International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

A Descriptive Study to Assess Nursing Informatics Skills and Perceived Competence to Work in Artificial Intelligence Enabled Healthcare Settings Among B.Sc. Nursing Students at Selected Nursing Colleges in Kerala

Lissy P J[1], Jasmine Santha J[2]

[1]PhD Scholar, Department of Medical Surgical Nursing, Nirwan University, Jaipur, India
[2]Professor & Principal, S N College of Nursing, Sri Ganganagar, Rajasthan, India

Abstract

This descriptive study was conducted to assess the nursing informatics skills and perceived competence to work in artificial intelligence enabled healthcare settings among nursing students in Kerala. A cross-sectional descriptive research design was used for the study. A sample of 139 nursing students was selected from selected nursing colleges in Kerala using a non-probability convenience sampling technique. Data were collected using a structured demographic proforma, an 18-item Nursing Informatics Skills scale, and a 15-item Perceived Competence scale. The collected data were analyzed using descriptive and inferential statistics with computer-based statistical software. The results revealed that the mean score for nursing informatics skills was 63.58 with a standard deviation of 12.51, and the mean score for perceived competence was 52.89 with a standard deviation of 9.28. In this study, 56.12 percent of the students possessed high informatics skills, while 51.80 percent had a moderate level of perceived competence to work in artificial intelligence settings. Chi-square analysis showed that personal laptop ownership was significantly associated with both informatics skills and perceived competence scores. Clinical exposure to electronic health records was also significantly associated with perceived competence levels. A very strong, statistically significant positive correlation was found between informatics skills and perceived competence scores among the students. The study concludes that regular access to workstation devices and early clinical exposure to digital systems are critical for preparing the future nursing workforce to work in technology-rich clinical environments.

Keywords: Nursing Informatics, Artificial Intelligence, Perceived Competence, India, Nursing Education

Introduction

In modern healthcare, technology is advancing at a very rapid pace. Healthcare delivery systems around the world are changing from traditional paper-based records to highly digitized systems.[1] Nursing informatics integrates nursing science, computer science, and information science to manage and communicate data, information, knowledge, and wisdom in clinical practice (Saba V.K. and McCormick K.A., 2021).[6] In an increasingly digital world, nursing informatics plays a critical role in improving patient

care quality, enhancing patient safety, and reducing clinical errors.[4]

Historically, the practice of nursing informatics can be traced back to Florence Nightingale, who used clinical data to improve healthcare outcomes.[6] The introduction of computers in healthcare during the 1950s and 1970s laid the foundation for modern hospital information systems.[6] The American Nurses Association recognized nursing informatics as a specialized nursing specialty in 1992.[9] To guide the integration of informatics into nursing education, the Technology Informatics Guiding Education Reform initiative was started in 2006.[11] This initiative established core informatics competencies for nurses, which include basic computer skills, information literacy, and information management.[13]

Recently, the integration of artificial intelligence has started transforming clinical environments.[15] Artificial intelligence refers to computer systems that can perform complex tasks which usually require human intelligence, such as logical problem-solving, clinical decision-making, and natural language processing.[17] In clinical settings, artificial intelligence is being used for real-time patient monitoring, clinical decision support systems, automated documentation, predictive analytics, and automated drug calculations.[6] Since nurses represent the largest group of healthcare providers in the workforce, they are the frontline users who must interact with these advanced technologies daily.[4] Therefore, preparing nursing students to work in artificial intelligence enabled healthcare settings has become a very urgent requirement for nursing education programs.[15]

In India, major national initiatives are driving the digitization of healthcare.[23] The Government of India launched the Ayushman Bharat Digital Mission in September 2021 to establish a unified and integrated digital health infrastructure across the country.[24] The Ayushman Bharat Digital Mission aims to create unique digital identifiers like the Ayushman Bharat Health Account for every citizen, build registries for healthcare professionals, and enable seamless, consent-based sharing of longitudinal health records across hospitals and clinics.[24] To support these national goals, the Indian Nursing Council revised the B.Sc. Nursing curriculum in 2021.[27] Under the new syllabus, a mandatory course on "Health/Nursing Informatics and Technology" was introduced in the 2nd semester of the B.Sc. Nursing program to ensure uniform digital standards.[27] This curriculum change aims to equip future nurses with essential digital literacy, database search capabilities, and experience with electronic medical records.[31]

