Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Enhancing nursing students' psychological safety in clinical practica through generative artificial intelligence: usefulness as a tool for thought organization and rehearsal prior to consulting clinical instructors

Michika Kannan
Kochi University
Hinata Omine
Kochi University
Miyu Akashi
Kochi University
Moeri Kojima
Kochi University
Yumi Okinaka
Kochi University
Yoko Ishioka
Kochi University
Kyoko Osaka
Kochi University
Kohei Araki
Kochi University
Keiichiro Yokota
Kochi University
Hiromichi Maeda
Kochi University
Hiroyuki Kitagawa
Kochi University
Satoru Seo
Kochi University
Tsutomu Namikawa
tsutomun@kochi-u.ac.jp

Kochi University

Research Article

Keywords: Nursing practice, Psychological safety, Generative AI, Mental health, Thought organization

Posted Date: November 13th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11357716/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Purpose

This study aimed to investigate the impact of utilizing generative artificial intelligence (AI) as a tool for organizing thoughts and rehearsing prior to consulting clinical instructors on nursing students' psychological safety and stability, thereby addressing psychological barriers experienced during reporting and consultation in clinical practica.

Methods

An anonymous, self-administered questionnaire survey consisting of 17 items was conducted among second- to fourth-year nursing students at the School of Medicine, Kochi University. Questionnaire responses were retrieved from a total of 178 patients. We analyzed psychological safety during clinical training, the status of generative AI utilization, and student expectations and perceived challenges regarding its use. Comparative analyses were performed across academic years and between two groups stratified by expectation level toward AI utilization (high- vs. low-expectation groups).

Results

Third-year students, who were commencing domain-specific clinical practica, exhibited the highest anxiety regarding asking questions to clinical instructors. Concurrently, they demonstrated the greatest reduction in perceived burden when formulating nursing care plans using AI, alongside the highest intention for future active AI utilization. Compared with the low-expectation group, the high-expectation group exhibited significantly more positive perceptions regarding psychological safety scores (2.5 vs. 2.9, $P < 0.001$) and psychological impact scores (2.1 vs. 3.3, $P < 0.001$).

Conclusion

These findings suggest that generative AI functions as an effective psychological buffer to lower interpersonal barriers, thereby enhancing nursing students' psychological safety during clinical training.

Introduction

Clinical practicums serve as a crucial learning opportunity for nursing students to integrate knowledge acquired through lectures and practical training into real-world clinical practice. However, in actual clinical settings, students are exposed to substantial psychological stress due to the heavy responsibility of patient safety and intense interpersonal tension in busy clinical environments. In particular, when reporting, communicating, or consulting with clinical instructors and faculty, students experience a

psychological barrier that leads them to hesitate in asking questions or seeking guidance for fear of making assessment errors or exposing their immaturity through elementary questions [1].

Under such circumstances, if psychological safety—defined as a climate where one feels comfortable speaking up without fear of being rejected or criticized—is compromised, learning opportunities are hindered. Moreover, this environment poses risks of fostering error concealment and burnout syndrome [2].

Generative AI, such as ChatGPT, which has rapidly spread in recent years, possesses non-interpersonal characteristics and does not engage in criticism or evaluation. In this study, generative AI was defined not merely as a knowledge retrieval tool, but as a "safe, non-judgmental thought organization and rehearsal partner" prior to reporting to clinical instructors [3]. We hypothesized that as students articulate and objectify their clinical assessments through dialogue with AI, interpersonal barriers to consulting instructors would be mitigated. The aim of this survey was to clarify the impact of generative AI utilization on nursing students' psychological safety and mental health.

Materials and Methods

Study Participants

The target population comprised second-, third-, and fourth-year undergraduate nursing students enrolled in the Department of Nursing, School of Medicine, Kochi University.

Survey Design

An anonymous, self-administered questionnaire survey was conducted. Survey items assessed basic demographic characteristics (e.g., academic year), continuous metrics evaluated on a 5-point Likert scale (1: Strongly agree, 2: Agree, 3: Neutral, 4: Disagree, 5: Strongly disagree), and open-ended textual feedback.

