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Regulated by Others: Reform Without Liberation in Indian Nursing Governance

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Abstract

Indian nursing constitutes the largest segment of the national health workforce, yet its regulatory governance remains structurally contingent on legislative design. This policy analysis examines the evolution of nursing regulation in India through a comparative review of State Nursing Council statutes and the National Nursing and Midwifery Commission Act, 2023 (NNMC). State-level provisions governing appointment of Registrars and selection of Presidents reveal diverse models, including executive-dominant, prior-sanction, hybrid, and profession-embedded frameworks. While some states provide for elected leadership and professional qualification safeguards, others retain ex officio governmental control. Against this backdrop, the NNMC introduces modern regulatory architecture but does not explicitly guarantee professional dominance. The article argues that reform in structure does not automatically translate into professional self-governance and calls for legislative recalibration to strengthen nurse-led regulatory leadership.

Keywords: Nursing regulation; NNMC Act 2023; professional autonomy; nursing governance; patriarchal regulation; India

Introduction

Nursing is the backbone of health systems globally. In India, nurses and midwives constitute nearly 60% of the total health workforce and are central to service delivery across preventive, promotive, curative, and rehabilitative domains [1,2]. Despite their numerical strength, expanding academic credentials, and increasing clinical responsibilities, nurses continue to be governed

by regulatory structures dominated by authorities external to the profession. Unlike medicine, dentistry, or pharmacy, nursing regulation has historically denied the profession the right to self-govern. This article critically analyses whether the National Nursing and Midwifery Commission Act, 2023 represents genuine professional empowerment or merely a reorganisation of long-standing structural subordination.

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Nursing Workforce in India: Scale and Professional Maturity

India has more than **3.3 million registered nurses and midwives**, making it one of the largest nursing workforces globally ^[1,2]. Nursing education spans diploma, undergraduate, postgraduate, and doctoral levels, with increasing specialisation in critical care, oncology, mental health, community health, and midwifery. A growing cohort of nurses hold **doctoral degrees** and contribute to research, teaching, leadership, and policy discourse. Despite this academic and clinical maturity, governance arrangements have not evolved to reflect professional capacity.

Historical Foundations of Nursing Regulation in India

Modern nursing regulation in India originated with the **Madras Nurses and Midwives Act, 1926**, which established the **first nursing council in India**, now completing a century. This Act served as the template for subsequent State Nursing Council legislations across the country. The Indian Nursing Council Act, 1947 constituted the Council through notification by the Central Government (Section 3) and required prior governmental sanction for its regulations (Section 16), reflecting significant executive oversight^[3]. Although professional representation was included, the Act did not guarantee statutory professional majority or nurse-led governance. Unlike other health professions, nursing councils were not conceptualised as self-regulating professional bodies, embedding dependency and administrative dominance at inception.

State Nursing Councils: Persistent Structural Asymmetry

Leadership Outside the Profession

An equally important determinant of regulatory autonomy concerns the method of selection of the President of the Council. In Maharashtra, the President and Vice-President are elected by members

from amongst themselves, thereby ensuring internal leadership selection within the statutory body ^[18]. Similarly, the Nagaland statute provides for election of the President and Vice-President by ballot from among Council members, with a fixed tenure and defined re-election limits ^[21]. These provisions embed democratic internal governance within the regulatory framework.

In contrast, in several other states, the President of the Nursing Council functions as an ex officio official, often the Director of Health Services (DHS) or Director of Medical Education (DME), reflecting a structurally executive-led model of oversight. The contrast between elected leadership and ex officio governmental presidency illustrates that professional self-governance in Indian nursing regulation varies significantly across states and is shaped directly by statutory design. In contrast, State Medical, Dental, and Pharmacy Councils are led by members of the respective professions. No explicit statutory rationale justifies this asymmetry, which reflects historical mistrust rather than contemporary professional realities.

Registrar Appointments: Deputation Versus Direct Recruitment

In the several states, statutory frameworks permit appointment or deputation of Registrars from government health services ^[16-20]. Deputation weakens institutional continuity, dilutes accountability, and undermines regulatory independence. Other professional councils appoint Registrars through **direct recruitment** under statutory rules, reinforcing professional control.

However, state statutes reveal multiple governance designs beyond deputation alone, including government-appointed models, prior-sanction frameworks, hybrid approval structures, and professional-qualification-embedded systems. These variations collectively demonstrate that the degree of professional autonomy in nursing regulation across Indian states is a function of legislative drafting rather than administrative inevitability ^[14-21].

