

Assessment of nursing students' perceived competence in preoperative patient care

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ABSTRACT

Aims: This study aimed to assess nursing students' perceived competence in providing preoperative patient care.

Methods: This descriptive and cross-sectional study was conducted at the faculty of nursing of a university in western Türkiye during the 2024-2025 academic year. The study sample consisted of 484 students with clinical experience in surgical units. Data were collected using a Descriptive Information Form and the Perceived Preoperative Nursing Care Competence Scale for Nursing Students (PPreCC-NS).

Results: The students' mean total score on the scale was 93.39 ± 15.53 . The highest subscale score was for legal responsibility and adherence to ethical principles (22.08 ± 3.97), while the lowest was for patient assessment and monitoring (19.84 ± 3.95). Female students, those not employed, and those who regularly reviewed course materials had significantly higher competence scores ($p < 0.05$). A weak positive correlation was also found between grade point average and perceived competence ($p < 0.01$).

Conclusion: Overall, nursing students demonstrated high levels of competence in preoperative care; however, further improvement is needed in patient assessment and monitoring. Incorporating scenario-based simulations, digital learning tools, and ethically guided Artificial Intelligence applications into educational programs may enhance students' clinical decision-making and patient safety-focused competencies.

Keywords: Preoperative care, nursing, students, clinical competence, perceived competence

INTRODUCTION

Surgical interventions are an indispensable component of modern healthcare services. The literature emphasizes that surgical care is "an integral and essential part of healthcare services," with hundreds of millions of surgeries performed worldwide each year.¹ While surgical procedures are vital for treating life-threatening conditions, they may also induce psychological and physiological stress in individuals. Therefore, effective management of the preoperative period plays a critical role in ensuring patient safety and well-being.² Preoperative nursing practices and preparations reduce the risk of complications, lower anxiety levels, and improve patient satisfaction.³

During this process, perioperative nurses assess patients holistically physically, psychologically, and socially. Obtaining the medical history, reviewing vital signs and laboratory results constitute fundamental steps in delivering safe care.⁴ Previous studies have demonstrated that preoperative nursing interventions increase patient satisfaction and reduce anxiety levels.^{5,6} Moreover, nurse-led educational and informational programs have been reported to decrease postoperative complications⁷ and to play an effective role in preventing

surgical site infections.⁸ Patient safety practices such as identity verification, surgical site marking, and the use of safety checklists also play a decisive role in minimizing errors.²

The ability of nurses to perform their complex and multifaceted roles effectively during the preoperative period is essential for maintaining both patient safety and quality of care. In this context, the concept of competence, which reflects nurses' knowledge, skills, and attitudes, becomes crucial.^{9,10} Particularly, assessing nursing students' competence in preoperative patient care is of great importance for evaluating the quality of education and fostering a culture of patient safety. Indeed, studies have shown that while students generally have adequate theoretical knowledge, their practical skills remain limited.¹¹

Although preoperative care education varies across nursing curricula worldwide, it is generally provided within the scope of perioperative nursing through both theoretical and clinical practice courses.¹² Measuring students' competence in this field serves as an important indicator for evaluating the effectiveness of educational programs, identifying weaknesses in curricula, and improving clinical teaching methods.¹³

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In conclusion, assessing nursing students' self-efficacy in providing preoperative patient care is crucial for evaluating the effectiveness of nursing education, promoting clinical safety, increasing patient satisfaction, and supporting improved surgical outcomes. However, research addressing this topic in the literature remains limited. Therefore, identifying students' knowledge and skill levels is fundamental for ensuring quality assurance in nursing education and for preparing future nurses capable of delivering safe, effective, and holistic care.

Study Questions

- What are the levels of nursing students' perceived competence in providing preoperative patient care?
- Are there significant differences in nursing students' perceived competence in providing preoperative patient care according to their sociodemographic characteristics?