The questionnaire was categorized into three domain structures: (A) "psychological safety in clinical practicum" (Items 1–6) comprising assessed anxiety regarding asking questions to clinical instructors, fear of exposing immaturity, and perceived safety in reporting errors; (B) "generative AI utilization status and psychological impact" (Items 7–12) comprising evaluated increased confidence in nursing assessments, reassurance from verifying basic knowledge, and reduction of documentation/workload burdens; (C) "expectations and challenges of AI utilization" (Items 13–17) comprising measured intention for future utilization, anxiety regarding being perceived as cutting corners or lazy, and compliance with ethical guidelines (Table 1).

Table 1
Questionnaire items assessing the impact of generative AI on nursing students' psychological safety and mental health.

Category	Item No.	Questionnaire Statement
A. Psychological safety in clinical practicum	1	When asking clinical instructors questions, I feel anxious that I might receive a negative response.
	2	I sometimes hesitate to report because I am worried my ideas will be seen as immature.
	3	I can openly share my mistakes and worries with members of my practicum group.
	4	Instructors and faculty members respond to students' questions with an accepting and receptive attitude.
	5	I sometimes wonder, "Is it okay to ask something like this?" and end up not asking at all.
	6	I feel safe knowing that I will not be excessively blamed even if I report a mistake or something I do not understand.
B. Generative AI usage and psychological impact	7	Through interactions with AI, I have gained confidence in my nursing assessments.
	8	I feel reassured by checking basic knowledge with AI first before asking instructors about things that are difficult to ask.
	9	Using AI has reduced time spent on documentation, providing me with greater cognitive capacity.
	10	Responses from AI have reduced the burden of formulating my nursing care plans.
	11	I feel that AI acts as a "safe sounding board" where I do not have to fear criticism.
	12	Using AI has reduced my feelings of loneliness and anxiety during clinical training.
C. Expectations and challenges of AI utilization	13	I would like to actively utilize generative AI in future clinical practica.
	14	Using AI has enabled me to communicate and offer clinical proposals to instructors more actively.
	15	I feel anxious that faculty members or instructors might view using AI as "cutting corners."
	16	I am able to use AI in compliance with ethical rules, such as protecting patient privacy.
	17	I believe that utilizing AI is effective for maintaining nursing students' mental health.

Survey analysis

During the enrollment period, the questionnaire was handed to 183 eligible students. A total of 178 questionnaires (97.3%) were retrieved, of which 178 (97.3%) were eligible. Respondents were 71 two-year students, 57 third-year students, and 50 fourth-year students. We investigated the awareness and utilization intentions by academic year, the nursing students' awareness of AI utilization by category, and the purposes of AI utilization across academic years. Additionally, participants were categorized into "high expectation" and "low expectation" groups based on their level of expectation toward AI utilization. Differences in psychological safety scores and efficacy metrics across categories were evaluated for statistical significance.

Statistical Analysis

Average response values for each item were calculated by academic year (2nd, 3rd, and 4th year). Comparative analyses across academic years were conducted using the Mann–Whitney U test and non-parametric equivalents. Continuous variable data are presented as mean values, and statistical significance was set at $P < 0.05$.

Ethical Considerations

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki and national ethical guidelines. Written explanations were provided regarding the study objectives, voluntary participation, privacy protection through anonymization, and assurance that non-participation would result in no academic disadvantage. Submitting the survey was considered informed consent. Furthermore, ethical protocols, including the strict prohibition of entering personal patient data into AI platforms, were thoroughly communicated to participants. This study was approved by the Ethics Committee of Kochi Medical School, Kochi University (Approval No.: 2025 – 169).

Results

Comparison of awareness and utilization intentions by academic year

The mean response values by academic year for each survey item and the comparative significance test results across academic years are detailed in Table 2. In Item 1 (evaluating anxiety regarding asking questions to clinical instructors due to fear of negative reactions), third-year students recorded a mean score of 2.0 (2nd-year: 2.9, 4th-year: 2.6), demonstrating significantly higher anxiety compared with second year ($P < 0.001$) and fourth-year students ($P = 0.016$). Similarly, in Item 2 (fear of appearing immature), third-year students reported the strongest fear (mean = 2.1; 3rd vs. 2nd: P = 0.030; 3rd vs. 4th: $P = 0.009$).

Table 2
Comparison of student responses and utilization intentions by academic year.