Table 1. Comparative Governance Structures for Appointment of Registrar in Selected State Nursing Councils (India)

State	Appointment Authority	Government Approval/Sanction	Professional Qualification Safeguard	Governance Typology
Kerala	Government (after consultation with Council)	Direct appointment by Government	Not explicitly specified	Executive-dominant model
West Bengal	Council	Prior sanction required	Not explicitly specified	Prior-sanction model
Goa	Council	Prior sanction required	Not explicitly specified	Prior-sanction model
Delhi	Council	Prior approval required	Registrar must be a nurse	Hybrid approval model
Maharashtra	Council	Government sanction required for disciplinary action	Not explicitly specified	Supervised autonomy model
Karnataka	President (under statutory rules/bye-laws)	Indirect oversight through rule framework	Not explicitly embedded in Act	Conditional internal autonomy model
Nagaland	Council	Prior approval required	Registrar must be a nurse (minimum BSc; PG preferred)	Profession-qualification-embedded model
Tamil Nadu*	Council-led direct recruitment (practice-based evolution)	Operational autonomy in practice	Registrar appointed from nursing profession	Profession-strengthened practice model

Taken together, the method of appointing the Registrar and the process for selecting the President emerge as two central structural determinants of professional autonomy within State Nursing Councils. While some states such as Maharashtra and Nagaland embed elected leadership within the Council ^[18,21], others retain ex officio governmental presidency, often through senior health administrators. Similarly, Registrar appointments range from direct governmental appointment to prior-sanction models, conditional internal autonomy, and professional-qualification-embedded

frameworks ^[14–21]. These variations demonstrate that nursing regulatory governance in India is not inherently executive-controlled but legislatively configured. The extent of professional dominance or executive oversight is therefore contingent upon statutory design rather than administrative necessity. This state-level diversity provides critical context for evaluating whether the National Nursing and Midwifery Commission Act, 2023 restructures regulatory authority or perpetuates patterns of conditional autonomy.

Tamil Nadu Model: Incremental Autonomy with Measurable Impact

Tamil Nadu represents a rare example where **partial regulatory autonomy has translated into tangible system-level impact**, even within a constrained statutory framework.

Evolution of Registrar Appointment

For nearly two decades, the Registrar of the **Tamil Nadu Nurses and Midwives Council (TNNMC)** has been appointed through **direct recruitment**, replacing earlier tenure-based appointments of retired government nursing tutors.

Table 2. Evolution of Registrar Appointment in Tamil Nadu

Period	Mode of Appointment	Statutory / Administrative Basis
Pre-2000s	Retired nursing tutors (tenure basis)	Executive practice under TN Act, 1926
2005 onwards	Direct recruitment by Council	Permissible autonomy under State Act

Ground-Level Impact

This shift enabled:

- Administrative continuity and institutional memory
- Digitised registration, renewal, and live nurse registry
- State-funded Continuing Nursing Education (CNE) linked to licensure
- Early adoption of **OSCE/OSPE** assessments
- Creation of nursing research archives and specialty journals
- Scale-up of simulation-based learning through public-private partnerships

These reforms improved **efficiency, transparency, nurse engagement, and public trust**.

Replicability for Other States

Other states can emulate Tamil Nadu **without legislative amendment** by:

1. Direct recruitment of Registrars
2. Digitalisation of licensing and renewal
3. Linking CNE credits to license renewal
4. Positioning councils as knowledge-driven regulatory institutions

Gender, Power, and Decision-Making in Nursing Governance

Indian nursing is a **predominantly female profession** (approximately **85–90%**)^[1,4], while regulatory leadership embedded within broader administrative hierarchies, a pattern noted globally in health workforce governance^[14] remains largely male and bureaucratic. This produces a **gendered governance paradox**: nurses' shoulder extensive clinical responsibility but are excluded from policy and regulatory decision-making.

From Responsibility to Stakeholdership

For nurses to become genuine stakeholders, reforms must include:

- Statutory representation of **clinical nurses and midwives**
- **Elected professional members**, not only nominated experts
- Leadership pathways valuing clinical expertise alongside academia
- Recognition of **advanced practice nurses** as policy actors

WHO and ICN evidence indicates that **profession-led, gender-balanced regulation** improves workforce morale, retention, and patient outcomes^[4–6].

The National Nursing and Midwifery Commission Act, 2023

Progressive Elements

The NNMCM Act replaces the INC Act, 1947 and introduces:

- A commission-based regulatory structure
- Four functional boards (UG, PG, Assessment, Ethics & Registration)

- Competency-based education and outcomes assessment
- Statutory recognition of advanced nursing practice ^[7]

Structural and Statutory Limitations

Despite these advances, the Act has critical limitations:

1. **No statutory guarantee of nurse-led dominance** (Chapter II)
2. Centralised executive control over appointments
3. Absence of elected professional representation
4. Silence on **Registrar cadre control** and direct recruitment

Thus, professional representation exists, but **professional dominance is not statutorily protected**.

State Nursing and Midwifery Commissions under NNMC

While the NNMC Act enables the establishment of State Nursing and Midwifery Commissions (SNMCs), it does not require:

- Election of Presidents from the nursing profession
- Direct recruitment of Registrars
- Explicit separation from DHS/DME control

This omission risks reproducing historical inequities under a new statutory framework.

Comparative Governance: NNMC and National Medical Commission

Table 3. Governance Comparison

Aspect	NMC Act, 2019	NNMC Act, 2023
Governing profession	Doctors	Nurses & midwives
Appointment authority	Central Government	Central Government
Professional dominance	Statutorily ensured	Not statutorily guaranteed
Government nominees	Limited	Significant
Degree of autonomy	High	Conditional

Statutory Basis

NMC Act 4–7^[8]; NNMC Act Chapter II ^[7]

Appointment authority and governance dominance are legally distinct concepts; although both the NMC Act, 2019 and the NNMC Act, 2023 confer appointment powers on the Central Government, only the NMC Act structurally safeguards professional majority, a protection not explicitly guaranteed under the NNMC framework. The distinction lies not in who appoints, but in who governs.

