS knowledge ($P<0.05$), aligning with the findings of Feng et al. [19]. The reasons for these influences are as follows: ①Internship duration: A longer internship provides students with more chances to observe, learn, and participate in ERAS processes, enhancing their understanding and acceptance. Therefore, nursing interns should be encouraged to actively engage in clinical practice, participate in case discussions, and attend academic lectures within their limited internship period. ② Level of education: Different educational backgrounds may affect students' ability to understand complex ERAS concepts. Typically, nursing interns with higher education levels have stronger self-directed learning abilities and can acquire new knowledge quickly through online resources, journals, and magazines. Encouraging interns to pursue higher education will broaden their perspectives and align them with global advancements in healthcare. ③Voluntary choice of the nursing profession: Interns who voluntarily choose the nursing profession tend to have higher intrinsic motivation and are more receptive to new concepts and technologies. Clinical education should focus on understanding interns' psychological states and strengthening their professional beliefs, incorporating evidence-based protocols into perioperative care to demonstrate the benefits of ERAS. By visualizing improvements in patient experiences, reduced hospital stays, enhanced care quality, and faster recovery, interns can develop a positive attitude towards ERAS. Clinical educators should also emphasize professional identity and belief education among nursing interns [20-21]. ④ERAS training experience: This significantly impacts interns' KAP levels, with trained interns demonstrating higher scores. This underscores the importance of direct training in enhancing ERAS knowledge and application skills. Hospitals should reinforce ERAS training for nursing interns, improve training mechanisms, and encourage the formation of dedicated training groups to promote comprehensive development. ⑤The level of ERAS knowledge influences interns' attitudes and behaviors: A greater understanding of ERAS principles and practices leads to more positive attitudes and behaviors that promote patient recovery. Clinical educators should continuously assess and enhance students' ERAS knowledge to improve their KAP levels, ultimately facilitating better patient outcomes.

6. Discussions

This study reveals that nursing interns at a comprehensive hospital exhibit moderate knowledge, attitudes, and practices (KAP) regarding Enhanced Recovery After Surgery (ERAS). Statistically significant differences were observed to factors such as age, internship duration, education level, voluntary choice of the nursing profession, ERAS training experience, and understanding of ERAS knowledge. It is advised that clinical teaching and internship programs regularly conduct ERAS-focused training sessions to integrate these concepts into practice effectively.

Acknowledgement

References

[1] Lao, L.D., Jiang, A.Y., and Jin, J.L. (2011) Analysis of the Current Status of Communication Skills among Nursing Students in Their Final Internship Phase. Chinese Higher Medical Education, 2011(04), 92-93.

[2] Mo, L.Q., Qin, J.K., Xu, R.X., et al. (2020) Analysis of the Effects of Enhanced Recovery After Surgery (ERAS) Concepts in the Nursing Care of Cardiac Patients Admitted to the ICU. Journal of Guangxi Medical University, 37(07), 1379-1383.

[3] Wang, J., Zhou, L.H., and Liao, T.T. (2020) Postural Management of Young Pediatric Patients Under General Anesthesia in Ophthalmology Under the Concept of Enhanced Recovery After Surgery. Chinese Journal of Strabismus & Pediatric Ophthalmology, 28(01), 31-32.

[4] Levytska, K., Yu, Z., and Wally, M. (2022) Enhanced Recovery After Surgery (ERAS) Protocol is Associated with Lower Post-Operative Opioid Use and a Reduced Office Burden After Minimally Invasive Surgery. Gynecol Oncol, 166(3), 471-475.

[5] Wang, H.J., and Li, G.H. (2020) Survey and Analysis of Urology Nurses' Mastery of the "Knowledge, Attitude, and Practice" Model of Accelerated Recovery Surgery. Modern Medicine, 48(04), 557-561.

[6] Nurguuli, M., Shi, L.Y., Li, X., et al. (2019) Knowledge, Attitude, and Practice Analysis Study of Orthopedic Nurses Caring for Patients Undergoing Accelerated Recovery Surgery for Joint Replacement. Journal of Fujian Medical University, 42(05), 697-701.

[7] Jiang, Z.W., Li, N., and Li, J.S. (2007) The Concept and Clinical Significance of Enhanced Recovery After Surgery. Chinese Journal of Practical Surgery, 2007(02), 131-133.

[8] Brindle, M.E., and McDiarmid, C. (2020) Consensus Guidelines for Perioperative Care in Neonatal Intestinal Surgery: Enhanced Recovery After Surgery (ERAS®) Society Recommendations. World J Surg, 44(8), 2482-2492.

[9] Kehlet, H. (1997) Multimodal Approach to Control Postoperative Pathophysiology and Rehabilitation. Br J Anaesth, 78(5), 606-617.

[10] Kehlet, H., and Mogensen, T. (1999) Hospital Stay of 2 Days After Open Sigmoidectomy with a Multimodal Rehabilitation Programme. Br J Surg, 86(2), 227-230.

[11] Di Saverio, S., and Podda, M. (2020) Diagnosis and Treatment of Acute Appendicitis: 2020 Update of the WSES Jerusalem Guidelines. World J Emerg Surg, 15(1), 27.

[12] Fearon, K.C., and Ljungqvist, O. (2005) Enhanced Recovery After Surgery: A Consensus Review of Clinical Care for Patients Undergoing Colonic Resection. Clin Nutr, 24(3), 466-477.

[13] Li, J.S. (2007) Understanding the Connotation of Fast-track Surgery. Chinese Medical Journal, 87(08), 515-517.

[14] Chen, L., Chen, Y.J., Dong, H.L., et al. (2018) Chinese Expert Consensus and Pathway Management Guidelines for Enhanced Recovery After Surgery (2018 Edition). Chinese Journal of Practical Surgery, 38(01), 1-20.

[15] Hu, Y.J., Tang, L., Jin, Z.H., et al. (2021) Reliability and Validity Test of the Knowledge, Attitude, and Practice Scale for Patients Undergoing Colorectal Cancer Surgery with Rapid Recovery. Modern Medical & Health, 37(18), 3077-3080.

[16] Li, P., Qi, S.S., and Zhou, M.M. (2024) Analysis of the Current Status and Influencing Factors of Ophthalmic Nurses' Knowledge, Attitude, and Practice of Enhanced Recovery After Surgery Concepts. Chinese Hospital Statistics, 31(01), 30-34.

[17] Rachel, C., and Rachael, G. (2019) Staff Experiences of Enhanced Recovery After Surgery: Systematic Review of Qualitative Studies. BMJ Open, 9(2).

[18] Wang, H.J., and Li, G.H. (2020) Survey and Analysis of Urology Nurses' Mastery of the "Knowledge, Attitude, and Practice" Model of Accelerated Recovery Surgery. Modern Medicine, 48(04), 557-561.

[19] Feng, X., Liu, S.H., Zhou, Y.M., et al. (2024) A Study on the Knowledge, Attitude, and Practice Status of Obstetrics and Gynecology Medical Staff in Ningxia Region Regarding Enhanced Recovery After Surgery. General Nursing, 22(04), 731-735.

[20] Kuang, C.Y., and Zhang, C.Y. (2024) Research on the Impact of Blended Teaching on the Self-Directed Learning Ability of Nursing Students. Science and Education Guide, 2024(08), 149-152.

[21] Xu, M., Chen, Q., Liu, X.H., et al. (2019) Cognitive Intervention Research on the Professional Identity of Nursing Undergraduates during Internships. Chinese Journal of Nursing, 54(05), 709-714.