METHODS

Ethics

Ethical approval for this study was obtained from the Ege University Scientific Researches and Publication Ethics Committee (Date: 01.07.2024, Decision No: E.1924088-10/01). Written permission was also granted by the institution where the study was conducted. Prior to data collection, all students were informed about the purpose and procedures of the study, and written informed consent was obtained from those who agreed to participate. All procedures involving human participants were conducted in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Study Design

This study employed a descriptive and cross-sectional design. The study was prepared in accordance with STROBE guidelines.

Population and Sample

The population of this descriptive and cross-sectional study consisted of second, third, and fourth year nursing students (n: 823) who had completed clinical placements in surgical clinics at the faculty of nursing of a university in western Türkiye during the 2024-2025 academic year. Data were collected between October 2024 and February 2025. The required sample size was calculated as 263 students, with a 95% confidence interval and a 5% margin of error. Considering potential data loss, all eligible students were invited to participate, and a total of 484 students who agreed to take part constituted the study sample.

Study Inclusion Criteria

Students who had completed their surgical nursing internship at the Faculty of Nursing at Ege University (second-, third-, and fourth-year students), students who could read, write, and speak Turkish, and students who voluntarily agreed to participate in the study were included.

Exclusion Criteria for the Study

Students not enrolled at the Faculty of Nursing at Ege University, first-year students at the Faculty of Nursing at Ege

University, and students who agreed to participate but did not complete all research forms were excluded from the study sample.

Data Collection Instruments

Two instruments were used for data collection: the Descriptive Information Form and the Perceived Preoperative Nursing Care Competence Scale for Nursing Students (PPreCC-NS).

Descriptive Information Form: This form was developed to determine the sociodemographic and descriptive characteristics of the students. It includes 10 questions, nine multiple-choice and one open-ended regarding age, gender, marital status, year of study, family type, monthly income level, employment status, living arrangements, repetition of classes, repetition of course topics, and use of study resources.¹³⁻¹⁵

Perceived Preoperative Nursing Care Competence Scale for Nursing Students (PPreCC-NS): Developed by Şimşek et al.¹³ this 22-item, five-point Likert-type Scale (1: Strongly Disagree, 5: Strongly Agree) measures nursing students' perceived competence in providing preoperative nursing care. The scale consists of five subdimensions: legal responsibility and adherence to ethical principles, patient assessment and monitoring, preoperative patient preparation, communication, and research and professional development.

The minimum possible score on the scale is 22, and the maximum is 110. Higher scores indicate greater perceived competence in delivering preoperative nursing care. The scale contains no reverse-coded items. Total scores are calculated by summing responses to all items according to the scoring guide.

Şimşek et al.¹³ reported Cronbach's alpha coefficients ranging between 0.79 and 0.96 for the subdimensions and 0.94 for the overall scale. In the present study, the Cronbach's alpha coefficient was 0.966, demonstrating a high level of internal consistency. Permission to use the scale was obtained electronically from the original authors on May 28, 2024.

Data Collection

Data were collected between October 2024 and February 2025 through face-to-face interviews with the students. The research data were obtained from students enrolled in the nursing care I course who had completed clinical practice in surgical units. First, the purpose of the study was explained to the students, and then written informed consent was obtained through a voluntary participation form. Completing the data collection form took approximately 10 minutes for each participant.

Statistical Analysis

The collected data were analyzed using the IBM SPSS Statistics (version 21.0) software package. Descriptive statistics were presented as counts, percentages, means, standard deviations, and minimum and maximum values. The normality of the data was assessed using the Kolmogorov-Smirnov test, and it was determined that the scale scores did not follow a normal distribution ($p < 0.05$). Therefore, the Mann-Whitney U test was

used for pairwise group comparisons, and the Kruskal-Wallis test was used for comparisons involving three or more groups. For variables where significant differences were detected in the Kruskal-Wallis test, post-hoc pairwise comparisons were conducted using the Bonferroni-corrected Mann-Whitney U test. The relationships between students' age and grade point average and their scale scores were evaluated using Spearman's correlation analysis. In all analyses, a p-value of <0.05 was considered statistically significant.¹⁶