Implications of Table 3

- Risk of continued **bureaucratic override** of nursing priorities

- Limited policy voice for practicing nurses
- Weak accountability to the nursing workforce
- Replication of DHS/DME dominance at national and state levels

Several South-East Asian countries demonstrate that nurse-led regulation is both feasible and effective. Thailand's Nursing and Midwifery Council functions as an autonomous statutory body with an elected nurse president and professional majority, and is frequently cited by the World Health Organization as a regional model of nursing self-regulation ^[9,10]. In the Philippines, the Board of Nursing operates under the Professional Regulation Commission, with governance vested in senior nurses appointed from professionally nominated

panels ^[11]. Malaysia and Singapore maintain nurse-majority regulatory boards under ministerial oversight, balancing accountability with professional autonomy ^[12,13]. These regional models illustrate that governmental appointment need not translate into executive dominance, reinforcing that India's nursing governance deficit reflects statutory design rather than administrative inevitability ^[7,9].

In contrast, nursing regulators in countries such as the United Kingdom, Australia, and Canada function as profession-led statutory bodies with elected nurse majorities, reflecting international norms of professional self-regulation.

Discussion: Reform Without Liberation

The NNMC Act represents **administrative modernisation without redistribution of power**. Tamil Nadu demonstrates that even partial autonomy yields measurable gains, yet the national framework fails to institutionalise such autonomy. The absence of statutory safeguards ensuring profession-led governance, together with continued centralised control, risks weakening reform implementation and, within a predominantly female profession, may perpetuate structural gender imbalances in health-sector decision-making. Global evidence shows that **self-regulation is not a privilege but a prerequisite** for professional accountability and system performance ^[4-6].

Recommendations

- Statutory mandate for nurse-led leadership at national and state levels
- Guaranteed professional majority in regulatory bodies
- Direct recruitment and cadre control of Registrars
- Explicit separation of nursing regulation from DHS/DME dominance
- Alignment with international norms of professional self-regulation

Limitations

This analysis is limited to statutory design, documentary evidence, and reported administrative practices. It does not include empirical interviews with regulators, educators, or nurse leaders. Future research may explore lived experiences of governance and leadership within nursing regulation.

Conclusion

Indian nursing has evolved into a sophisticated, indispensable profession, yet its governance remains anchored in historical mistrust and patriarchal control. The NNMC Act, 2023 modernises regulatory processes but stops short of professional liberation. A century after the Madras Act of 1926, the challenge is no longer regulation *of* nurses, but regulation *by* nurses. Without statutory guarantees of nurse-led governance, reform will remain incomplete.

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Emotional Intelligence Competencies used by The Clinical Teacher in Internship: A Scoping Review

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Abstract

Background: A clinical educator who embodies humanistic qualities and emotional intelligence (EI) is attentive to the affective dimensions of the teaching-learning process. The integration of emotional intelligence into clinical teaching offers multiple advantages that enhance the quality of learning outcomes. The objective of this scoping review (SR) is to map and describe research that includes emotional intelligence competencies that are used by clinical teachers in internships and to gain a clearer picture of the concepts related.

Methods: SR following the Joanna Briggs Institute methodology. A deductive approach was used once we mapped the data within the Daniel Goleman Emotional Intelligence Model. Twenty-seven studies were included. The main identified strategy is encouragement and motivation of students' development through interactive feedback.

Conclusions: This SR offers an evidence-based perspective on the key competences involved in clinical teaching with EI. Clarifying the role of emotional intelligence in clinical teaching helps illuminate its complexity and provides a foundation for future correlational research. Findings also guide researchers into primary studies evaluating the effectiveness of EI strategies for clinical education.

Keywords: Clinical teaching - Competences - Emotional Intelligence - Internship - Mental Health

Introduction

Emotional intelligence in clinical teaching enables educators to address students' emotional needs, strengthen teacher-student communication, and

foster a supportive learning environment. Evidence shows a positive association between emotional intelligence and clinical teaching effectiveness, indicating that educators with higher emotional competence tend to perform more effectively¹.

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Emotions are organised responses involving physiological, cognitive, motivational, and experiential components, typically triggered by internal or external events of personal significance. They play a fundamental role in shaping and directing human behaviour². Emotions have been viewed as distinct from cognition and rational thought. Intelligence, by contrast, is understood as the capacity to act purposefully, reason effectively, and manage one's environment³.

Emotional Intelligence (EI) emerges from the integration of cognitive, affective and conative domains, reflecting the capacity to understand, regulate and utilise emotions in oneself and others. EI introduced by Salovey and Mayer involves skills for understanding, regulating and using emotions effectively. These abilities support motivation and goal achievement⁴.

Daniel Goleman expanded on Salovey and Mayer's research, creating a model of EI focused on leadership. He conceptualises EI within four domains and twelve competencies. The domain of self-awareness relates to emotional awareness competence; the domain of self-management relates to emotional self-control, adaptability, achievement orientation, and positive outlook competencies; the social awareness domain relates to empathy and organizational awareness; and the relationship management domain relates to influence, coach and mentor, conflict management, teamwork and inspirational leadership competences. These competencies are learned and learnable capabilities that allow outstanding performance at work or as a leader⁵.

