



IMPACT PARAMEDICAL AND HEALTH INSTITUTE COLLEGE OF NURSING

Annexure 3 Quality of Teachers and Teaching

Annexure 3 Reference to Point 3(b)

List of Publication:

S.no.	Faculty Name	Publication	Journal	Volume/Issue/ISSN No.
1	Dr. Archana Choudhry, Ms. Shivani Sharma	Nurse burnout and mental health: A meta-analysis of the post-pandemic crisis	Sarvodaya International Journal of Medicine	3050-8298 / 3050-838X Vol. 1, Issue 1
2	Ms. Shivani Sharma	Effectiveness of health education intervention in preventing common childhood illnesses: A systemic review	Sarvodaya International Journal of Medicine	3050-8298 / 3050-838X Vol. 1, Issue 2
3	Mrs. Shivani Sharma, Ms. Akanksha Rai, Ms. Akansha	Effectiveness of play therapy in reducing anxiety among hospitalized children: A paediatric nursing intervention study	Journal of Advance of Future Research	2984-889X Vol. 4
4	Dr. Archana Choudhry, Mrs. Rajni Sharma, Dr. Nipun Choudhry	Digital Health Competency and readiness among undergraduate B.Sc. Nursing students in India: A Structured Narrative Review.	Sarvodaya International Journal of Medicine	3050-8298 / 3050-838X Vol 3, issue

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Effectiveness of Health Education Interventions in Preventing Common Childhood Illnesses: A Systematic Review

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Abstract

Preventable childhood illnesses such as diarrhea, acute respiratory infections, and malnutrition remain major public health challenges worldwide. Health education interventions led by nurses and healthcare professionals are considered a cornerstone of child health nursing practice. To systematically review and synthesize evidence on the effectiveness of health education interventions in preventing common childhood illnesses. A systematic review was conducted following Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Electronic databases, including PubMed, Google Scholar, CINAHL, and Cochrane Library, were searched for studies published between 2010 and 2024. Experimental, quasi-experimental, and observational studies evaluating health education interventions for mothers/caregivers of under-five children were included. Data were extracted and analyzed narratively. A total of 28 studies were identified, of which 15 met the inclusion criteria. The majority of studies reported significant improvement in caregivers' knowledge, attitudes, and practices, along with a reduction in the incidence of common childhood illnesses. Nurse-led and community-based interventions demonstrated the highest effectiveness. The review provides strong evidence that structured health education interventions are effective in preventing common childhood illnesses. Integrating evidence-based educational strategies into routine child health nursing practice is strongly recommended.

Keywords: Child health nursing, childhood illnesses, health education, prevention, systematic review

INTRODUCTION

Child health nursing focuses on holistic care of children with an emphasis on disease prevention and health promotion. Despite advances in medical care, preventable childhood illnesses continue to contribute significantly to under-five morbidity and mortality, particularly in low-and middle-income countries (World Health Organization [WHO], 2016).^[1] Health education provided to mothers and caregivers is a proven strategy to improve child health outcomes (Sharma *et al.*, 2012; Gupta and Verma, 2014).^[2,3] A systematic review of existing evidence is essential to guide evidence-based nursing practice.

Review question

What is the effectiveness of health education interventions in preventing common childhood illnesses among under-five children?

METHODOLOGY

Review design

Systematic review following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Search strategy

Databases searched included PubMed, Google Scholar, CINAHL, and Cochrane Library. Keywords used were: *child health nursing, health education, maternal knowledge, childhood illness prevention, and under-five children.*

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Inclusion criteria

- Studies published between 2010 and 2024
- Experimental, quasi-experimental, and observational studies
- Studies focusing on health education interventions for caregivers of under-five children
- Articles published in English

Exclusion criteria

- Review articles and editorials
- Studies unrelated to child health education
- Non-English publications

Study selection process

Initially, 28 articles were identified. After removal of duplicates and screening of titles and abstracts, 20 articles were assessed for full-text eligibility. Finally, 15 studies were included in the review.

Preferred Reporting Items for Systematic Reviews and Meta-analyses flow description

- Records identified through database searching (n = 28)
- Records after duplicates removed (n = 24)
- Full-text articles assessed for eligibility (n = 20)
- Studies included in final review (n = 15)

Data extraction and quality assessment

Data extracted included author, year, study design, sample size, intervention type, and key outcomes. Quality appraisal was performed using standardized critical appraisal tools appropriate to the study design.

RESULTS

Characteristics of included studies

The included studies were conducted in India, Asia, Africa, and developed countries. Most studies employed quasi-experimental designs with sample sizes ranging from 40 to 300 participants.

Effectiveness of health education interventions

Most studies reported statistically significant improvement in caregiver knowledge and practices related to hygiene, nutrition, immunization, and early identification of illness (Kaur *et al.*, 2017; Adeyemi *et al.*, 2019).^[4,5] Several studies also reported reduced incidence of diarrhea and respiratory infections following interventions (Patel *et al.*, 2020; Singh and Rao, 2022).^[6,7]

DISCUSSION

The findings of this systematic review demonstrate that health education interventions are effective in preventing common

childhood illnesses (WHO, 2016; Sharma *et al.*, 2012).^[1,2] Nurse-led community programs and structured teaching modules were particularly successful. However, heterogeneity among study designs and outcome measures limited the meta-analysis.

Implications for child health nursing

- Supports evidence-based child health nursing practice
- Highlights the critical educator role of nurses
- Guides the development of standardized educational protocols^[8,9]

Limitations

- Limited randomized controlled trials
- Variation in outcome measurement tools
- Language restriction to English

CONCLUSION

This systematic review concludes that health education interventions significantly improve caregiver knowledge and reduce common childhood illnesses. Incorporation of structured, nurse-led health education into routine child health services is recommended to enhance child health outcomes.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Nurse Burnout and Mental Health: A Meta-analysis of the Post-pandemic Crisis

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Abstract

Nurse burnout has emerged as a major healthcare concern globally, especially in the wake of the COVID-19 pandemic. This article presents a meta-analysis of research studies conducted between 2020 and 2024 to assess the prevalence, causes, and consequences of burnout among nurses. The analysis also explores coping mechanisms and institutional interventions. Findings suggest alarmingly high levels of emotional exhaustion, depersonalization, and reduced personal accomplishment among nurses, indicating an urgent need for policy changes and workforce support.