RESULTS

A total of 484 nursing students participated in the study. The mean age of the participants was 22.23 ± 1.88 years (min: 19, max: 38). The students cumulative grade point average was 3.06 ± 0.36 (min: 2.4, max: 3.9). Among the students, 34.9% (n=169) were second-year, 32.2% (n=156) were third-year, and 32.9% (n=159) were fourth-year students. Of the participants, 77.9% (n=377) were female and 22.1% (n=107) were male. The majority (99.4%) were single, 56.6% resided in state dormitories, and 54.3% reported that their income was equal to their expenses. Additionally, 16.5% were employed, and 72.9% stated that they regularly reviewed their coursework. Furthermore, 62.8% reported not using any supplementary study resources beyond class notes, 16.5% read scientific articles in addition to course materials, and 56% stated that the theoretical content taught in class was consistent with clinical practice (Table 1).

Table 1. Distribution of students according to their sociodemographic characteristics

Age: 22.23 ± 1.88 years (min: 19, max: 38)			
Cumulative grade point average: 3.06 ± 0.36 (min: 2.4, max: 3.9)			
Variable	Category	n	%
Class level	2 nd year	169	34.9
	3 rd year	156	32.2
	4 th year	159	32.9
Gender	Female	377	77.9
	Male	107	22.1
Marital status	Married	3	0.6
	Single	481	99.4
Living arrangement	Living alone	30	6.2
	With family	96	19.8
	With friends	58	12.0
	Private dormitory	26	5.4
	Public dormitory	274	56.6
Income status	Income less than expenses	172	35.5
	Income equal to expenses	263	54.3
	Income greater than expenses	49	10.1
Employment status	Yes	80	16.5
	No	404	83.5
Course review	Yes	353	72.9
	No	131	27.1
	None	304	62.8
Use of additional learning resources	Article	80	16.5
	Artificial Intelligence	42	8.7
	Summary notes	10	2.1
	Internet etc.	48	9.9
Consistency between theoretical and practical learning	Yes	271	56.0
	No	20	4.1
	Sometimes	193	39.9
Total participants		484	100.0
Min: Minimum, Max: Maximum			

The mean total score of the students on the Perceived Preoperative Nursing Care Competence Scale for Nursing Students (PPreCC-NS) was 93.39 ± 15.53 . Among the subdimensions, the highest mean score was observed in legal responsibility and adherence to ethical principles (22.08 ± 3.97), while the lowest mean score was found in patient assessment and monitoring (19.84 ± 3.95). The Cronbach's alpha coefficient for the scale was 0.966, indicating a very high level of internal consistency (Table 2).

Table 2. Distribution of Scores on the PPreCC-NS (n:484)

Subdimensions of the PPreCC-NS	$\bar{X} \pm SD$	Min-Max
Legal responsibility and compliance with ethical principles	22.08 ± 3.97	5.00-25.00
Patient assessment and monitoring	19.84 ± 3.95	5.00-25.00
Preoperative patient preparation	17.57 ± 3.22	4.00-20.00
Communication	17.33 ± 3.18	4.00-20.00
Research and professional development	16.58 ± 3.31	4.00-20.00
Total scale score (PPreCC-NS)	93.39 ± 15.53	22.00-110.00
PPreCC-NS: Perceived Preoperative Nursing Care Competence Scale for Nursing Students, SD: Standard deviation, Min: Minimum, Max: Maximum		

No statistically significant difference was found between students' marital status and class level variables and the total and sub-dimension scores of the scale ($p > 0.05$).