Clinical teaching differs from traditional instruction in that the educator is also a health or social-science professional, recognised for their expertise and responsible for preparing future practitioners. The effectiveness of clinical teaching is strengthened when educators draw on emotional intelligence competencies, including humanistic and leadership attributes.⁶

Clinical teachers develop their activity in internships, which is a period of learning in a professional environment that provides real-world experience, skills development, networking, and career exploration.

Teaching with EI refers to the teacher's attention to the emotional dimension of learning, with the aim of increasing students' ability to learn. The advantages of using EI competencies in clinical teaching are improved communication, better stress management, enhanced development of empathy, easier conflict resolution, development of clinical teaching⁷.

Regarding the use of emotional intelligence competencies in clinical teaching, Omid, Haghani and Adibi⁸ are the most prominent contributors to the field. Their work, published since 2016 in English from Iran, spans mixed-methods research, narrative reviews and expert opinion, all grounded in Goleman's emotional intelligence framework. Beyond these authors, only a limited number of studies address the topic, predominantly qualitative investigations and narrative literature reviews.

For the selection of studies and data syntheses in the study, we will use Goleman's framework as reference, since the clinical teacher is the leader of the learning process, and his model includes a description of competencies that clarifies and facilitates the syntheses.

The objective of this Scoping Review (SR) is to map and describe research that includes emotional intelligence competencies that are used by clinical teachers in internships and to gain a clearer picture of the related concepts.

Considering that there are few publications on the subject regarding clinical teachers, the objective of this research, and the fact that this information is not collated and organized in this perspective anywhere, we choose a Scoping Review kind of research. A scoping review maps a broad field, applying flexible criteria and without undertaking an evaluative synthesis of quality whereas a systematic review addresses a highly specific question using stringent criteria and critical appraisal⁹. So, we argue that the SR is the methodology that best applies, so we can investigate where, how and what research has been conducted in EI competencies used by the clinical teacher in internship. The results of this SR may, therefore, inform future research.

A preliminary search for existing SR and systematic reviews on the topic has been conducted in

Prospero, Figshare, Cochrane Database of Systematic Reviews and JBI Evidence Synthesis, and no current or in-progress scoping reviews or systematic reviews on the topic were identified.

Material and Methods

This review has been conducted in accordance with the Joanna Briggs Institute (JBI) methodology for Scoping Reviews⁹ and is reported in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist¹⁰.

A protocol was drafted according to the JBI Evidence Synthesis manuscript style and preparation guidelines⁹, and is registered in Figshare, DOI: 10.6084/m9.figshare.28616777.

Review Questions

- Q1.** Which emotional intelligence competencies, as conceptualised within Daniel Goleman's model, are reported as being used by clinical teachers in internship or clinical placement contexts?
- Q2.** What personal and professional attributes characterise clinical teachers who employ emotional intelligence competencies during internships?
- Q3.** What methodological approaches and data collection strategies have been used in studies examining emotional intelligence skills in clinical teaching in internship settings?
- Q4.** Which concepts, constructs, or related themes are associated with the use of emotional intelligence competencies by clinical teachers in internship contexts?
- Q5.** In which educational and healthcare professional settings have studies on emotional intelligence in clinical teaching during internships been conducted?

The inclusion criteria will reflect the type of participants (P), the concept (C), and the context (C) on which the SR will focus.

Includes studies that focus on clinical teachers. This is an adult population, enabled with professional certification. Clinical teachers of health care professionals are to be considered.

The overarching concept of interest is the Emotional Intelligence competences that are used in clinical teaching.

Context consider internships in all healthcare settings are to be considered since research in this field is likely to be international in scope.

Types of Evidence Sources

Eligible sources included qualitative, quantitative, mixed-methods, and evidence-synthesis studies, as well as grey literature, focusing on emotional intelligence competencies used by clinical teachers in internship contexts. Only studies published within the past 10 years were included. The search was not limited by language, time frame, or geographic location. When duplicate sources were identified, the most recent one was selected. Conference abstracts, manuscripts formatting publications, and all kinds of protocol reviews, were excluded.

Search Strategy

The search process extended over a ten-month period, conducted between March and December 2025.

A 3-step search strategy was used to locate both published and unpublished studies. First, an initial limited search of PubMed (National Library of Medicine) and CINAHL (EBSCOhost) (both limited to the first 200 results) were conducted using a preliminary search strategy containing keywords related to EI competences, clinical teaching and internship (validated on DeCS/MeSH)¹¹.

Secondly, text words from the titles and abstracts of the retrieved articles, along with the index terms used to describe them, were examined to identify additional keywords and ensure comprehensive coverage of the relevant literature. Thirdly, the reference lists of the reports and articles selected for full-text review were examined to identify additional sources.

The search strategy was #1 (Emotional intelligence/Inteligência emocional); #2 (Clinical teaching/Ensino clínico); #3 (Internship/Estágio); #4 (#1 AND #2); #5 (#1 AND #2 AND #3); #6 (#1 AND #2 OR Clinical mentoring/Mentoria AND

#3); #7 (#1 AND #2 OR Clinical mentoring/Mentoria OR Clinical Supervision/Supervisão Clínica AND #3); #8 (#1 AND #2 OR Clinical Mentoring/Mentoria OR Clinical Supervision/Supervisão Clínica OR Perceptorship/Preceptoria AND #3); #9 (#1 AND #2 OR Clinical Mentoring/Mentoria OR Clinical Supervision/Supervisão Clínica OR Perceptorship/Preceptoria AND #3 OR Clinical Clerkship/Estágio Clínico).