Keywords: Burnout, nurses, pandemic

INTRODUCTION

Nurses form the backbone of the healthcare system, yet they are among the most affected by occupational stress, especially post-COVID-19. With increasing patient loads, longer shifts, emotional trauma, and staffing shortages, nurse burnout has reached critical levels. This article seeks to understand the scope and implications of nurse burnout through a meta-analysis of current peer-reviewed literature.^[1]

METHODOLOGY

A systematic search was conducted using databases such as PubMed, CINAHL, Scopus, and Google Scholar using key words: "nurse burnout," "COVID-19 impact on nursing," "nursing mental health," and "stress in nursing workforce." A total of 38 studies published between January 2020 and January 2024 were reviewed. Out of these, 20 met the inclusion criteria (quantitative studies, sample size >100, focus on burnout in registered nurses). Meta-analysis was conducted using random-effects modeling to account for heterogeneity.

RESULTS

Prevalence of burnout

- Average burnout prevalence: 56.2% among nurses globally

- Emotional exhaustion was reported in 61% of the samples
- Highest burnout reported in intensive care unit and emergency nurses [Table 1].

Psychological impact

- Depression: 40% of nurses showed symptoms
- Anxiety: Prevalence in 36%
- Post-traumatic stress disorder (PTSD)-like symptoms: Reported in 22%.

Table 1: Key contributing factors

Factor	Percentage contribution
Staff shortages	75
Long working hours	68
Emotional trauma from COVID-19	64
Lack of institutional support	52
Inadequate pay	44

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Institutional responses

Studies found mixed outcomes. Organizations with mental health counseling, rotation schedules, and increased staffing showed 30%–40% reduction in burnout indicators.

DISCUSSION

Burnout among nurses is not only a workforce issue but also a patient safety concern. Burned-out nurses are more prone to medical errors, absenteeism, and leaving the profession entirely. While the pandemic intensified the issue, the root causes predate it, pointing to systemic healthcare inadequacies.^[2]

A recurring gap was the lack of effective wellness programs and the underutilization of psychological support services. Only 15% of nurses accessed institutional counseling services, despite high reported mental distress.^[3]

RECOMMENDATIONS

- Policy reforms: Mandate nurse–patient ratio limits
- Work-life balance: Introduce flexible scheduling and limit mandatory overtime
- Mental health support: Make psychological services routine and stigma-free
- Recognition and pay: Improve compensation structures and acknowledge frontline efforts

- Retention programs: Provide career advancement and training to reduce professional stagnation.

CONCLUSION

Burnout among nurses is a critical and growing issue with far-reaching consequences on healthcare delivery. Through this meta-analysis, it is evident that comprehensive strategies are needed at the institutional, national, and global levels. Supporting nurses' mental health is no longer optional—it is imperative.^[4]

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Effectiveness of Play Therapy in Reducing Anxiety Among Hospitalized Children: A Paediatric Nursing Intervention Study

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Abstract

Background: Hospitalization can cause significant anxiety in children, leading to behavioural issues and reduced cooperation with treatment. Paediatric nurses play a crucial role in implementing therapeutic interventions to reduce anxiety and improve patient outcomes.

Objective: To examine the effectiveness of structured play therapy in reducing anxiety levels among hospitalized children aged 5–12 years.

Methods: A quasi-experimental study was conducted in the paediatric ward of a tertiary care hospital. Sixty children were divided into intervention ($n = 30$) and control ($n = 30$) groups. The intervention group received daily play therapy sessions for four days, while the control group received routine nursing care. Anxiety was measured using the Children's Anxiety Rating Scale—Revised (CARS-R) before and after the intervention.

Results: Post-intervention anxiety scores were significantly lower in the intervention group compared to the control group ($p < 0.01$). Children participating in play therapy displayed increased cooperation during procedures and improved mood.

Conclusion: Play therapy is an effective nursing intervention to reduce anxiety in hospitalized children. Integration of structured play into paediatric nursing care can improve overall patient experience and cooperation.

Keywords:

Paediatric nursing, play therapy, hospitalization, anxiety, nursing intervention

Introduction

Hospitalization is often a stressful experience for children due to unfamiliar environments, separation from family, painful procedures, and fear of the unknown. Anxiety can lead to behavioural disturbances such as crying, withdrawal, and resistance to medical procedures. Paediatric nurses are uniquely positioned to implement non-pharmacological interventions that address emotional needs and reduce anxiety. Play therapy has been identified as a beneficial approach to help children express feelings, understand treatment procedures, and cope with stress.

Methods

Design and Setting

A quasi-experimental study was conducted over six months in the paediatric ward of a tertiary care hospital.

Participants

Children aged 5–12 years admitted for medical treatment were recruited. Criteria included stable condition, ability to communicate, and consent from parents/guardians.

Intervention

The intervention group underwent structured play therapy sessions for 30 minutes daily over four consecutive days. Sessions included therapeutic play tools such as storytelling, drawing, role-playing with medical dolls, and interactive games facilitated by a trained paediatric nurse.

Data Collection Tool

Anxiety levels were measured using the Children’s Anxiety Rating Scale—Revised (CARS-R), a validated observational tool for child anxiety assessment.

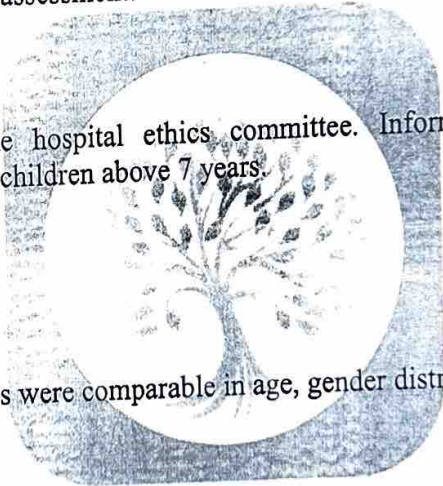
Ethical Considerations

Approval was obtained from the hospital ethics committee. Informed consent was received from parents/guardians, and assent from children above 7 years.

Results

Baseline Comparisons

The intervention and control groups were comparable in age, gender distribution, and baseline anxiety scores ($p > 0.05$).



Effect of Play Therapy

Post-intervention anxiety scores were significantly lower in the intervention group compared to the control group (Mean difference = 4.5, $p < 0.01$). Children in the intervention group exhibited improved mood, increased engagement with nursing staff, and greater cooperation during procedures.