A statistically significant difference was found between students' gender and the total scale score ($p = .042$) and the sub-dimensions "legal responsibility and ethical compliance" ($p = .041$), "patient preparation" ($p = .046$), "research and professional development" ($p = .043$), and "patient assessment" ($p = .047$). In all significant areas, female participants had higher average scores compared to male participants. A highly significant difference was found between students' employment status and all sub-dimensions except "communication" and the total scale score ($p = .002$). The mean scores on the total scale (94.50 ± 0.71), legal responsibility (22.37 ± 0.18), patient preparation (17.80 ± 0.14), research and development (16.76 ± 0.15), and patient assessment (20.07 ± 0.18) were significantly higher in non-working participants compared to working participants ($p < 0.05$). The total scale score (94.88 ± 0.51) and the sub-dimension scores of "legal responsibility and ethical compliance" ($p = .025$), "patient preparation" ($p = .021$), "research and professional development" ($p = .000$), and "patient assessment" ($p = .000$) were statistically significantly higher in those who repeated/revised the course ("Yes") compared to those who did not repeat the course. A statistically significant difference was found between participants' perceptions of consistency between theoretical training and clinical practice and their mean scores on the 'patient assessment' subscale of the scale ($p = .007$; $p < .01$). Further analysis revealed that those who indicated consistency between theoretical and practical applications ('Yes') had significantly higher mean patient assessment scores (20.05 ± 0.25) compared to those who indicated inconsistency ('No': 17.90 ± 0.84) and those who indicated sometimes consistency ('Sometimes': 19.73 ± 0.24). This finding indicates that as consistency between training and practice increases, students'/healthcare professionals' patient assessment skills and perceptions in this area improve positively (Table 3).

Table 3. Distribution of Mean Scale scores according to variables

Variable	Groups	n	Total scale score (X±SD)	p	Legal responsibility and ethical compliance (X±SD)	p	Patient preparation (X±SD)	p	Communication (X±SD)	p	Research and professional development (X±SD)	p	Patient assessment (X±SD)	p
Gender	Female	377	94.13±0.78	.042	22.28±0.19	.041	17.71±0.16	.046	17.47±0.16	.053	16.74±0.16	.043	19.92±0.19	.047
	Male	107	90.77±1.59		21.37±0.42		17.05±0.33		16.80±0.32		16.01±0.33		19.52±0.41	
Marital status	Married	3	100.66±2.33	.437	23.66±1.33	.382	19.33±0.66	.276	18.00±0.57	.910	19.00±1.00	.132	20.66±0.33	.714
	Single	481	93.34±0.70		22.07±0.18		17.55±0.14		17.32±0.14		16.56±0.15		19.83±0.18	
Employment status	Yes	80	87.80±2.17	.002	20.60±0.56	.001	16.38±0.44	.001	16.53±0.43	.057	15.62±0.44	.019	18.65±0.52	.016
	No	404	94.50±0.71		22.37±0.18		17.80±0.14		17.48±0.14		16.76±0.15		20.07±0.18	
Class level	2 nd year	169	91.57 ±1.15	.507	21.76±0.28	.243	17.15±0.24	.611	17.05±0.25	.790	16.46±0.26	.225	19.12±0.30	.083
	3 rd year	156	89.41±1.42		20.99±0.38		16.87±0.29		16.63±0.27		15.82±0.28		19.08±0.34	
	4 th year	159	99.69±0.79		23.48±0.21		18.68±0.18		18.28±0.20		17.44±0.21		21.32±0.25	
Course review status	Yes	353	94.88±0.51	.000	22.27±0.20	.025	17.76±0.16	.021	17.49±0.16	.107	16.91±0.16	.000	20.24±0.20	.000
	No	131	89.90±1.44		21.55±0.35		17.03±0.30		16.87±0.30		15.68±0.31		18.74±0.35	
Income status	Income < expenses	172	91.45±1.35	.095	21.74±0.32	.150	17.25±0.28	.066	17.05±0.27	.223	16.00±0.28	.053	19.38±0.32	.151
	Income = expenses	263	93.91±0.89		22.11±0.24		17.60±0.18		17.37±0.18		16.86±0.18		19.96±0.23	
	Income > expenses	49	97.40±1.60		23.35±0.35		18.48±0.33		18.02±0.37		17.08±0.46		20.69±0.49	
Consistency between theory and practice	Yes	271	94.34 ±1.00	.002	22.23±0.26	.008	17.72±0.20	.027	17.54±0.20	.004	4.19±0.83	0.43	20.05±0.25	.007
	No	20	84.50±4.15		20.30±0.99		15.85±1.01		15.40±0.85		3.76±0.97		17.90±0.84	
	Sometimes	193	92.98±0.95		22.05±0.23		17.52±0.19		17.22±0.20		4.11±0.78		19.73±0.24	