Item	Mean Score			*P* value		
	2nd Year	3rd Year	4th Year	2nd Year vs. 3rd Year	2nd Year vs. 4th Year	3rd Year vs. 4th Year
1	2.9	2.0	2.6	< 0.001	0.159	0.016
2	2.6	2.1	2.7	0.030	0.49	0.009
3	2.6	2.5	2.5	0.495	0.613	0.872
4	2.3	2.7	2.8	0.052	0.009	0.575
5	2.5	2.3	2.5	0.278	0.755	0.495
6	3.2	3.6	3.2	0.021	0.907	0.051
7	2.9	2.7	2.7	0.305	0.534	0.722
8	2.3	2.1	2.5	0.294	0.402	0.087
9	2.3	2.2	2.6	0.645	0.123	0.072
10	2.5	2.0	2.7	0.028	0.322	0.005
11	2.5	2.4	2.7	0.802	0.346	0.260
12	2.7	2.9	3.1	0.397	0.116	0.513
13	2.3	2.1	2.7	0.391	0.057	0.014
14	2.9	2.7	3	0.335	0.737	0.218
15	2.6	2.4	2.7	0.232	0.903	0.202
16	2.2	2.0	2.3	0.388	0.616	0.200
17	2.2	2.1	2.5	0.748	0.257	0.189

Conversely, in Item 10 (evaluating perceived reduction of burden in nursing care planning through AI), third-year students scored 2.0 (2nd-year: 2.5, 4th-year: 2.7), reflecting a significantly greater sense of workload reduction compared with other cohorts (2nd vs. 3rd: P = 0.028; 3rd vs. 4th: *P* = 0.005). Regarding future intentions to actively utilize AI (Item 13), third-year students expressed the highest willingness (mean = 2.1; 3rd vs. 4th: *P* = 0.014).

These findings indicate that third-year students concurrently experience high psychological strain related to clinical training alongside a high demand for AI assistance. Third-year students engage in intensive, domain-specific clinical practica involving complex patient assessments and extensive care-plan documentation. Consequently, apprehension regarding consulting instructors (Item 1) and exposing intellectual immaturity (Item 2) manifests more intensely than in other academic years.

In response to advanced clinical assessment demands, generative AI mitigates the care-planning load (Item 10) and offers psychological reassurance through preliminary trial validation. By the fourth year, anxiety and dependence level off due to increased clinical familiarity and competence; thus, the mental support value of AI is highest during the transition into full clinical practica in the third year.

Comparison of nursing students' awareness of AI utilization by category

In the categorical comparisons (Table 3), elevated scores were observed among third- and fourth-year students in "Expectations and Challenges of AI Utilization," with a statistically significant difference between third- and fourth-year cohorts ($P = 0.028$).

Table 3
Comparison of student perceptions toward generative AI by domain category and academic year.

Category	Mean Score			*P* value		
	2nd Year	3rd Year	4th Year	2nd Year vs. 3rd Year	2nd Year vs. 4th Year	3rd Year vs. 4th Year
Psychological safety in nursing practicum	2.7	2.5	2.7	0.094	0.817	0.095
Generative AI usage and its psychological impact	2.5	2.4	2.7	0.381	0.232	0.062
Expectations and challenges of AI utilization	2.5	2.3	2.2	0.236	0.262	0.028

Comparative verification by expectation level of AI utilization

Participants were categorized into a "high expectation group" (2nd-year: n = 43, 3rd-year: n = 44, 4th-year: n = 23) and a "low expectation group" (2nd-year: n = 28, 3rd-year: n = 13, 4th-year: n = 27) based on their expectation level regarding AI utilization (Table 4). Highly significant differences ($P < 0.001$) were observed across all survey categories between the two groups. Students with higher expectations reported significantly greater psychological benefits, such as reassurance gained from organizing information with AI in advance and a reduction in feelings of isolation during training.

Table 4
Comparison of psychological metrics stratified by AI expectation level.