Table 1: Demographic Characteristics of Participants (N = 60)

Variable	Intervention Group (n=30)	Control Group (n=30)	p-value
Age (Mean ± SD)	8.2 ± 2.1 years	8.5 ± 2.3 years	0.62
Gender			
Male	16 (53%)	15 (50%)	0.80
Female	14 (47%)	15 (50%)	
Type of Illness			

	Intervention Group (n=30)	Control Group (n=30)	p-value
Medical	20 (67%)	18 (60%)	0.57
Surgical	10 (33%)	12 (40%)	

Table 2: Comparison of Pre- and Post-Intervention Anxiety Scores

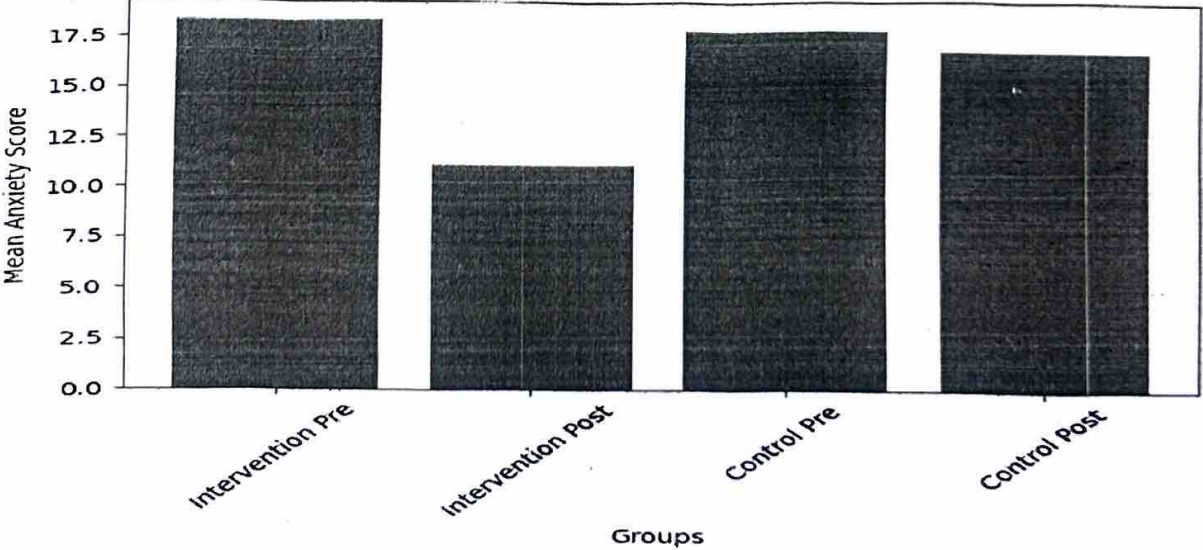
Group	Pre-test Mean ± SD	Post-test Mean ± SD	Mean Difference	p-value
Intervention (n=30)	18.4 ± 3.2	11.2 ± 2.5	7.2	<0.01*
Control (n=30)	17.9 ± 3.5	16.8 ± 3.1	1.1	0.09

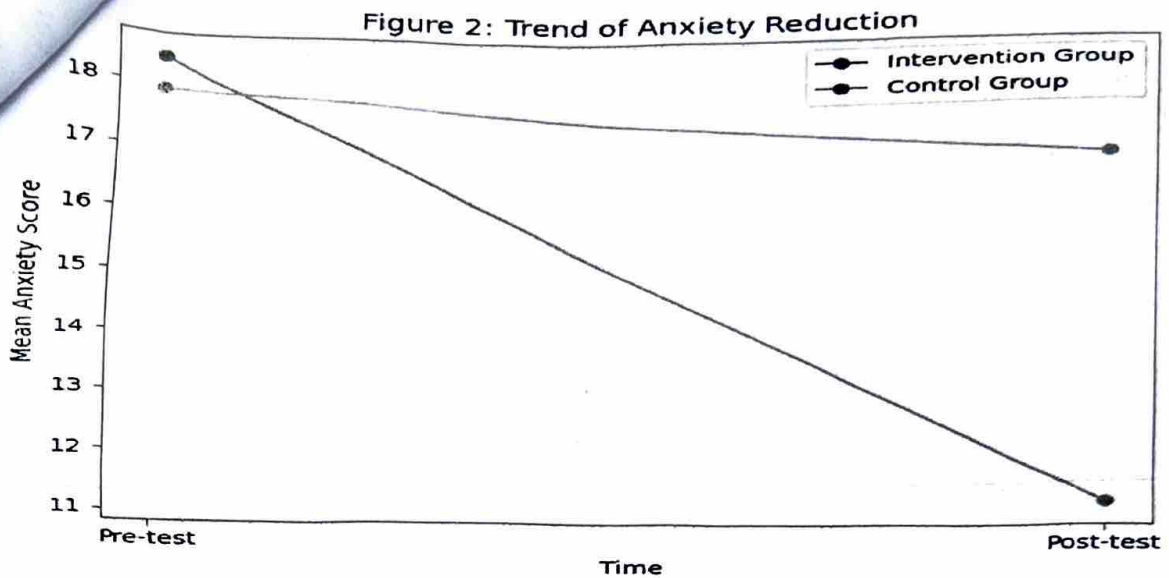
*Statistically significant at $p < 0.05$

Table 3: Between-Group Comparison of Post-Test Anxiety Scores

Group	Mean ± SD	t-value	p-value
Intervention	11.2 ± 2.5	6.45	<0.01*
Control	16.8 ± 3.1		

Figure 1: Comparison of Pre and Post Anxiety Scores





Discussion

The findings of this study suggest that structured play therapy significantly reduces anxiety among hospitalized children. Play allows children to express emotions, gain mastery over fears, and view medical events through a less threatening lens. This aligns with previous paediatric nursing research demonstrating the psychosocial benefits of play interventions.

Implications for Nursing Practice

Incorporating play therapy into routine paediatric nursing care supports holistic child-centred care. Nurses should be trained in therapeutic play techniques and provide age-appropriate play resources within the ward.

Limitations

The study was conducted in a single setting with a relatively small sample size, which may limit generalizability. Long-term effects of play therapy beyond hospitalization were not assessed.

Conclusion

Play therapy is an effective, non-invasive nursing intervention that significantly reduces anxiety in hospitalized children. Paediatric nurses should consider play therapy as a standard supportive care approach to enhance emotional well-being and cooperation during hospital stays.