Need for the Study

Although the revised Indian Nursing Council syllabus has made informatics training compulsory, the actual implementation across colleges in India faces several practical challenges.[13] Many nursing colleges have restricted access to computer laboratories, lack structured software training, and have limited technical resources.[13] This creates a massive gap between what is taught in the classroom and what is required in clinical practice.[12] Studies show that while modern nursing students are "digital natives" who spend a lot of time daily on mobile phones for personal entertainment, they often lack professional computer skills like working with spreadsheets, creating structured reports, or searching academic databases like Google Scholar or PubMed.[14]

In Kerala, the health department has implemented the eHealth Kerala initiative under the State Digital Health Mission.[36] This project is currently functional in more than 465 government hospitals, connecting primary health centers to medical colleges through a centralized healthcare cloud system.[36] Since hospitals in Kerala are rapidly moving towards digital charting and automated workflows, nursing students must develop professional informatics skills before graduating.[37]

There is a major lack of research in Kerala regarding how student informatics skills influence their

psychological readiness and perceived competence to work in artificial intelligence enabled settings.[37] If students do not feel prepared, they will experience technology anxiety, which can lead to clinical errors and compromise patient safety when they enter the digital clinical workforce.[21] Therefore, this study was conducted to evaluate the actual informatics skills of nursing students and their perceived competence for artificial intelligence driven clinical environments. This will help educators and clinical administrators to make necessary changes in training methods (Muthuram G., 2024).[39]

Objectives and Hypotheses

The specific objectives of the study were:

1. To assess the nursing informatics skills of nursing students.
2. To assess the perceived competence of nursing students to work in artificial intelligence enabled healthcare settings.
3. To find the association between nursing informatics skills and selected demographic variables.
4. To find the association between perceived competence and selected demographic variables.
5. To correlate the informatics skills and perceived competence scores among nursing students.

To achieve these objectives, the following null hypotheses were formulated:

- H01: There is no significant association between the level of nursing informatics skills and selected demographic variables among nursing students.
- H02: There is no significant association between the level of perceived competence to work in artificial intelligence enabled healthcare settings and selected demographic variables among nursing students.
- H03: There is no significant correlation between the nursing informatics skills and perceived competence scores among nursing students.

Methodology

A non-experimental cross-sectional descriptive research design was used for this study. The study was conducted at selected nursing colleges in Kerala. These colleges are affiliated with the Kerala University of Health Sciences Thrissur and follow the standard syllabus prescribed by the Indian Nursing Council. The target population consisted of B.Sc. Nursing, General Nursing and Midwifery, and Post Basic B.Sc. Nursing students enrolled in these colleges.

A sample of 139 nursing students was selected using a non-probability convenience sampling technique. The inclusion criteria for the study were students who were studying in the selected colleges, available during the period of data collection, and willing to participate. Students who were absent during data collection were excluded from the study.

Data collection was performed using a structured tool consisting of three sections. Section A was a demographic questionnaire containing 11 items, which collected information on age, gender, course of study, academic year, college type, place of residence, device ownership (mobile phone, laptop, tablet), formal computer training, daily screen time, learning management system experience, and clinical exposure to electronic health records.

Section B was a Nursing Informatics Skills scale consisting of 18 items distributed across three domains: Basic Computer Skills (6 items), Information Management Skills (6 items), and Applied Informatics Skills (6 items). Each item was rated on a 5-point scale (1 = Not Competent, 2 = Somewhat Competent, 3 = Moderately Competent, 4 = Very Competent, 5 = Highly Competent). The total score ranged from 18 to 90, categorized as low skills (18-36), moderate skills (37-63), and high skills (64-90).