Correlated factors are indicated in bold. p<0.05; SD: Standard deviation, Min: Minimum, Max: Maximum

According to the results of the Spearman correlation analysis, a weak positive and statistically significant relationship was found between students' grade point averages and their perceived competence scores ($r=0.180$; $p<0.01$). This finding indicates that students with higher academic achievement also had higher perceptions of competence in preoperative nursing care. No significant correlation was identified between students' age and their perceived competence scores ($p>0.05$).

DISCUSSION

Preoperative patient care is a specialized area within nursing practice that requires comprehensive knowledge and advanced clinical skills. Maintaining patient safety and preventing complications during the preoperative period largely depend on nurses' knowledge and clinical performance. Therefore, nursing students' self-efficacy in providing preoperative patient care is considered an important indicator of their professional development.^{13,14} In the present study, nursing students demonstrated levels of self-efficacy in providing preoperative patient care. These findings highlight the importance of strengthening educational strategies aimed at improving students' confidence and preparedness for preoperative nursing practices. In the present study, the mean total score of student nurses regarding their competence in preoperative nursing care was found to be 93.39 ± 15.53 , indicating that students generally perceived themselves as competent in providing preoperative nursing care. This finding is consistent with previous studies reporting similar mean competence scores (94.96 ± 23.14 ; 93.382 ± 14.25).^{14,15}

When the subdimensions of the scale were examined, the highest mean score was observed in legal responsibility and adherence to ethical principles (22.08 ± 3.97), while the lowest mean score was found in patient assessment and monitoring (19.84 ± 3.95). The literature indicates that a clear discrepancy often exists between theoretical knowledge and practical application in the domains of basic clinical sciences and systematic patient assessment, which are considered relatively challenging learning areas for students.¹⁷⁻²⁰ These findings are consistent with the results of the present study. Indeed, it has been reported that structured educational tools and technology-enhanced simulation practices such as gamified or virtual reality (VR) based scenarios and weekly clinical skill tracking forms can significantly enhance students' learning levels in these domains.¹⁷⁻²⁰

The finding that female students achieved higher mean scores in total and in most subdimensions aligns with previous research indicating that female students tend to demonstrate stronger abilities in communication, empathy, and emotional intelligence. However, it has also been noted that gender-based differences in competence are not always pronounced or consistent across contexts.^{21,22} Therefore, the observed gender difference in this study may be interpreted as a limited and context-specific variation influenced by sample characteristics and the sensitivity of the evaluated subdimensions.

The observation that employed students had lower competence scores is strongly supported by the literature. Studies have shown that nursing students who engage in paid employment

during the academic term particularly those working longer weekly hours experience negative effects on their academic performance and the time available for study. Increased workload has also been associated with reduced frequency of course review and lower levels of deep learning.²³⁻²⁵ These factors may indirectly contribute to a decline in students' perceived competence levels.

The finding that regular course review was associated with higher competence scores, and the detection of a weak positive correlation between grade point average and perceived competence ($r=0.18$), represent an expected pattern. The literature highlights positive relationships between learning styles, self-directed learning skills, and clinical competence; moreover, e-learning readiness and academic self-efficacy have been shown to significantly enhance students' academic achievement. Nevertheless, it has also been emphasized that academic performance alone cannot fully predict clinical success, and that the incorporation of diverse pedagogical strategies such as simulation and blended learning is essential to optimize learning outcomes.²⁶⁻²⁸