Due to the large volume of records retrieved from the database searches and the fact that our team was small, we chose to screen only the first 200 records from each search.

The search was conducted in English and Portuguese, covering the past ten years, and limited to full-text, peer-reviewed publications with an available abstract. Non-English studies that could be translated using DeepL Translate to extract relevant information were also included. The EBSCOHost platform was used to search the CINAHL, MEDLINE Complete, Nursing & Allied Health Collection: Comprehensive, and MedicLatina

databases. Grey literature was searched via MedNar, Google Scholar (both limited to the first 200 results), Repositórios Científicos de Acesso Aberto de Portugal (RCAAP), and ProQuest Dissertations and Theses.

Evidence Selection

Following the search, all identified records were collated and transferred into an Excel® spreadsheet, and duplicates were removed. To ensure reliability, and after a pilot test, two reviewers independently screened the titles and abstracts against the inclusion criteria. Full-text versions of potentially relevant papers were then obtained, and their citation details imported into another Excel® spreadsheet. All full-text papers were assessed in detail by the two independent reviewers according to the inclusion criteria. Any disagreements arising at any stage of the study-selection process were resolved through discussion or with the involvement of a third reviewer. The search results and study-selection process were comprehensively reported and illustrated using a PRISMA flow diagram¹²(Figure 1).