Section C was a Perceived Competence scale consisting of 15 items designed to assess the psychological readiness and adaptability of students to work with artificial intelligence tools in clinical settings. It used a 5-point Likert scale (5 = Strongly Agree, 4 = Agree, 3 = Undecided, 2 = Disagree, 1 = Strongly Disagree). Two items (item 7 regarding nervousness about artificial intelligence and item 13 regarding technology changes doubt) were negative and were reverse-scored. The total score ranged from 15 to 75, categorized as low competence (15-34), moderate competence (35-54), and high competence (55-75).

To ensure the validity and reliability of the research tools, they were distributed to nursing and informatics experts for validation.[42] Modifications were made based on their suggestions, and the final tools were pilot-tested.[42] The internal consistency of the tools was evaluated using Cronbach's alpha, which showed high reliability with values of 0.85 for the skills scale and 0.91 for the perceived competence scale.

Data collection was carried out using an online questionnaire. Prior to data collection, formal approval was obtained from the Institutional Research Committee and the heads of the selected colleges. Implied informed consent was obtained from each participant before they filled out the survey. Anonymity and confidentiality of the data were strictly maintained.

Data were analyzed using computer-based statistical software. Descriptive statistics, such as frequency, percentage, mean, and standard deviation, were calculated to describe the demographic variables, informatics skills, and perceived competence. Inferential statistics, including Chi-square tests of independence, were performed to find the association between demographic variables and levels of skills and competence. Pearson correlation coefficient was calculated to determine the relationship between informatics skills and perceived competence scores among the students.

The mathematical formula used for calculating the Chi-square statistic was:

$$\chi^2 = \sum \frac{(O - E)^2}{E} \quad (1)$$

In this equation, O represents the observed frequency in each category, and E represents the expected frequency.

The Pearson correlation coefficient was calculated using the formula:

$$r = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2]}} \quad (2)$$

In this formula, X and Y represent individual scores of informatics skills and perceived competence, respectively, and N represents the sample size of 139.

A p-value of less than 0.05 was considered statistically significant.

Results

The collected data were organized, coded, and presented in the following tables.

Table 1: Frequency and Percentage Distribution of Demographic Variables of Nursing Students N = 139

Demographic Variable	Category	Frequency (f)	Percentage (%)
Age (Years)	18	20	14.39

Demographic Variable	Category	Frequency (f)	Percentage (%)
	19	27	19.42
	20	28	20.14
	21	32	23.02
	22	32	23.02
Gender	Female	124	89.21
	Male	15	10.79
Course of Study	B.Sc. Nursing	102	73.38
	GNM	25	17.99
	Post Basic B.Sc.	12	8.63
Academic Year	1st Year	32	23.02
	2nd Year	36	25.90
	3rd Year	37	26.62
	4th Year	34	24.46
College Type	Government	41	29.50
	Mission	27	19.42
	Private	71	51.08
Place of Residence	Rural	55	39.57
	Semi-urban	42	30.22
	Urban	42	30.22
Mobile Phone Ownership	Yes	139	100.00
Laptop Ownership	No	70	50.36
	Yes	69	49.64
Tablet Ownership	No	114	82.01

Demographic Variable	Category	Frequency (f)	Percentage (%)
	Yes	25	17.99
Formal Computer Training	None	97	69.78
	< 3 months	10	7.19
	3–6 months	16	11.51
	> 6 months	16	11.51
Daily Screen Time	< 1 hour	11	7.91
	1–2 hours	31	22.30
	2–4 hours	70	50.36
	> 4 hours	27	19.42
LMS Experience	No	98	70.50
	Yes	41	29.50
Electronic Records Exposure	No	62	44.60
	Yes	77	55.40

The data in Table 1 shows that most of the participants belonged to the age group of 21 to 22 years (46.04 percent), were female (89.21 percent), and were pursuing a B.Sc. Nursing course (73.38 percent). The distribution across the four academic years was almost equal. Slightly more than half of the students studied in private colleges (51.08 percent), and 39.57 percent resided in rural areas. Notably, 100.00 percent of the students owned a mobile phone, but only 49.64 percent owned a personal laptop, and only 17.99 percent owned a tablet. A vast majority of the students (69.78 percent) had never received any formal computer training, and 70.50 percent had no experience working with a learning management system. However, more than half (55.40 percent) had been exposed to electronic record-keeping systems in clinical settings.