The absence of a significant difference according to class level suggests that the distribution of preoperative care content across academic years in the program is relatively homogeneous or that students have comparable levels of clinical exposure and learning opportunities. In the literature, interdisciplinary simulation courses and scenario-based training designed to enhance perioperative skills have been reported to yield substantial competence gains regardless of class level. Accordingly, integrating standardized simulation sessions into the curriculum at each grade level has been emphasized as a beneficial strategy to improve students' competence in preoperative care.²⁹

When examining students' use of external learning resources beyond lecture notes, those who utilized the internet and Artificial Intelligence obtained the highest scores. This finding is consistent with current evidence indicating that digital learning resources, and particularly AI-supported learning tools, can enhance students' self-efficacy, clinical reasoning, and decision-making skills. However, alongside these positive outcomes, the literature also underscores the importance of ethical use of Artificial Intelligence and digital resources, emphasizing the need to develop and implement guidelines to ensure information reliability and responsible usage.³⁰⁻³⁴

Limitations

The limitations of this study are that students' proficiency levels were assessed based on their self-reported perceptions. Therefore, the perceived proficiency reported by the students may not always accurately reflect their actual clinical skills and performance in real clinical settings. Another limitation is that, for some variables, the relatively small sample sizes of certain subgroups (such as married students) may have limited the statistical power and generalizability of the findings.

CONCLUSION

This study assessed nursing students' perceived competence in providing preoperative patient care and found that students generally demonstrated high competence levels. However, the relatively lower scores in the patient assessment and

monitoring subdimension indicate that these skills need to be further strengthened through clinical practice. The finding that female students, those who were not employed, and those who regularly reviewed course materials had higher perceived competence scores suggests that academic discipline, study habits, and effective time management are key factors influencing nursing students' perceived competence in preoperative patient care. Furthermore, students who utilized digital resources such as the internet and Artificial Intelligence achieved higher scores, supporting the contribution of technology to learning processes. Considering that the lowest competence scores were observed in the patient assessment and monitoring subdimension, expanding scenario-based simulations and technology-supported clinical training focused on patient assessment, monitoring, and decision-making processes may help strengthen these competencies in nursing education. In addition, integrating training on the ethical and reliable use of Artificial Intelligence and online resources into the curriculum is expected to enhance students' professional development and strengthen their patient safety-oriented care competencies.

ETHICAL DECLARATIONS

Ethics Committee Approval

This study was approved by the Ege University Scientific Researches and Publication Ethics Committee (Date: 01.07.2024, Decision No: E.1924088-10/01).

Informed Consent

Written informed consent was obtained from all individual participants prior to their inclusion in the study. Participants were fully informed about the study's aims, procedures, potential risks and benefits, and their rights-including the right to withdraw at any time without consequence. All participants voluntarily signed a written informed consent form.

Peer Review Process

This manuscript was subject to external peer review.

Conflict of Interest

The authors declare no conflicts of interest related to this study.

Financial Disclosure

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Author Contributions

Concept: BSK, MAA, MYVG; Design: BSK, MAA, MYVG; Control: BSK, MAA, MYVG; Resources: BSK, MAA, MYVG; Materials: BSK, MAA, MYVG; Data Collection and/or Processing: BSK, MAA; Analysis and/or Interpretation: BSK, MAA, MYVG; Literature Review: BSK, MAA, MYVG; Writing the Article: BSK, MAA, MYVG; Critical Review: BSK, MAA, MYVG.