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Digital Health Competency and Readiness among Undergraduate B.Sc. Nursing Students in India: A Structured Narrative Review

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Abstract

Background: Digital transformation is changing documentation, communication, decision support, remote care, and patient engagement across health systems. Undergraduate nurses therefore require more than basic computer literacy; they need digital health competence that is clinically meaningful, ethically grounded, and transferable to rapidly changing technologies. India has simultaneously expanded its national digital-health infrastructure through the Ayushman Bharat Digital Mission (ABDM) and incorporated Health/Nursing Informatics and Technology into the B.Sc. Nursing curriculum. **Objective:** To synthesize current evidence on digital health competency and readiness among undergraduate nursing students, examine its relevance to the Indian B.Sc. Nursing context, identify educational and research gaps, and propose a practical competency and curriculum framework for India. **Methods:** A structured narrative review was undertaken using targeted searches of PubMed/MEDLINE, publisher databases, and official websites, supplemented by reference chaining from recent systematic and scoping reviews. Literature was updated through 5 September 2026. Evidence concerning undergraduate/prelicensure nursing students, digital or informatics competency, eHealth literacy, electronic health records, telehealth, artificial intelligence (AI), digital-health education, and relevant national or international policy was prioritized. Because exhaustive multi-database de-duplication and dual-reviewer screening were not undertaken, this article is not presented as a Preferred Reporting Items for Systematic Reviews and Meta-Analyses systematic review. **Results:** The evidence converged on eight domains: Foundational informatics; information and digital-health literacy; electronic records and documentation; telehealth and remote care; data and interoperability; privacy, cybersecurity and digital professionalism; AI and clinical decision support; and patient-facing digital inclusion. International studies commonly report stronger basic computer skills than applied informatics or information-management competence. Indian student-level evidence remains sparse. A 2024 survey of 572 undergraduate nursing students from northern and southern India found widespread smartphone use and confidence in eHealth concepts in 66.1%, but also substantial demand for further training. The Indian Nursing Council curriculum provides an important starting point; however, competency development should be longitudinal, clinically embedded, and assessed through observable performance rather than self-report alone. **Conclusions:** Digital readiness should be treated as an entry-to-practice nursing outcome in India. A staged curriculum that links the existing informatics course with simulated and authentic electronic records, telehealth, ABDM workflows, data stewardship, responsible AI use, and digital inclusion is recommended. Nationally representative studies and validated India-context assessment tools are priorities.

Keywords: Artificial intelligence, B.Sc. Nursing, digital competence, digital health, eHealth literacy, electronic health records, India, nursing informatics, nursing students, telehealth

INTRODUCTION

Digital health has moved from being a specialist informatics concern to a routine dimension of clinical work. Electronic records, mobile health, teleconsultation, remote monitoring, interoperable data exchange, clinical decision support and artificial intelligence (AI) increasingly shape how health information is generated, interpreted, communicated and acted

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upon. The World Health Organization (WHO) has extended its Global Strategy on Digital Health to 2027, reinforcing the expectation that health systems develop not only infrastructure but also a workforce capable of using digital tools safely, effectively and equitably.^[1] The WHO strategic directions for nursing and midwifery and the International Council of Nurses (ICN) likewise position digital capability as relevant to the future nursing workforce.^[2,3]

For nursing education, the implication is important: digital readiness cannot be reduced to operating a computer or using a smartphone. Nurses must understand how information flows through clinical systems, document accurately, protect confidentiality, recognize unsafe technology-mediated care, evaluate digital information, support patients who have different levels of digital literacy, and maintain professional accountability when technology or algorithms influence decisions. Early informatics frameworks therefore distinguished computer skills from broader informatics knowledge and skills,^[10] while international competency work such as the TIGER framework has progressively expanded expectations toward information management, communication, quality, and safe use of technology.^[11]

India presents a particularly relevant setting for this discussion. The National Digital Health Blueprint established architectural principles for a national digital ecosystem,^[4] and the Ayushman Bharat Digital Mission (ABDM) now connects identity, health records, facilities and healthcare professionals through standards-based digital infrastructure.^[5] The Healthcare Professionals Registry explicitly includes nurses among the professional groups intended to participate in the digital ecosystem.^[5] In parallel, the Indian Nursing Council (INC) Revised Regulations and Curriculum for B.Sc. Nursing introduced Health/Nursing Informatics and Technology as a formal curricular component.^[6] These developments create a strong policy rationale for asking not simply whether nursing students are digitally literate, but whether they are ready to function safely and competently in digitally enabled care environments.

Although the international literature on nursing informatics is expanding, direct Indian evidence remains limited. Verma and Gupta highlighted the need to define and embed nursing informatics competencies in India.^[7] More recently, Baby and Ravi surveyed 572 undergraduate nursing students from two nursing colleges in northern and southern India and found that 92.5% used smartphones as their internet source and 66.1% were confident in eHealth concepts; notably, students who lacked confidence in specific concepts often expressed greater willingness to learn them.^[8] Workforce evidence also indicates that digital competency continues to vary after graduation, supporting the need for stronger preregistration preparation and continuing development.^[9]

This review therefore addresses a practical question for nursing education in India: what should “digital health competency and readiness” mean for a B.Sc. Nursing graduate, what does

the current evidence indicate, and how should curricula and assessment evolve? The review synthesizes student-focused evidence, policy and competency literature, and translates the findings into an India-specific framework and staged curriculum map.

REVIEW AIM AND QUESTIONS

The aim of this structured narrative review is to synthesize evidence on digital health competency and readiness among undergraduate nursing students and interpret its implications for B.Sc. Nursing education in India. The review addresses four questions:

1. How are digital health competency and readiness conceptualized and measured in undergraduate nursing education?
2. What do current studies show about students’ strengths, deficits, and educational needs across major digital-health domains?
3. How do India’s nursing curriculum and national digital-health ecosystem alter the competencies expected of graduates?
4. What competency framework, curriculum sequence, and research agenda are appropriate for the Indian B.Sc. Nursing context?

METHODS

Review design

A structured narrative review approach was used. This design was selected because the review integrates heterogeneous evidence: competency frameworks, cross-sectional surveys, educational interventions, scoping and systematic reviews, psychometric studies, policy documents, and curriculum standards. The purpose is interpretive synthesis and curriculum translation rather than pooled effect estimation.

Search strategy and sources

Searches were updated through September 5, 2026. Targeted searches were conducted in PubMed/MEDLINE and publisher databases, with supplementary searching of WHO, ICN, INC, Ministry of Health and Family Welfare, and National Health Authority/ABDM websites. Reference lists of recent high-level reviews were used to identify seminal and additional empirical studies. Core search concepts combined terms for nursing students/prelicensure nursing with digital health/informatics/eHealth/electronic health record (EHR)/telehealth/AI and competency/readiness/literacy/curriculum. India-specific searches added India, INC, ABDM, and B.Sc. Nursing terms.