Table 2: Level of Nursing Informatics Skills and Perceived Competence among Nursing Students N = 139

Level	Informatics Skills Frequency (f)	Informatics Skills Percentage (%)	Perceived Competence Frequency (f)	Perceived Competence Percentage (%)
High	78	56.12	62	44.60

Moderate	59	42.45	72	51.80
Low	2	1.44	5	3.60
Total	**139**	**100.00**	**139**	**100.00**

The results in Table 2 indicate that more than half of the nursing students (56.12 percent) had high nursing informatics skills, while 42.45 percent had moderate skills, and only 1.44 percent had low skills. Regarding perceived competence to work in artificial intelligence enabled settings, 44.60 percent had high competence, 51.80 percent had moderate competence, and 3.60 percent had low competence.

Table 3: Mean and Standard Deviation of Total Skills and Perceived Competence Scores
N = 139

Variable	Mean Score	Standard Deviation (SD)	Possible Range
Informatics Skills	63.58	12.51	18–90
Perceived Competence	52.89	9.28	15–75

The descriptive statistics in Table 3 reveal that the students had a mean nursing informatics skill score of 63.58 (SD = 12.51) and a mean perceived competence score of 52.89 (SD = 9.28). These values reflect a moderate to high level of digital capability within the studied group.

Table 4: Summary of Chi-Square Test Results between Demographic Variables and Levels of Informatics Skills and Perceived Competence
N = 139

Demographic Variable	Informatics Skills Chi-Square	df	p-value	Perceived Competence Chi-Square	df	p-value
Age (Years)	5.81	8	0.67	7.37	8	0.50
Gender	4.44	2	0.11	0.53	2	0.77
Course of Study	1.58	4	0.81	0.62	4	0.96
Academic Year	5.27	6	0.51	4.72	6	0.58
College Type	3.67	4	0.45	1.77	4	0.78
Place of Residence	6.84	4	0.14	1.76	4	0.78

Demographic Variable	Informatics Skills Chi-Square	df	p-value	Perceived Competence Chi-Square	df	p-value
Laptop Ownership	**11.05**	**2**	**0.004**	**8.65**	**2**	**0.013**
Tablet Ownership	1.77	2	0.41	**6.34**	**2**	**0.042**
Computer Training	8.55	6	0.20	4.41	6	0.62
Daily Screen Time	5.07	6	0.53	5.71	6	0.46
LMS Experience	1.86	2	0.39	0.83	2	0.66
Electronic Records	1.70	2	0.43	**6.49**	**2**	**0.039**

The statistical results in Table 4 show that personal laptop ownership has a highly significant association with both informatics skills ($p = 0.004$) and perceived competence levels ($p = 0.013$). Tablet ownership ($p = 0.042$) and clinical electronic records exposure ($p = 0.039$) are also significantly associated with perceived competence levels. Other variables, including age, gender, course of study, academic year, college type, place of residence, and computer training, did not show any statistically significant association with either of the two main variables.[1] Therefore, the null hypotheses H01 and H02 are partially rejected.

Table 5: Cross-Tabulation of Laptop Ownership with Nursing Informatics Skills Levels
N = 139

Laptop Ownership	High Skills f (%)	Moderate Skills f (%)	Low Skills f (%)	Total f (%)
No	30 (42.86)	38 (54.29)	2 (2.86)	70 (100.00)
Yes	48 (69.57)	21 (30.43)	0 (0.00)	69 (100.00)
Total	**78 (56.12)**	**59 (42.45)**	**2 (1.44)**	**139 (100.00)**

The data in Table 5 shows that among students who owned a personal laptop, 69.57 percent possessed high informatics skills, and 0.00 percent had low skills. Conversely, among those who did not own a laptop, only 42.86 percent had high skills, and 2.86 percent had low skills. This difference was highly significant ($p = 0.004$).[1]