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REFERENCES

- Martinez-Nicolas I, Arnal-Velasco D, Romero-García E, et al. Perioperative patient safety recommendations: systematic review of clinical practice guidelines. *BJS Open*. 2024;8(6):zrae143. doi:10.1093/bjsopen/zrae143
- Salazar Maya ÁM. Nursing care during the perioperative within the surgical context. *Invest Educ Enferm*. 2022;40(2):e02. doi:10.17533/udea.iee.v40n2e02
- Ataro BA, Geta T, Endirias EE, Gadabo CK, Bolado GN. Patient satisfaction with preoperative nursing care and its associated factors in surgical procedures, 2023: a cross-sectional study. *BMC Nurs*. 2024;23(1):235. doi:10.1186/s12912-024-01881-5
- Hara K, Yamamoto C, Mills S, et al. Influence of certified perioperative nurses on the establishment of preoperative outpatient clinic and rate of preoperative assessment in Japan. *Scient Rep*. 2024;14(1):1192. doi:10.1038/s41598-023-51043-x
- Atomsa L, Temesgen S, Dechasa A, et al. Preoperative patient teaching practices and associated factors among nurses working at hospitals in West Shoa Zone, Ethiopia, 2022: a cross-sectional study. *Front Public Health*. 2024;12:1498406. doi:10.3389/fpubh.2024.1498406
- Doğan SD, Köse Tosunöz İ, Gülmez Mİ. The effect of brochure-assisted education given before septorhinoplasty on surgical fear and anxiety: a randomized controlled trial. *Nurs Health Sci*. 2024;26(3):e13148. doi:10.1111/nhs.13148
- Nakamura R, Miyamoto K, Tsuji K, et al. The impact of a preoperative nurse-led orientation program on postoperative delirium after cardiovascular surgery: a retrospective single-center observational study. *J Intensive Care*. 2023;11(1):20. doi:10.1186/s40560-023-00666-3
- Association of periOperative Registered Nurses. The effectiveness of perioperative nursing interventions for surgical site infection prevention in orthopedic surgery. *AORN J*. 2024;119(4):304-307. doi:10.1002/aorn.14116
- Nestler N. Nursing care and outcome in surgical patients-why do we have to care? *Innov Surg Sci*. 2019;4(4):139-143. doi:10.1515/iss-2019-0010
- Suganandam DK. Pre-intra-post-operative nursing care pathway: fragments to fusion, isolation to integration. *Indian J Contin Nurs Educ*. 2019;20(2):87-91. doi:10.4103/IJCN.IJCN_12_20
- Alnjadat R, Etoom M. Factors affecting nursing and midwifery students' knowledge regarding preoperative nursing care. *Adv Med Educ Pract*. 2024;15:161-171. doi:10.2147/AMEP.S441145
- Mukantwari J, Omondi L, Ryamukuru D. Perioperative nursing training in Rwanda in partnership with American universities: the journey so far. *Rwanda J Med Health Sci*. 2021;4(1):185-196. doi:10.4314/rjmh.v4i1.13
- Şimşek P, Özmen GÇ, Kemer AS, Aydın RK, Bulut E, Çilingir D. Development and psychometric testing of Perceived Preoperative Nursing Care Competence Scale for Nursing Students (PPreCC-NS). *Nurse Educ Today*. 2023;120:105632. doi:10.1016/j.nedt.2022.105632
- Kırtıl I, Arslan Ç, Sağlam Demir E. Examination of nursing students' knowledge level regarding evidence-based preoperative patient preparation and preoperative nursing care competencies. *J Life Long Nurs*. 2025;6(2):34-51. doi:10.29228/lnursing.82668
- Baydoğan GM. Investigation of nursing students' perceived competencies regarding preoperative nursing care: descriptive research. *Türk Klin J Nurs Sci*. 2025;17(3):702-709. doi:10.5336/nurses.2024-107461
- Erdoğan S, Nahcivan NO, Esin MN, eds. *Hemşirelikte Araştırma: Süreç, Uygulama ve Kritik*. Nobel Tıp Kitabevleri; 2014:1-403.
- Rafferty B, Mthimunya K, Bimerew M. Theory-practice gap: nursing students' self-reported depth of understanding of bioscience and its relevance to clinical practice. *PLoS One*. 2023;18(12):e0294319. doi:10.1371/journal.pone.0294319