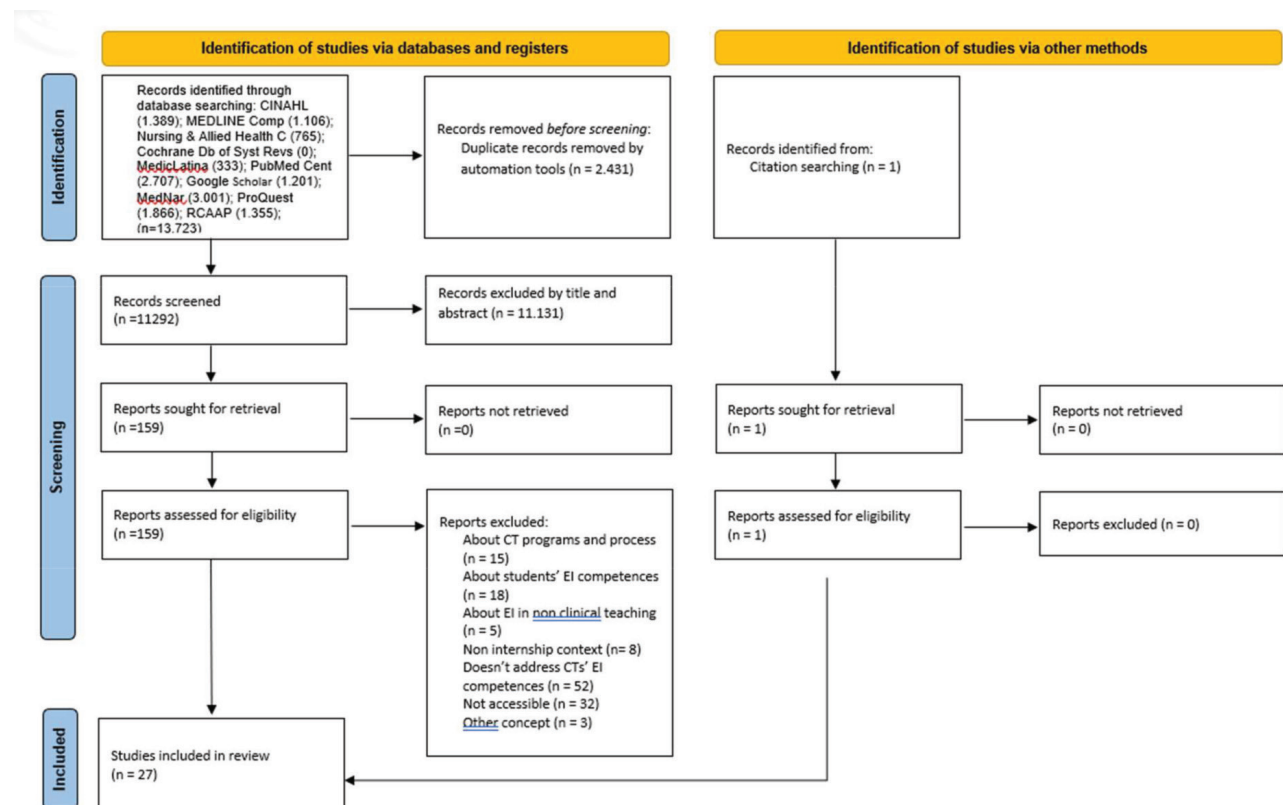


Figure 1: Search results and study selection and inclusion process

Database searches were conducted between April 4th, 2025, and October 10th, 2025, yielding 1.389 citations in CINAHL, 1.106 in Medline Complete, 765 in Nursing & Allied Health Collection: Comprehensive, 0 in Cochrane Database of Systematic Reviews, 333 in MedicLatina, 2.707 in PubMed Central (all in EBSCOhost), 1.201 citations in Google Scholar, 3001 in MedNar, 1.866 from ProQuest Dissertations, and 1.355 from Repositórios Científicos de Acesso Aberto de Portugal (RCAAP), making a total of 13.723 citations. Due to the large volume of citations, it wasn't possible the transference into EndNote (Clarivate), so the authors introduced the registers into an EXEL© table. A total of 2.431 duplicates were removed on an automated way by the programme, which left 11,292 citations that were screened by the title and abstract by 2 independent reviewers. At this level, 11.131 citations were excluded, leaving 159 reports assessed for eligibility. Reviewed by 2 reviewers, 133 were excluded.

The main reason papers were excluded at full-text screening was due to addressing the clinical teaching program and process but not the EI competences or teachers' attributes, focusing on the EI students' competences, regarding in the EI teachers' competences in non-clinical teaching context, didn't address the teachers' EI competences, weren't accessible to full text reading, and were about other concept than EI competences. 26 publications were obtained. Then the reviewers screened the bibliography of these selected studies and added another publication making a total of 27 studies included in the review.

Data Extraction

Two members of the review team extracted the

data using a draft form co-created by the reviewers, based on JBI guidance⁹.

The extracted data included citation details, geographic location, level of evidence source, study aims, methodology, population, main concept, related concepts, context, data recollection instrument, and emotional Intelligence competences and strategies used.

Data Analysis and Presentation

Two researchers categorized the study results into broader concepts using content analysis. The findings will be presented in maps, tables or diagrams, with a narrative summary addressing the review objective and the questions formulated. The summary will highlight key research questions, designs, methods, and related concepts¹³.

Deviations from Protocol

There are three deviations from the protocol, namely: the replacement of the third author, Tânia Gamito, for Célia Nicolau; the use of an EXEL© table instead of the EndNote (Clarivate) citations platform; and the search questions were reformulated in a more clearly and articulated way.

Results and Discussion

Results

A deductive approach was undertaken, once we mapped the data within the Daniel Goleman Emotional Intelligence Model.

A total of 27 studies were included in the review has showed in Table 1.

Table 1. Included Studies

Study ID	Title	Authors	Year of publication
A	A preceptorship model to facilitate clinical nursing education in health training institutions in Botswana ¹⁴	Dube, A., & Rakhudu, M. A.	2021

Continue....

B	A skill to be worked at: using social learning theory to explore the process of learning from role models in clinical settings ¹⁵	Horsburgh, J., & Ippolito, K.	2018
C	Advanced practice and clinical supervision: An exploration of perceived facilitators and barriers in practice ¹⁶	Lee, G. A., Baker E. E. & Stewart C, Raleigh M	2023
D	Clinical supervision strategies, learning, and critical thinking of nursing students ¹⁷	Silva, A.O.V. D., Carvalho A. L. R. F., Vieira, R. M., & Pinto C. M. C.B.	2023
E	Developing a model for clinical teaching with emotional intelligence ¹⁸	Omid, A., Haghani, F. & Toufan, N.	2024
F	Core competencies for Registered Nurse preceptors: A mapping review of quantitative studies ¹⁹	Ryan C. L., Cant R., Hughes, L., Ahchay, D., & Strickland, K.	2024
G	Clinical teaching with emotional intelligence: A teaching toolbox ⁸	Omid, A., Haghani, F., & Adibi, P.	2016
H	Evaluating preceptorship during advanced pharmacy practice experiences in Saudi Arabia: A Cross-Sectional Study ²⁰	Alnezary, F.S., Alzahrani, F., Alatawi, Y., & Alhifany, A. A.	2024
I	How to choose a preceptor: aspects to consider based on a grounded theory study ²¹	Amaral, G., Figueiredo, A. S.	2023
J	Impact of Preceptorship Models for Undergraduate Nursing Students and Its Implementation: Systematic Review ²²	Rosli, N., Choo, T. & Idris, Deeni	2022
K	Key tips for teaching in the clinical setting ²³	Burgess, A., van Diggele, C., Roberts, C., & Mellis C.	2020
L	Pharmacy preceptor training: addressing the challenges of clinical supervision in community practice ²⁴	Knott GJ, Mylrea MF, Glass BD	2023
M	Most Relevant Clinical Supervision Strategies In Nursing Practice ²⁵	Pires, Regina & Santos, Margarida & Rocha, Filipe & Rocha, Inês.	2016
N	Should We Be Trained to Train? Nursing Students' and Newly Qualified Nurses' Perception on Good Lecturers and Good Clinical Preceptors ²⁶	Martínez-Linares, J. M., Parra-Sáez, C., Tello-Liébaña, C., & López-Entrambasaguas, O. M.	2019
O	Strategies used by midwives to enhance knowledge and skill development in midwifery students: an appreciative inquiry study ²⁷	Arundell, F., Sheehan, A., & Peters K.	2024