Eligibility and synthesis

Priority was given to English-language peer-reviewed publications involving undergraduate or prelicensure nursing students and addressing digital health, nursing informatics, eHealth or digital literacy, EHR use, telehealth, AI readiness, educational interventions, or competency measurement. Reviews and competency frameworks were included where

they directly informed undergraduate education. Selected studies of practicing nurses were retained only when they provided India-specific workforce context or transferable competency evidence. Purely technical algorithm studies, generic online-learning studies without a digital-health competency component, and technology studies with no meaningful nursing education relevance were excluded from the interpretive synthesis.

The literature was synthesized thematically. Particular weight was given to systematic/scoping reviews, multi-site or larger studies, validated competency frameworks, and official national/international guidance. Self-reported confidence was explicitly distinguished from objectively demonstrated competence.

Reporting note: Preferred Reporting Items for Systematic Reviews and Meta-Analyses and this review

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) is designed for systematic reviews and requires transparent identification, de-duplication, screening, and inclusion counts. This manuscript does not claim a PRISMA systematic review because an exhaustive multi-database search with duplicate removal and independent dual-reviewer screening was not undertaken. A PRISMA-style search description is provided for transparency, but no invented flow counts are reported. If the article is later upgraded to a systematic or scoping review, the search should be rerun across at least MEDLINE, CINAHL, Scopus/Web of Science, and relevant Indian databases, with a registered protocol where applicable and a documented PRISMA flow diagram.

WHAT CONSTITUTES DIGITAL HEALTH COMPETENCY AND READINESS?

Digital health competency is best understood as an applied professional capability rather than a narrow technology skill. Earlier nursing informatics work established that competent practice requires knowledge, skills, and attitudes, and that basic computer literacy is only one component.^[10] The TIGER international recommendation framework later consolidated core informatics competencies relevant to nursing across countries.^[11] Curriculum scholarship has similarly argued that informatics should be distributed through nursing education rather than isolated as a technical elective.^[12,13]

For undergraduate students, “competency” and “readiness” overlap but are not identical. Competency refers to the ability to perform defined tasks and apply knowledge safely. Readiness includes competency but also confidence, attitudes, willingness, familiarity with clinical technologies, perceived usefulness, adaptability and the presence of enabling educational or clinical environments. A student can therefore be highly willing to use technology but not yet competent; conversely, a technically capable student may use a digital system unsafely if privacy, documentation, or clinical judgment principles are weak.

Recent reviews reinforce this multidimensional interpretation. Kleib *et al.* identified substantial gaps in the scope and consistency of digital-health education across undergraduate and graduate nursing programs.^[14] Almarwani’s systematic review found that student informatics competency generally ranged from fair to good, but study conclusions were constrained by heterogeneous instruments and scoring systems.^[15] A 2026 systematic review of digital-competence instruments found substantial variation in constructs and measurement properties, underscoring the need to match the assessment tool to the competency definition and intended context.^[16]

EVIDENCE SYNTHESIS

Foundational informatics: Basic confidence does not guarantee applied competence

Across the literature, students tend to rate basic computer or communication tasks more favorably than higher-order information management and clinically applied informatics. Choi and De Martinis identified specific competency gaps among undergraduate and graduate nursing students,^[17] while Abdrbo linked nursing informatics competencies with patient-safety competencies, reinforcing that digital capability has direct implications for safe care.^[18]

Raghuathan *et al.* reported a particularly useful baseline study of 142 undergraduate nursing students: only 40.84% were classified at the competent level overall. Foundational information and communication skills were strongest, and information/knowledge management was weakest.^[19] Formal curricular exposure and previous experience with clinical systems influenced scores. In South Africa, Chipps *et al.* similarly found that final-year students viewed informatics skills as relevant and had positive attitudes toward computerization, yet competence varied across informatics domains.^[20] Earlier work in other settings likewise documented uneven technical informatics preparation.^[21]

Educational intervention evidence is encouraging. Almarwani and Yacoub found improved student informatics competence after an educational program, particularly where baseline applied skills were weak.^[22] These findings support a curriculum model in which foundational knowledge is taught early and repeatedly practiced in clinical scenarios.

Digital-health education remains fragmented internationally

The 2024 scoping review by Kleib *et al.* included 100 records and found that, despite progress, digital-health education remains inconsistently defined and insufficiently comprehensive across nursing programs.^[14] The problem is not simply the absence of content; it is often fragmentation. Students may use learning-management systems, simulation platforms, or online resources extensively while receiving limited education in the digital systems, data responsibilities,

and decision-support technologies they will encounter in practice.

Reviews of curriculum integration have repeatedly called for explicit informatics outcomes, faculty development, and stronger academic-clinical partnerships.^[13,23] More recent curriculum scholarship argues for scaffolded integration across the degree rather than a one-time informatics course.^[24,25] The implication for India is that the presence of a formal informatics subject should be regarded as the beginning of competency development, not the endpoint.

Electronic health records and digital documentation

EHRs are a central area where educational exposure and work readiness intersect. A scoping review of academic electronic medical records in nurse education found that simulated records are used to teach documentation, technology safety, and preparation for clinical practice, but implementation is constrained by software access, cost, and faculty capability.^[26] Student access to real clinical EHRs is also inconsistent. Baillie *et al.* reported variable opportunities for students to access and use electronic records and highlighted governance concerns around authorized access and verification of student entries.^[27]

Acceptance of academic EHR systems is influenced by attitudes, perceived usefulness, and self-efficacy.^[28] Importantly, simulation can move learning beyond familiarity. Everett-Thomas *et al.* demonstrated that virtual patients combined with simulated EHR documentation can support critical thinking and documentation practice.^[29] More recent EHR competency tools and simulated-EHR interventions provide a basis for performance-based assessment rather than asking students only how confident they feel.^[44,45]

For India, EHR readiness should include structured documentation, medication and allergy safety, nursing care planning, data quality, privacy, consent, handover, and understanding of interoperable records. These capabilities are directly relevant to the ABDM ecosystem, where person identification, consented record exchange and standardized digital infrastructure are core design principles.^[4,5]

Telehealth and remote care

Telehealth became more visible during the coronavirus disease 2019 pandemic, but curricular uptake remains uneven. A national survey in the United States found that 55% of responding prelicensure programs had no telehealth curricular content at the time of the survey, with lack of funds identified as a leading barrier.^[30] Qualitative work shows that telehealth clinical placements can provide valuable exposure to communication, assessment, and technology-mediated care when carefully designed.^[31]

A 2024 survey of allied health and nursing students found gaps between attitudes, knowledge, skills and actual telehealth experience.^[32] More recently, a large competency-based prelicensure initiative reported integration of telehealth across the curriculum and more than 2000 simulated telehealth

encounters, illustrating how remote-care competency can be operationalized at scale.^[33]

In the Indian context, telehealth competency should extend beyond videoconferencing. Students need to know how to establish identity, consent, and privacy; conduct remote history and focused assessment; recognize when virtual care is unsafe or insufficient; communicate escalation and follow-up; and support patients with limited connectivity, language barriers, or digital access.