- Tambunan EH. The theory-practice gap during clinical learning: nursing students' experiences. *J Caring Sci*. 2024;13(2):74-81. doi:10.34172/jcs.33251
- Koivisto JM, Buure T, Engblom J, Rosqvist K, Haavisto E. Association between game metrics in a simulation game and nursing students' surgical nursing knowledge-a quasi-experimental study. *BMC Nurs*. 2024;23(1):16. doi:10.1186/s12912-023-01668-0
- Mohamed S, Sinnasamy N, Ansar S, LaRiviere M. Assessing and monitoring clinical practice of undergraduate nursing students: a Middle Eastern context. *Front Med*. 2025;12:1524230. doi:10.3389/fmed.2025.1524230
- Zhu Y, Zhu J. Nursing students' competence and perceived mentor assessment literacy: the mediating role of self-efficacy and gender bias. *BMC Nurs*. 2025;24(1):1243. doi:10.1186/s12912-025-03862-8
- Deng X, Chen S, Li X, et al. Gender differences in empathy, emotional intelligence and problem-solving among nursing students. *Nurs Edu Today*. 2023;120:105649. doi:10.1016/j.nedt.2022.3859
- Salamonson Y, Roach D, Crawford R, et al. The type and amount of paid work while studying influence academic performance. *Nurs Edu Today*. 2020;84:104213. doi:10.1016/j.nedt.2019.104213
- Clynes M, Sheridan A, Frazer K. Working while studying: the impact of term-time employment on student engagement in the Republic of Ireland: a cross-sectional study. *Nurse Educ Today*. 2020;92:104513. doi:10.1016/j.nedt.2020.104513
- Reyes H, Hartin V, Loftin C, Davenport D, Carter V. The impact of employment on nursing students' academic performance. *J Prof Nurs*. 2012;28(5):218-221. doi:10.1097/NNE.0b013e318262abc9
- Mousavi SK, Javadzadeh A, Hasankhani H, Parizad ZA. Relationship between learning styles and clinical competency in nursing students. *BMC Med Educ*. 2024;24(1):5432. doi:10.1186/s12909-024-05432-z
- El-Gazar HE, Zoromba MA, Fayed SM, et al. E-learning readiness, academic self-efficacy, and academic achievement among nursing students. *BMC Nurs*. 2024;23(1):214. doi:10.1186/s12912-024-02125-2
- Dixit P, Rathee A, Tiwari SK, Phalswal U, Das S. Factors influencing clinical competence among nursing students: exploring emotional intelligence and sleep quality. *Investig Educ Enferm*. 2025;43(2):e14. doi:10.17533/udea.iee.v43n2e14
- Hashemi G, Zhang Y, Wu Y, et al. Perioperative inter-professional education training in simulation to refine perioperative skills. *Clin Simul Nurs*. 2024;97:101655. doi:10.1016/j.ecns.2024.101655
- Shin H, Gagne JDC, Kim SS, Hong M. The impact of Artificial Intelligence-assisted learning on nursing students' ethical decision-making and clinical reasoning in pediatric care: a quasi-experimental study. *Comput Inform Nurs*. 2024;42(10):704-711. doi:10.1097/CIN.0000000000001177
- Jallad ST, Alsaqer K, Albadareen BI, Al-Maghaireh D. Artificial Intelligence tools utilized in nursing education: incidence and associated factors. *Nurse Educ Today*. 2024;142:106355. doi:10.1016/j.nedt.2024.106355
- Cucci F, Marasciulo D, Romani M, et al. The contribution of Artificial Intelligence in nursing education: a scoping review of the literature. *Healthcare (Basel)*. 2025;15(8):283. doi:10.3390/nursrep15080283
- Bozkurt SA, Aydoğan S, Dursun Ergezen F, Türkoğlu A. A systematic review and sequential explanatory synthesis: Artificial Intelligence in healthcare education, a case of nursing. *Int Nurs Rev*. 2025;72(2):e70018. doi:10.1111/inr.70018
- Berre VO, Knutstad U, Jensen KT. Nursing students' use of digital resources for self-directed learning in bioscience. *SAGE Open Nurs*. 2025;11:23779608251363870. doi:10.1177/23779608251363870