Domain/ Variable	High Expectation Group	Low Expectation Group	*P* value
Grade Distribution (n)			0.004
2nd Year	43	28	
3rd Year	44	13	
4th Year	23	27	
Category (Mean Score)			
Psychological safety in clinical practicum	2.5	2.9	< 0.001
Generative AI usage and its psychological impact	2.1	3.3	< 0.001
Expectations and challenges regarding AI utilization	2.0	3.2	< 0.001

Purposes of AI utilization across academic years

The self-reported purposes of AI utilization during clinical practica across academic years are summarized in Fig. 1. AI was most frequently utilized for general information gathering, acquiring ideas for nursing care plans, and organizing personal thoughts. The proportion of students using AI for basic information gathering decreased as academic year advanced (1st-year: 67.6%, 2nd-year: 56.1%, 3rd-year: 36.0%). Conversely, the proportion of students utilizing AI to derive insights and hints for nursing care plans increased progressively in higher academic years (1st-year: 25.4%, 2nd-year: 66.7%, 3rd-year: 72.0%).

Discussion

The findings of this study demonstrate that generative AI functions as an effective psychological buffer to alleviate interpersonal risks experienced by nursing students when interacting with instructors and faculty. Crucially, third-year students—who undergo full-scale domain-specific clinical training—reported the highest anxiety regarding consulting clinical instructors while simultaneously exhibiting a prominent reduction in nursing care planning burden and a strong intention for active AI adoption. Furthermore, students in the high AI-expectation group demonstrated significantly more positive scores across psychological safety and psychological impact domains compared with those in the low-expectation group.

In healthcare environments and nursing education, psychological safety, where individuals feel comfortable voicing questions and concerns without fear of negative consequences, is essential for team communication, clinical learning, and healthcare quality [2]. However, students frequently refrain

from asking questions or seeking feedback due to hierarchical dynamics and evaluation pressure. Lu et al. proposed a model in which AI conversational agents serve as an initial psychological buffer for isolated individuals hesitating to seek guidance, ultimately bridging them toward constructive relationships with professional supervisors [4]. In our study, students gained reassurance and self-efficacy by utilizing AI prior to instructor consultations to verify basic knowledge and structure their clinical reasoning. This demonstrates that AI functions as a "psychologically safe consulting partner." Preliminary rehearsal through dialogue with AI softens interpersonal barriers, facilitating proactive and structured consultation behaviors with instructors.

Prior research on AI introduction in clinical practice highlights that AI support in administrative and record-keeping tasks alleviates workload, thereby creating temporal and psychological capacity for healthcare workers [5–8]. The finding that third-year students experienced a substantial reduction in care-planning burden reflects their acute need during a transition period characterized by heavy documentation requirements and demands for higher-level clinical judgment. Utilizing AI to streamline preliminary planning is not mere avoidance of effort; rather, it serves as a valid educational strategy to create cognitive bandwidth for patient care and thought organization.

Nirgiz et al. demonstrated that clinical nurses with lower anxiety regarding skill acquisition exhibited more positive attitudes toward AI adoption [9]. It has also been reported that higher familiarity and trust correspond to lower technology anxiety and greater acceptance. Li et al. demonstrated that chatbot-based conversational interventions effectively reduce stress among university students [10]. In line with these findings, students in our high-expectation group achieved significantly higher psychological safety scores. When students understand the utility of AI and adhere to structured guidelines, AI integration contributes to anxiety reduction and supports positive clinical learning.

Furthermore, studies on conversational AI indicate high user satisfaction when AI serves complementary roles in information provision and emotional reassurance [11]. The low resistance and high sense of reassurance observed among nursing students utilizing AI reinforce previous evidence that conversational AI complements users' cognitive and emotional needs.

Conversely, generative AI utilization presents notable challenges. Bodur et al. emphasized ethical concerns regarding data privacy and accountability, alongside the risk that excessive reliance on AI may compromise critical thinking and human-centered nursing care [5]. Survey items in our study also reflected student concerns regarding being perceived as "cutting corners" by faculty, as well as the necessity for strict patient privacy compliance [13]. Nursing educational institutions and clinical partner sites must establish clear operational guidelines and educational frameworks to ensure students critically evaluate AI outputs, uphold information ethics, and use AI autonomously to support, rather than replace, clinical reasoning [12, 13].

This study has several limitations. First, it was conducted at a single institution in Japan with a specific sample size, which may limit the generalizability of findings to other institutions with different curricula or organizational cultures. Second, reliance on a self-administered questionnaire introduces potential

reporting and social desirability biases, particularly regarding instructor-related anxiety and ethical AI use. Third, the cross-sectional design precludes establishing causal relationships between AI utilization, psychological safety, and long-term academic outcomes. Fourth, individual differences in baseline digital literacy were not fully controlled. Finally, as generative AI rapidly evolves, student perceptions and ethical considerations will continue to shift. Future longitudinal, multi-center studies with objective learning outcomes are warranted.