Artificial intelligence: Readiness must include critical appraisal and accountability

Generative AI and clinical AI create a new layer of digital readiness. Student enthusiasm alone is not a sufficient educational endpoint. Labrague *et al.* found moderate readiness among student nurses to adopt AI in their studies and identified barriers including limited knowledge, skills, and access.^[34] Abou Hashish and Alnajjar similarly examined nursing students' knowledge, attitudes and skills across digital transformation, health literacy and AI, illustrating the need to integrate these areas rather than teaching them as separate trends.^[35]

A 2025 systematic review of nursing students and practicing nurses found generally moderate AI literacy/readiness and highlighted the importance of education, organizational support and governance.^[36] Undergraduate AI competency should therefore focus on safe use: recognizing that AI outputs can be wrong, biased, or fabricated; verifying recommendations against clinical evidence and patient context; protecting confidential information; documenting appropriately; understanding accountability; and preserving human clinical judgment.

AI literacy should also be assessed through realistic tasks. Students can be asked to critique an AI-generated care plan, identify hallucinated or unsafe recommendations, explain what patient information must not be entered into public tools, and justify when a clinical decision must be escalated to a qualified supervisor.

Digital health literacy and information appraisal

Digital health literacy includes the ability to find, understand, evaluate, and use online health information and digital services. The eHealth Literacy Scale remains a widely cited early measure,^[37] while the Digital Health Literacy Instrument broadened assessment to include multiple Health 1.0 and Health 2.0 skills.^[18] These tools are useful but do not by themselves measure all professional nursing digital competencies.

For nursing students, digital health literacy has two directions: the nurse must be able to appraise digital information and must also help patients navigate digital information safely. A recent case-based undergraduate intervention showed that digital-health-literacy learning can be deliberately integrated into nursing education.^[39] In India, this domain should include appraisal of multilingual health information, misinformation recognition, patient education for government and hospital

portals/apps, and support for people who have limited literacy, disability, connectivity, or device access.

Privacy, cybersecurity and digital professionalism

Privacy and cybersecurity are sometimes taught as policy topics rather than clinical behaviors. For entry-level nurses, competence should include secure authentication, password and device hygiene, appropriate messaging, prevention of unauthorized photography or sharing, recognition of phishing and social-engineering risks, safe handling of removable media, minimum-necessary access, consent and confidentiality in telehealth, and escalation of suspected data breaches. Digital professionalism also includes maintaining professional boundaries on social media, avoiding discussion of identifiable patients in public or consumer AI tools, and documenting technology-mediated communication appropriately.^[3,11]

Faculty capability, clinical exposure and the hidden curriculum

Student competence depends on more than the formal syllabus. Faculty confidence, access to current technologies, simulation resources, permissions in clinical settings and the behavior modelled by clinical staff all shape learning. If students are prohibited from using EHRs during placements, they may graduate without authentic experience even after passing an informatics course. Conversely, unstructured exposure can teach unsafe workarounds rather than good practice.

Recent competency-development studies support explicit frameworks, faculty development, and co-designed learning resources.^[40-42] A systematic review of educational interventions for healthcare professionals also found that digital competence can be strengthened through purposeful education, although intervention design and outcome measurement remain heterogeneous.^[43] The educational unit of change is therefore the curriculum-plus-practice environment, not the classroom alone.

THE INDIAN CONTEXT: CURRICULUM STRENGTH, IMPLEMENTATION GAP AND AYUSHMAN BHARAT DIGITAL MISSION-ERA READINESS

The Indian B.Sc. Nursing curriculum provides a stronger policy foundation than is sometimes assumed in discussions of digital readiness. The INC's Revised Regulations and Curriculum for B.Sc. Nursing (2020 regulations, notified in 2021) includes Health/Nursing Informatics and Technology as a defined curricular component.^[6] This is an important strength because the problem is not simply curricular absence. The larger challenge is whether informatics learning is reinforced across medical-surgical, community, mental-health, maternal-child, leadership and internship experiences, and whether students encounter realistic digital workflows.

ABDM makes this implementation question more urgent. India's national architecture is designed around interoperable health information, digital identities and registries, consented

record exchange, and connected facilities/professionals.^[4,5] Graduates entering such a system need to understand not only a local hospital software interface but also core principles that transfer across systems: accurate person identification, data quality, role-based access, consent, interoperability, traceability and professional responsibility for digital documentation.

The Indian evidence base is not yet sufficient to make national claims about student competence. The Baby and Ravi study is important because it directly sampled undergraduate nursing students from two regions, but it primarily assessed perceived confidence and willingness rather than observed clinical digital performance.^[8] This gap creates a clear research opportunity: India needs multi-state studies using validated instruments and objective assessment stations, with analysis by year of study, type of institution, geography, prior exposure, clinical-site digitization, and faculty resources.

A second gap concerns equity. Digital-health readiness in India must prepare nurses to care for patients who differ in language, literacy, disability, socioeconomic resources and connectivity. Nurses are often the professionals who explain portals, consent processes, remote-care instructions, and discharge information. Digital inclusion should therefore be treated as a nursing competency, not as an optional public-health topic.

CURRICULUM INTEGRATION ACROSS THE 4-YEAR B.Sc. NURSING PROGRAM

A single informatics course is unlikely to create durable work readiness. The existing curriculum can be strengthened through a spiral model in which students revisit digital competencies with increasing clinical complexity.

ASSESSMENT STRATEGY: MOVE FROM CONFIDENCE TO DEMONSTRATED PERFORMANCE

Most available student studies rely heavily on self-report, which is useful for attitudes and perceived readiness but cannot establish whether a student can document safely, protect privacy, or conduct a telehealth assessment. Indian programs should therefore combine self-report with objective performance.

A feasible assessment portfolio could include: (1) a simulated-EHR documentation OSCE; (2) a telehealth consultation station; (3) an information-appraisal task; (4) a privacy/cybersecurity scenario; (5) an AI-output critique; and (6) a longitudinal e-portfolio with verified clinical or simulation experiences. Assessments should use explicit rubrics, repeat low-stakes practice before high-stakes testing, and distinguish errors of system navigation from errors of clinical judgment.