Table 6: Cross-Tabulation of Electronic Records Exposure with Perceived Competence Levels
N = 139

Electronic Records	High Competence f (%)	Moderate Competence f (%)	Low Competence f (%)	Total f (%)
No	27 (43.55)	30 (48.39)	5 (8.06)	62 (100.00)
Yes	35 (45.45)	42 (54.55)	0 (0.00)	77 (100.00)
Total	**62 (44.60)**	**72 (51.80)**	**5 (3.60)**	**139 (100.00)**

The data in Table 6 indicates that among students who had been exposed to electronic record-keeping systems in clinical settings, 0.00 percent demonstrated low perceived competence, and 54.55 percent had moderate competence. In contrast, among those without clinical exposure to electronic records, 8.06 percent had low perceived competence. This difference was statistically significant ($p = 0.039$).

Table 7: Correlation Between Nursing Informatics Skills and Perceived Competence Scores
N = 139

Variable	Pearson Correlation Coefficient (r)	p-value	Significance
Skills vs Perceived Competence	0.926	< 0.001	Extremely Significant

The correlation data in Table 7 indicates an extremely strong, positive, and statistically significant relationship between informatics skills and perceived competence scores among the nursing students ($r = 0.926$, $p < 0.001$). This means that as the informatics skills of the students increase, their perceived competence to work in artificial intelligence enabled healthcare settings also increases. Therefore, the null hypothesis H03 is rejected.

Discussion

The results of this study show critical trends regarding how ready nursing students are for the digitized healthcare system in India.

A very important finding of this study is the extremely strong positive correlation ($r = 0.926$, $p < 0.001$) between informatics skills and perceived competence to work in artificial intelligence enabled settings. This strong relationship suggests that technical skills and psychological readiness are closely connected.[46] When a person has mastery over basic tasks, their confidence to handle complex, related systems increases.[46] In our study, students who knew how to operate computers, format documents, enter data, and use online forms (Section B) felt significantly more confident to adapt to clinical artificial intelligence systems, use automated decision support, and manage data safely (Section C). Conversely, students who

have low computer skills feel highly nervous about technological changes in the hospital, which can lead to technological stress and clinical errors.[21]

Another critical finding is that laptop ownership is significantly associated with both informatics skills ($p = 0.004$) and perceived competence ($p = 0.013$).[1] Although 100.00 percent of the students own mobile phones, mobile phones are primarily used for entertainment, messaging, and simple social media browsing. A mobile phone does not help a student to learn professional workstation skills like data entry, file organization, academic referencing, and document formatting.[14] Laptops provide a structured keyboard interface and larger screens, which are highly necessary for learning professional digital tasks.[14] This shows that the common belief that all modern youth are digital experts because they use smartphones is a big myth.[35] To develop real clinical informatics competency, students must have regular, hands-on access to workstation computers.[4]

The study also showed a significant association between clinical exposure to electronic health records and perceived competence for artificial intelligence settings ($p = 0.039$), but no significant association with general informatics skills ($p = 0.43$). This is an interesting second-order insight. It indicates that seeing and using digital charts during clinical postings helps to demystify technology.[12] It reduces technology anxiety and builds a positive attitude towards computerized care.[21] However, clinical exposure alone does not teach students how to perform technical operations like file management or database searching, which must be taught in a structured college laboratory.[13] Therefore, there must be a combination of college laboratory training and hands-on hospital exposure.[5]

An unexpected finding was the statistically significant association between tablet ownership and perceived competence ($p = 0.042$), where tablet users showed a higher percentage of low competence (12.00 percent) compared to non-tablet users (1.75 percent). This could indicate that over-reliance on intermediate touchscreen mobile devices, without experiencing full professional desktop environments, can create confusion and a false sense of security.[33] When these students are exposed to complex clinical software, they may experience higher anxiety and lower perceived competence.[21]