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P	Student nurse perceptions of supervision and clinical learning environment: a phenomenological research study ²⁸	Vizcaya-Moreno, M. F., Pérez-Cañaveras, R. M., Ruiz, I., & De Juan, J.	2018
Q	Student-Valued Measurable Teaching Behaviours of Award-Winning Pharmacy Preceptors ²⁹	O'Sullivan, T.A., Lau, C., Patel, M., Mac, C., Krueger, J., Danielson, J., & Weber, S.S.	2015
R	Clinical supervision and preceptorship/ tutorship: contributions to the Supervised Curricular Internship in Nursing ³⁰	Esteves, L. S. F., Cunha, I. C. K. O., Bohomol, E., & Santos, M. R.	2019
S	The effect of the preceptorship training program on the participation of clinical nurses in training nursing internship students: a quasi-experimental study ³¹	Mashayekh, R., Ebadi, A., Nehrir, B., Moayed, M. S.	2024
T	"They cared about us students": learning from exemplar clinical teaching environments ³²	Gamble Blakey, A., Smith-Han, K., Anderson, L., Collins, E., Berryman, E., & Wilkinson, T.	2019
U	A Critical Review of Preceptor Development for Nurses Working with Undergraduate Nursing Students ³³	Kamolo, E., Vernon, R., & Toffoli, L.	2021
V	Clinical Teaching: An Evidence-based Guide to Best Practices from the Council of Emergency Medicine Residency Directors ⁶	Natesan, S., Bailitz, J., King, A., Krzyzaniak, S. M., Kennedy, S. K., Kim, A. J., Byyny, R., & Gottlieb, M.	2020
W	Effects of Preceptors' Clinical Teaching Behaviour on the Field Adaptation of New Graduate Nurses: Mediating Effects of Self-Leadership and Resilience ³⁴	Eun Jung, K., & Eungyung, K.	2023
X	Emotional Intelligence: An Old Issue and a New Look in Clinical Teaching ³⁵	Omid, A., Haghani, F., & Adibi, P.	2018
Y	Faculty Perceptions on the Roles of Mentoring, Advising, and Coaching in an Anaesthesiology Residency Program: Mixed Methods Study ³⁶	Nykiel-Bailey, S., Burrows, K., Szafarowicz, B. E., Moquin, R.	2025
Z	Measuring and assessing the competencies of preceptors in health professions: a systematic scoping review ³⁷	Bartlett, A. L. D., Um, I. S., Luca, E. J., Krass, I., & Schneider, C. R.	2020
AA	Relevance of indicators of clinical supervision strategies in nursing ³⁸	Pinto, D., Santos, M., & Pires, R.	2017

Characteristics of Included Studies

The geographical locations where the included studies were conducted were: 5 in Australia^{19,23,24,27,37}, 1 in Botswana¹⁴, 1 in Brazil³⁰, 1 in Brunei Darussalam²²,

1 in East Africa³³, 2 in England^{15,16}, 4 in Iran^{8,18,31,35}, 1 in New Zealand³², 4 in Portugal^{17,21,25,38}, 1 in Saudi Arabia²⁰, 1 in South Korea³⁴, 2 in Spain^{26,28}, 3 in the United States of America^{6,29,36}(Figure 2).