For national research, an India-context measurement program is needed. Existing instruments can inform item development, but direct importation without validation risks measuring constructs that do not fully match Indian curricula, ABDM workflows, or

Table 1: Search transparency and evidence-identification approach

Source	Purpose	Indicative search approach	Use in review
PubMed/MEDLINE	Student and review evidence	("nursing students" OR "undergraduate nursing" OR prelicensure OR "BSc nursing") AND ("digital health" OR informatics OR eHealth OR "digital health literacy" OR telehealth OR "electronic health record" OR "artificial intelligence") AND (competenc* OR readiness OR literacy OR curriculum OR education)	Peer-reviewed nursing education, competency, readiness, and intervention studies
Publisher databases/journal sites	Verification and recent literature	Title/author/DOI searches for candidate records and recent 2025–2026 publications	Bibliographic verification and access to abstracts/full text where available
WHO/ICN	Global policy and professional context	Digital health strategy; nursing and midwifery strategic directions; digital transformation and nursing practice	Authoritative global policy and professional guidance
INC/MoHFW/NHA-ABDM	Indian curriculum and digital ecosystem	B.Sc. Nursing regulations; health/nursing informatics; National Digital Health Blueprint; ABDM; HPR; electronic records	Official Indian curriculum and health-system context
Reference chaining	Seminal and domain-specific evidence	Backward searching from recent systematic/scoping reviews and key empirical papers	Foundational informatics frameworks, EHR, telehealth and educational studies

Search strings are presented to support reproducibility; this table should not be interpreted as a PRISMA flow diagram. ICN: International council of nurses, INC: Indian nursing council, WHO: World Health Organization, MoHFW: Ministry of health and family welfare, ABDM: Ayushman bharat digital mission, NHA-ABDM: National health authority - ABDM, HPR: Healthcare professionals registry, DOI: Digital object identifier, PRISMA: Preferred reporting items for systematic reviews and meta-analyses

Table 2: Evidence map of selected high-value studies

Study	Setting/design	Focus	Main contribution	Relevance to India
Baby and Ravi, 2024 ^[8]	India; undergraduate nursing students; n=572	eHealth confidence and willingness to learn	66.1% confident in eHealth concepts; high smartphone use; lower confidence often accompanied by willingness for training	Direct India-specific student evidence; self-reported and two colleges
Raghuathan et al., 2023 ^[19]	Australia; undergraduates; n=142	Informatics competency	Only 40.84% reached competent level; information/knowledge management weakest	Strongly supports applied informatics and clinical-system exposure
Chippis et al., 2022 ^[29]	South Africa; final-year students; n=91	Relevance, competence, attitudes	Computer literacy rated highly; competence varied; attitudes generally positive	Shows positive attitude does not ensure uniform competence
Almarwani, 2024 ^[13]	Systematic review; 13 studies	Nursing informatics competency	Competency generally fair-to-good but tools and cut-offs heterogeneous	Supports mandatory informatics education and measurement caution
Kleib et al., 2024 ^[14]	Scoping review; 100 records	Digital-health education/training	Significant gaps and inconsistent scope remain across nursing education	Supports broader, longitudinal digital-health curriculum
D'Agostino et al., 2026 ^[16]	Systematic review	Digital-competence measurement instruments	Multiple instruments assess heterogeneous constructs and have variable measurement evidence	Tool selection/validation is a major India research priority
Raghuathan et al., 2021 ^[20]	Scoping review; 34 studies	Academic electronic medical records	Benefits for documentation/informatics; barriers include cost, access, and faculty capability	Supports simulated EHR plus academic-clinical partnerships
Baillie et al., 2013 ^[27]	UK; students; survey + focus groups	Learning EHRs in clinical practice	Variable access/training; governance and verification concerns	Clinical permissions and supervision need explicit planning
Everett-Thomas et al., 2021 ^[29]	USA; undergraduates; n=84	Virtual simulation + EHR	Documentation and critical-thinking practice improved across assignments	Supports performance-based digital assessment
Eckhoff et al., 2022 ^[30]	USA; national program survey	Telehealth curriculum	Many prelicensure programs lacked telehealth content; funding was a barrier	Telehealth cannot be assumed to be learned incidentally
Svoboda et al., 2026 ^[13]	USA; prelicensure program	Competency-based telehealth integration	Large-scale simulated encounters used to build telehealth capability	Model for curriculum-wide scaffolding
Labrague et al., 2023 ^[34]	Student nurses	AI readiness and barriers	Moderate readiness; knowledge, skill, and access barriers identified	AI education should include capability and governance
El Arab et al., 2025 ^[36]	Systematic review; 37 studies	AI attitudes/literacy/readiness	Moderate literacy/readiness with education and governance needs	Supports responsible-AI competency rather than tool enthusiasm
Martzoukou et al., 2026 ^[49]	Nursing students	Co-designed digital competency toolkit	Co-design approach supports relevant, learner-oriented competency development	Useful model for Indian adaptation and student engagement
Stunden et al., 2026 ^[41]	Preregistration students; qualitative	Barriers to digital literacy in clinical settings	Educational and clinical barriers limited competence development	Highlights hidden curriculum and practice-site constraints
Kolnik et al., 2026 ^[42]	Delphi	Digital competence framework for nursing education	Contextualized domains through expert consensus	Supports systematic local contextualization in India

It is not an exhaustive systematic-review extraction table. AI: Artificial intelligence, EHR: Electronic health records

Table 3: Proposed competency framework for Indian B.Sc. nursing programs

Domain	Expected graduate capability	Illustrative assessment
1. Foundational digital operations	Use devices, networks, institutional applications and standard productivity tools safely; troubleshoot basic issues; recognize limitations	Secure login, device handling, basic system navigation and escalation of technical problems
2. Information and evidence literacy	Search, appraise, synthesize and cite reliable digital health information; identify misinformation	Evidence search and appraisal case; patient-information verification task
3. EHR and nursing documentation	Document assessments, care plans, medications and outcomes accurately; retrieve relevant data; avoid copy-forward errors	Simulated EHR OSCE with documentation rubric
4. Telehealth and virtual communication	Conduct safe remote interactions, verify identity/consent, communicate clearly, recognise need for in-person escalation	Teleconsultation OSCE with communication and safety checklist
5. mHealth, wearables and remote monitoring	Interpret patient-generated data appropriately; explain device limitations; support adherence and escalation	Remote-monitoring scenario and trend interpretation
6. Data literacy and interoperability	Understand structured data, data quality, dashboards, basic interoperability concepts and ABDM-related workflows	ABDM/record-linking scenario; data-quality audit exercise
7. Privacy, cybersecurity and consent	Apply confidentiality, minimum-necessary access, secure messaging, cyber hygiene and breach reporting	Privacy/consent vignette; phishing and data-breach simulation
8. AI and clinical decision support	Use AI/CDSS critically; verify outputs; recognise bias and hallucination; maintain accountability	Critique an AI-generated recommendation and justify final nursing action
9. Patient digital-health literacy and inclusion	Assess patient digital capability and support equitable access across language, disability, literacy and connectivity barriers	Patient-teaching station using accessible/multilingual resources
10. Digital professionalism and communication	Maintain boundaries, respectful electronic communication, social-media professionalism and documentation standards	Professionalism scenario and reflective portfolio
11. Digital quality and patient safety	Recognize technology-related hazards, alert fatigue, documentation errors and workflow risks; contribute to QI	Digital incident analysis or mini quality-improvement project
12. Adaptive learning and innovation	Learn new systems, seek support, evaluate technology changes and participate in interdisciplinary improvement	E-portfolio demonstrating skill progression and reflective learning