These findings are consistent with previous studies in India and globally. Beutlin et al. (2026) conducted a study in Nagercoil and found that while nursing students have moderate confidence in basic artificial intelligence principles, they have low confidence when using these tools in clinical practice, suggesting a major gap in hands-on clinical training.[39] Sharon Raichal Jai et al. (2026) at KMCT College of Nursing, Kozhikode, also reported that although nursing students have moderate knowledge, their practice in artificial intelligence is limited, and they require structured clinical training.[3] Muthuram et al. (2024) and Ganga Bhavani (2022) have also emphasized that the Indian nursing curriculum must be upgraded with computer-based practice and simulated electronic health records to make students clinical-ready.[4]

Conclusion

This study evaluated the nursing informatics skills and perceived competence of nursing students to work in artificial intelligence enabled healthcare settings in Kerala. The findings show that while basic phone-based literacy is ubiquitous, professional workstation skills are highly dependent on laptop ownership and clinical exposure. There is a very strong, highly significant positive correlation between a student's basic informatics skills and their psychological confidence to handle advanced healthcare artificial intelligence technologies.

As the Ayushman Bharat Digital Mission and eHealth Kerala continue to digitize healthcare rapidly, nursing educational institutions must take immediate steps to bridge the gap between classroom theory

and clinical application.[24] Relying on basic mobile literacy is not enough to prepare the future workforce for safe, high-quality, and error-free digital clinical practice.[21]

Acknowledgement
We Acknowledge all the participants and the institutions who have cooperated To conduct this study

References

1. Gunaseelan SK, Natarajan R, Subahan A, Samayanan S, Pandian K, Jayakumar D. Assessing Nursing Informatics Knowledge Among Staff Nurses in A Tertiary Care Hospital, Madurai. Int J Multidiscip Res. 2026;8(3). Available from: https://www.ijfmr.com/papers/2026/3/78784.pdf
2. Jai SR, P F, Shivani, Bineesh C, Haq I, Tp S, et al. The Knowledge, Attitude and Practice Regarding Artificial Intelligence among Nursing Students. Int J Res Sci Innov. 2026 Jan;13(1):2050-6. Available from: https://rsisinternational.org/journals/ijrsi/uploads/vol13-iss1-pg2050-2056-202602_pdf.pdf
3. Muthuram G, Dhakshinamoorthy S, Mary HR. Assessment of Nurses' Competencies in Informatics – Towards Embracing Digital Future. Res Rev Int J Multidiscip. 2024 Oct;9(10):95-105. doi: 10.31305/rrijm.2024.v09.n10.010
4. Afra A, Ban M, Seneysel Bachari S. Assessment of Informatics Competency Among Nursing Faculty Members and Its Application in Educating Nursing Students at Abadan Nursing Faculty. J Med Edu. 2024 Nov 06;23(1):e156577. doi: 10.5812/jme-156577
5. Nashwan AJ, Cabrega JCA, Othman MI, Khedr MA, Osman YM, El-Ashry AM, et al. The evolving role of nursing informatics in the era of artificial intelligence. Int Nurs Rev. 2025 Jan 10;72(1):e13084. doi: 10.1111/inr.13084. PMID: 39794874
6. Beutlin R, Steward A, Jude SI. Preparedness of Nursing students to Integrate Artificial Intelligence (AI) Technologies in Health Care Settings. Asian J Nurs Educ Res. 2026;16(1):15-9. doi: 10.52711/2349-2996.2026.00004
7. ResearchGate. 9947 PDFs | Review articles in NURSING INFORMATICS. [Internet]. ResearchGate; 2026 [cited 2026 May 22]. Available from: https://www.researchgate.net/topic/Nursing-Informatics~Health-Informatics/publications
8. Sultan A, Naz N, Bibi A, Jamal H, Sanaullah. KNOWLEDGE OF UNDERGRADUATE NURSING STUDENTS REGARDING NURSING INFORMATICS IN KHYBER MEDICAL UNIVERSITY PESHAWAR. J Peoples Univ Med Health Sci Women. 2023 Mar 31;13(1):117-23. doi: 10.46536/jpumhs/2023/13.01.394
9. Kokilamma B, Rupa B, Rani PS, Sreelatha M. KNOWLEDGE REGARDING NURSING INFORMATICS AMONG B.SC NURSING STUDENTS AT COLLEGE OF NURSING SVIMS, TIRUPATI. J Emerg Technol Innov Res. 2019 Jul;6(7):24-33. Available from: https://www.jetir.org/papers/JETIR1907K04.pdf
10. afoemax01. Introduction to Nursing Informatics. [Internet]. Scribd; 2024 [cited 2026 May 22]. Available from: https://www.scribd.com/document/886476703/Introduction-to-Nursing-Informatics
11. Fetter MS. Graduating Nurses' Self-Evaluation of Information Technology Competencies. J Nurs Educ. 2009 Feb;48(2):86-90. doi: 10.3928/01484834-20090201-05
12. Verma M, Gupta S. Competency in informatics for nursing professional in india: Imbibing the tech-culture among nursing professionals. Int J Nurs Educ. 2019 Jan;11(1):67-72. doi: 10.5958/0974-9357.2019.00015.1