Conclusion

Generative AI functions effectively as a "thought organization and rehearsal tool" prior to consulting clinical instructors, significantly improving psychological safety among nursing students—particularly third-year students at the peak of their clinical training strain. AI integration demonstrated clear benefits in mitigating care-planning workloads and alleviating feelings of isolation. Moving forward, establishing rigorous ethical guidelines, promoting receptive understanding among clinical educators, and developing supportive educational environments that integrate AI into nursing curricula will be essential.

Acknowledgments and Disclosures

Declarations

Conflict of interest:

None

Conflict of Interest

(COI): The authors declare no relevant conflicts of interest to disclose.

Author Contribution

Study conception and design: Tsutomu Namikawa.Acquisition of data: Tsutomu Namikawa, Michika Kannan, Hinata Omine, Miyu Akashi, Moeri Kojima.Analysis and interpretation of data: Tsutomu Namikawa, Yumi Okinaka, Yoko Ishioka, Kyoko Osaka, Kohei Araki, Keiichiro Yokota, Hiromichi Maeda, Hiroyuki Kitagawa, Satoru Seo.Drafting of manuscript: Tsutomu Namikawa.Critical revision of manuscript: Tsutomu Namikawa and Satoru Seo.All authors reviewed the manuscript.

Acknowledgments:

A portion of this study was presented at the 79th Kochi Medical Association Scientific Meeting.

References

1. LaPlante RD, Ponte PR, Magny-Normilus C. Essential elements and outcomes of psychological safety in the healthcare practice setting: A systematic review. Appl Nurs Res. 2025;83:151946.
2. Bahadurzada H, Edmondson A, Kerrissey M. Psychological Safety as an Enduring Resource Amid Constraints. Int J Public Health. 2024;69:1607332.
3. Morrow E, Zidaru T, Ross F, Mason C, Patel KD, Ream M, Stockley R. Artificial intelligence technologies and compassion in healthcare: A systematic scoping review. Front Psychol. 2023;13:971044.
4. Lu Y, Yuan GF, Liang J. From isolation to connection: A nursing model for AI-enhanced mental health crisis management in rural Chinese adolescent communities. Arch Psychiatr Nurs. 2026;62:152127.
5. Bodur G, Cakir H, Turan S, Seren AKH, Goktas P. Artificial intelligence in nursing practice: a qualitative study of nurses' perspectives on opportunities, challenges, and ethical implications. BMC Nurs. 2025;24(1):1263.
6. El Arab RA, Alshakihs AH, Alabdulwahab SH, Almubarak YS, Alkhalifah SS, Abdrbo A, Hassanein S, Sagbakken M. Artificial intelligence in nursing: a systematic review of attitudes, literacy, readiness, and adoption intentions among nursing students and practicing nurses. Front Digit Health. 2025;7:1666005.
7. Shishehgar S, Murray-Parahi P, Alsharaydeh E, Mills S, Liu X. Artificial Intelligence in Health Education and Practice: A Systematic Review of Health Students' and Academics' Knowledge, Perceptions and Experiences. Int Nurs Rev. 2025;72(2):e70045.
8. Yu X, Wu W, Ni J, Lin Z. Artificial Intelligence in Nursing Education: A Bibliometric Analysis. Nurs Res Pract. 2026;2026:1538554.
9. Nirgiz C, Sarı MK, Çaylı N. The relationship between nurses' anxiety and attitudes towards artificial intelligence and examination of influencing factors. BMC Nurs. 2026;25(1):122.
10. Li Y, Chung TY, Lu W, Li M, Ho YWB, He M, Mei X, Chen D, Bressington D. Chatbot-Based Mindfulness-Based Stress Reduction Program for University Students With Depressive Symptoms: Intervention Development and Pilot Evaluation. J Am Psychiatr Nurses Assoc. 2025;31(4):398–411.
11. Li K, Wu S, Zhang Y, Zhu B, Qi Z, Hou S, Wang W. The Usability and Experience of Artificial Intelligence-Based Conversational Agents in Health Education for Cancer Patients: A Scoping Review. J Clin Nurs. 2025. 10.1111/jocn.70020.
12. El Arab RA, Al Moosa OA, Sagbakken M, Ghannam A, Abuadas FH, Somerville J, Al Mutair A. Integrative review of artificial intelligence applications in nursing: education, clinical practice, workload management, and professional perceptions. Front Public Health. 2025;13:1619378.
13. Rony MKK, Numan SM, Akter K, Tushar H, Debnath M, Johra FT, Akter F, Mondal S, Das M, Uddin MJ, Begum J, Parvin MR. Nurses' perspectives on privacy and ethical concerns regarding artificial intelligence adoption in healthcare. Heliyon. 2024;10(17):e36702.