The framework should be nationally validated before use as a formal standard. AI: Artificial intelligence, EHR: Electronic health records, OSCE: Objective structured clinical examination, ABDM: Ayushman Bharat Digital Mission, CDSS: Clinical decision support systems, QI: Quality improvement

Table 4: Suggested longitudinal curriculum map

Stage	Priority content	Learning experiences	Primary outcome
Year 1/early semesters	Digital professionalism; information search and appraisal; foundational informatics; privacy and cyber hygiene; introduction to EHR concepts; digital inclusion	Basic informatics laboratory; simulated record navigation; evidence-search exercise; privacy scenarios	Safe foundational use and vocabulary
Year 2	Clinical documentation: medication and allergy safety; structured nursing data; bedside devices; introduction to telehealth; secure communication	EHR documentation stations; medication-safety digital case; telehealth micro-simulation	Apply digital skills to common clinical workflows
Year 3	Community digital health; ABDM concepts; patient-facing apps; remote monitoring; public-health data; telehealth; AI/CDSS foundations	ABDM/consent workflow; community telehealth simulation; dashboard interpretation; AI-output critique	Integrate digital care across hospital and community contexts
Year 4/ internship	Authentic EHR exposure where permitted; interprofessional virtual care; data quality and QI; advanced documentation; safe AI use; transition-to-practice portfolio	Digital OSCE; supervised EHR competency sign-off; e-portfolio; QI project using de-identified data	Demonstrate entry-to-practice readiness in realistic contexts

Content should be integrated with existing clinical subjects rather than added only as stand-alone classroom hours. EHR: Electronic health records, AI: Artificial intelligence, CDSS: Clinical decision support systems, ABDM: Ayushman Bharat Digital Mission, OSCE: Objective structured clinical examination, QI: Quality improvement

local clinical exposure.^[15,16] Content validity should involve nursing educators, clinicians, informatics experts, students, regulators, and digital-health stakeholders, followed by psychometric testing across diverse institutions [Tables 1-4].

PRIORITY RESEARCH AGENDA FOR INDIA

1. Conduct a multi-state, multi-institution baseline study of digital health competency among B.Sc. Nursing students using both self-report and performance measures
2. Develop or culturally adapt and validate an India-specific digital-health competency/readiness instrument aligned

3. Compare competency by year of study, institution type, urban/rural location, clinical-site digitization, prior EHR exposure and faculty digital capability
4. Evaluate longitudinal curriculum interventions rather than one-off workshops; include EHR simulation, telehealth, cybersecurity, data literacy and responsible AI
5. Assess whether digital competency predicts transition-to-practice outcomes such as documentation quality, technology-related errors, confidence during induction and supervisor-rated readiness

6. Study faculty digital competence, availability of simulation/EHR resources and academic-clinical governance arrangements that enable or block student access to digital systems
7. Include equity outcomes: Multilingual digital communication, disability accessibility, rural connectivity, affordability and support for patients with low digital literacy
8. Create national consensus on minimum digital competencies expected at B.Sc. Nursing graduation and map them explicitly to assessment and internship requirements.

IMPLICATIONS FOR NURSING EDUCATION LEADERS AND REGULATORS

For nursing colleges, the immediate opportunity is not necessarily to create a new subject. Instead, institutions can audit where each competency is taught, practiced, and assessed; identify gaps in simulation and clinical exposure; and build faculty capability. Low-cost approaches can include de-identified paper-to-digital documentation exercises, locally built simulated records, structured telehealth role-play and case-based cyber/AI teaching before investment in advanced simulation platforms.

For clinical partners, student access to digital systems requires governance. Academic-service agreements should define role-based student access, supervision, authentication, documentation verification and data-protection responsibilities. Where direct access is not permitted, realistic simulated systems should reproduce the cognitive workflow rather than merely displaying screenshots.

For regulators and universities, competency statements should be periodically updated because technology will change faster than formal curriculum cycles. Standards should therefore emphasize durable capabilities, information quality, privacy, judgment, accountability, communication, interoperability and adaptability, rather than mastery of a particular vendor product.

STRENGTHS AND LIMITATIONS OF THIS REVIEW

This review combines recent systematic/scoping reviews, empirical student studies, foundational competency literature and official Indian policy sources, and translates the evidence into a concrete competency and curriculum model. Its principal limitation is methodological: It is a structured narrative review rather than a systematic review. Searches were targeted rather than exhaustive across all subscription databases; records were not screened independently by two reviewers; no formal risk-of-bias appraisal was undertaken; and therefore no PRISMA inclusion counts are reported. The evidence base is also dominated by self-reported competency studies and research from settings outside India. These limitations

should temper any claim of national prevalence or causal effectiveness.

CONCLUSION

Digital health competency is now part of basic nursing work readiness. For Indian B.Sc. Nursing students, it should encompass much more than computer literacy: informatics, EHR documentation, telehealth, data quality and interoperability, privacy and cybersecurity, digital professionalism, patient digital inclusion, AI literacy, and technology-related safety all require deliberate preparation.

India has two major assets on which to build: A national B.Sc. Nursing curriculum that already recognizes Health/Nursing Informatics and Technology, and a rapidly developing national digital-health ecosystem through ABDM. The next educational step is therefore implementation – ensuring that digital competencies are reinforced across all 4 years, linked to authentic or simulated clinical workflows and assessed through observable performance.

Direct Indian student evidence is promising but still too limited to define national readiness. A coordinated research program using validated measures, multi-state samples and performance-based assessment could establish a national baseline and guide evidence-based curriculum improvement. The central educational goal should be a nurse who can use technology confidently without surrendering clinical judgment, patient safety, privacy or equity.

Ethics approval and consent to participate

Not applicable. This article reviews published literature and publicly available policy documents.

Availability of data and materials

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