13. Verma MP, Gupta S. Competency in Informatics for Nursing Professional in India: Imbibing the Tech-culture among Nursing Professionals. Int J Nurs Educ. 2019 Jan;11(1):68-72. Available from: https://medicopublication.com/index.php/ijone/article/download/4696/4426/8815
14. Knowledge and attitudes of nursing students towards artificial intelligence and related factors: A systematic review. J Nurs Rep Clin Pract. 2024. doi: 10.32598/JNRCP.2408.1134. Available from: https://www.jnursrcp.com/article_217761.html
15. Kerala University of Health Sciences. Syllabus for Courses affiliated to the Kerala University of Health Sciences: Bachelor of Science in Nursing (B.Sc. Nursing). [Internet]. Thrissur: Kerala University of Health Sciences; 2021 [cited 2026 May 22]. Available from: https://mosccon.org/uploads/userfiles/SEMESTER%20SYLLABUS%20B_Sc%20Nursing%202021%20scheme.pdf
16. Thomsen-Martin B. Artificial Intelligence Competencies for the Next-Generation Nurse. [Internet]. Nursing CE Central; 2026 [cited 2026 May 22]. Available from: https://nursingcecentral.com/lessons/artificial-intelligence-competencies-for-the-next-generation-nurse/
17. Jai SR, P F, Shivani, Bineesh C, Haq I, Tp S, et al. The Knowledge, Attitude and Practice Regarding Artificial Intelligence among Nursing Students. Int J Res Sci Innov. 2026 Jan;13(1):2050-6. Available from: https://rsisinternational.org/journals/ijrsi/uploads/vol13-iss1-pg2050-2056-202602_pdf.pdf
18. El-Banna MM, Sajid MR, Rizvi MR, Sami W, McNelis AM. AI literacy and competency in nursing education: preparing students and faculty members for an AI-enabled future-a systematic review and meta-analysis. Front Med (Lausanne). 2025 Nov 26;12:1681784. doi: 10.3389/fmed.2025.1681784. PMID: 41384110
19. Enhancing Competencies of Nursing Students in Pain Management Education Through Artificial Intelligence (AI): A Narrative Review. PubMed. 2026. Available from: https://pubmed.ncbi.nlm.nih.gov/41455657/
20. El Arab RA, Alshakihs AH, Alabdulwahab SH, Almubarak YS, Alkhalifah SS, Abdrbo A, et al. Artificial intelligence in nursing: a systematic review of attitudes, literacy, readiness, and adoption intentions among nursing students and practicing nurses. Front Digit Health. 2025 Sep 25;7:1666005. doi: 10.3389/fdgth.2025.1666005
21. Jallad S, Sawalha R, Awamleh FT. Factors Influencing Acceptance of Nursing Informatics System Among Nursing Students in Nursing Education A Cross-sectional Study. CIN Comput Inform Nurs. 2025 May;43(5). doi: 10.1097/CIN.0000000000001330
22. Kumari R. The Impact of Informatics on Nursing Education and Promoting Quality of Health Care. Int J Adv Nurs Manag. 2019 Jul-Sep;7(3):285-8. doi: 10.5958/2454-2652.2019.00067.2