Figures

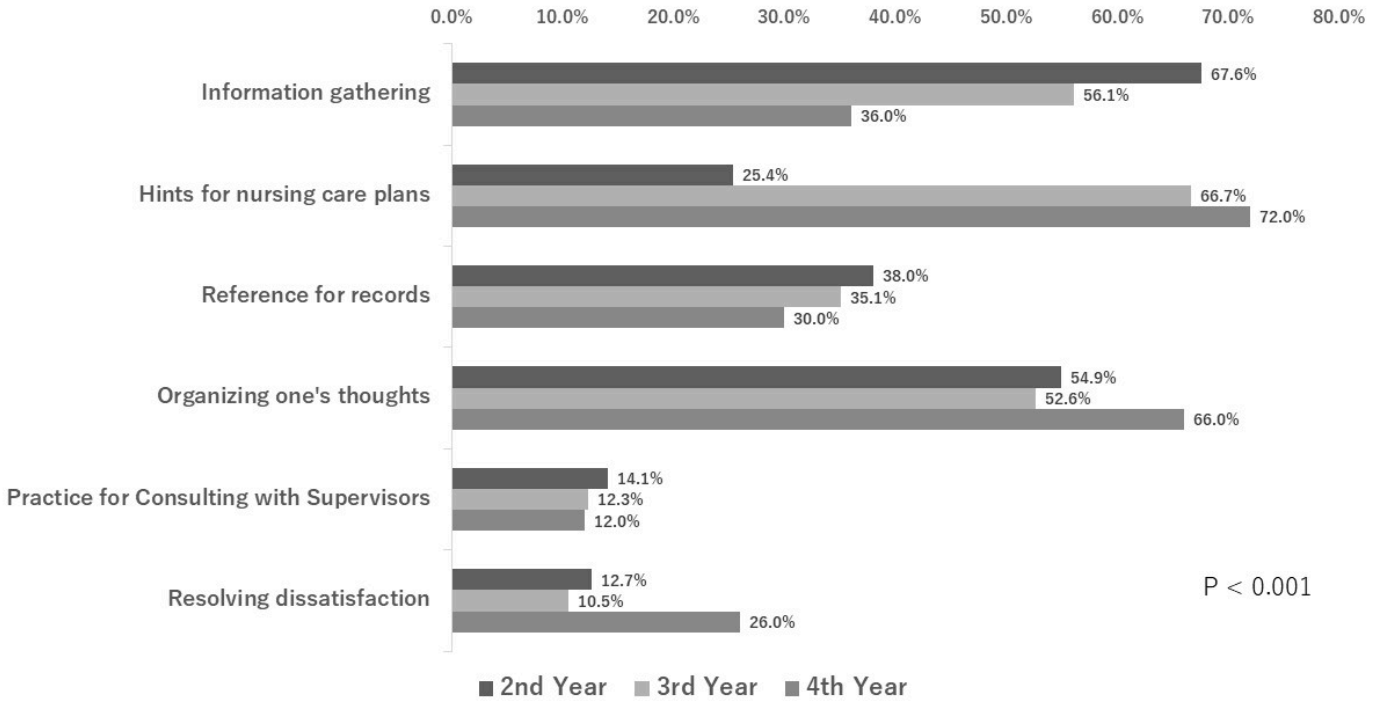


Figure 1

Figure 1

AI utilization purposes in clinical training across academic years.

Comparison of the proportion of nursing students utilizing generative AI for various purposes (e.g., information gathering, clarifying thoughts, and preparation for clinical instructor consultation) across academic years. Significant shifts in primary utilization patterns were observed as academic years progressed ($P < 0.001$).

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- BMCNAINSTables.docx