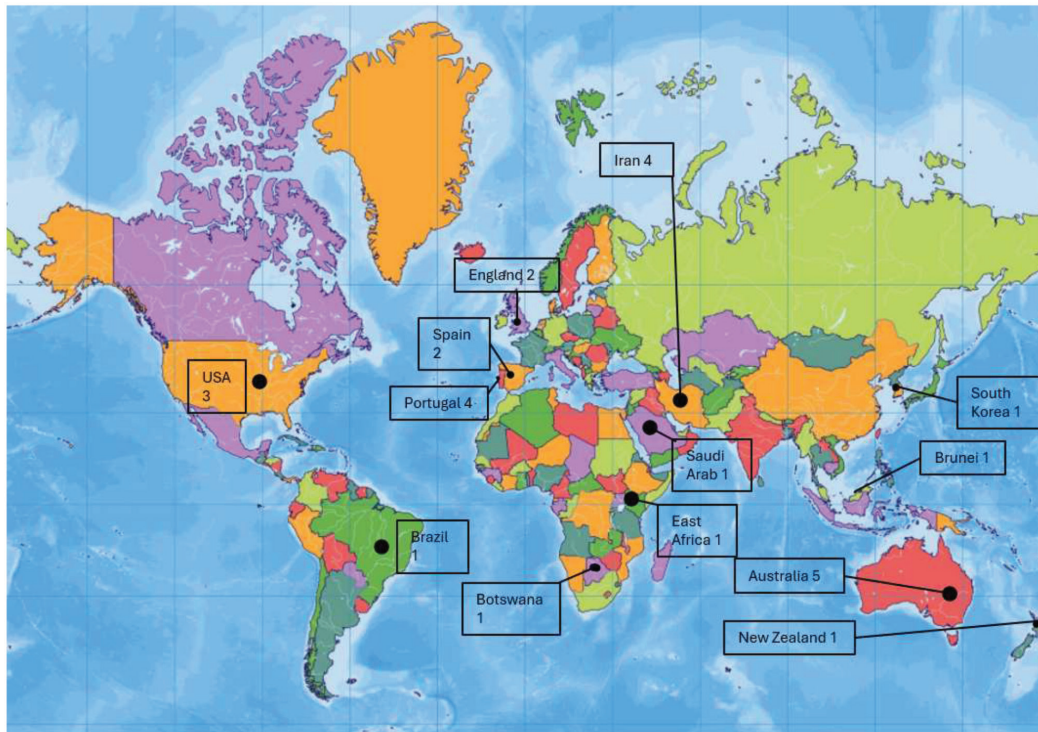


Figure 2: Included studies countries

Accordingly with de JBI reference, the level of evidence of the included studies are: 1 level 1²², 1 level 2³¹, 17 level 4^{8,14,15,16,17,18,20,21,25,26,27,28,29,33,34,36,38}, 8 level 5^{6,19,23,24,30,32,35,37}. So, about 59% of the studies are level 4 of evidence, followed by level 5 with approximately 30%; with a representation near 4% are the studies with level 1, 2 and 3 (Table 2).

Most **methodologies** used were qualitative (n=12)^{14,15,17,18,20,21,25,26,27,28,29,34}, followed by Expert Opinion (n=6)^{23,24,30,32,6,35}, there were 4 Mixed Methods Studies^{16,33,36,38}, 2 Scoping Reviews^{19,37}, 1 Literature Review⁸, 1 Quasi-Experimental Study³¹, and 1 Systematic Review²² (Table 2).

Table 2. Level of evidence and research methodology of included studies

Level of Evidence	Research Methodology	Studies	n	%
Level 1	Systematic Review	J	1	3.70%
Subtotal Level 1			1	3.70%
Level 2	Quasi-Experimental	S	1	3.70%
Subtotal Level 3			1	3.70%

Continue....

Level 4	Qualitative	A, B, D, E, H, I, M, N, O, P, Q, W	12	44.44%
	Mixed Methods	C, U, Y, AA	4	14,81%
	Literature Review	G	1	3.70%
Subtotal Level 4			16	59.26%
Level 5	Expert Opinion	K, L, R, T, V, X	6	22.22%
	Scoping Review	F, Z	2	7.41%
Subtotal Level 5			8	29.63%
TOTAL			27	100%

The aims of the studies were: Focus on developing, evaluating, or defining preceptorship structures and the qualities required of preceptors^{14,19,21,22,25,32,34}. Objectives centred on supervision processes, teaching approaches, and the broader clinical learning environment^{16,17,23,24,26,28,29,31,33,35}. Objectives addressing interpersonal teaching behaviours, role modelling, and the development of professional identity and

competence^{15,27,30,38}. Objectives focused on emotional intelligence, resilience, and the relational aspects of teaching and learning^{18,20,36,37}.

The targeted populations were nursing-related learners and professionals (n=12)^{14,17,19,22,25,26,27,28,30,31,34,38}, other health professions (n=7)^{15,16,20,24,29,32,36}, clinical educators (n=7)^{6,18,21,23,33,35,37} (Chart 1).

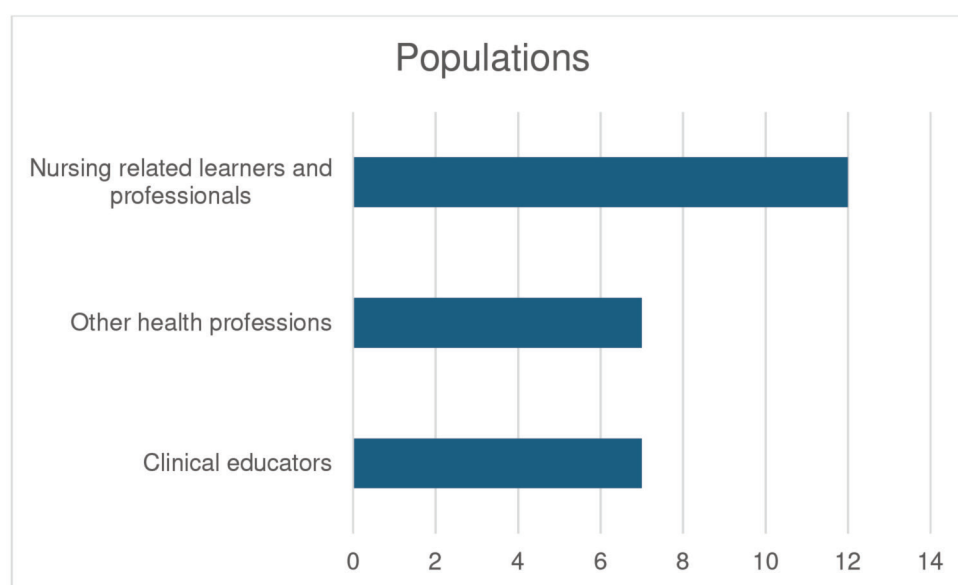


Chart 1: Distribution of targeted populations in the included studies

Four categories of concepts were recognised, being: clinical teaching/preceptorship/supervision ($n=11/40,74\%$)^{6,14,16,20,21,22,23,26,30,32}, clinical supervision strategies/ learning strategies of knowledge and

skill development ($n=6/22,22\%$)^{15,17,25,27,34,38}, preceptorship competences and training requirements, ($n=6/22,22\%$)^{19,24,31,33,36,37}, clinical teaching with emotional intelligence ($n=4/14,81\%$)^{8,18,29,35} (Chart 2).

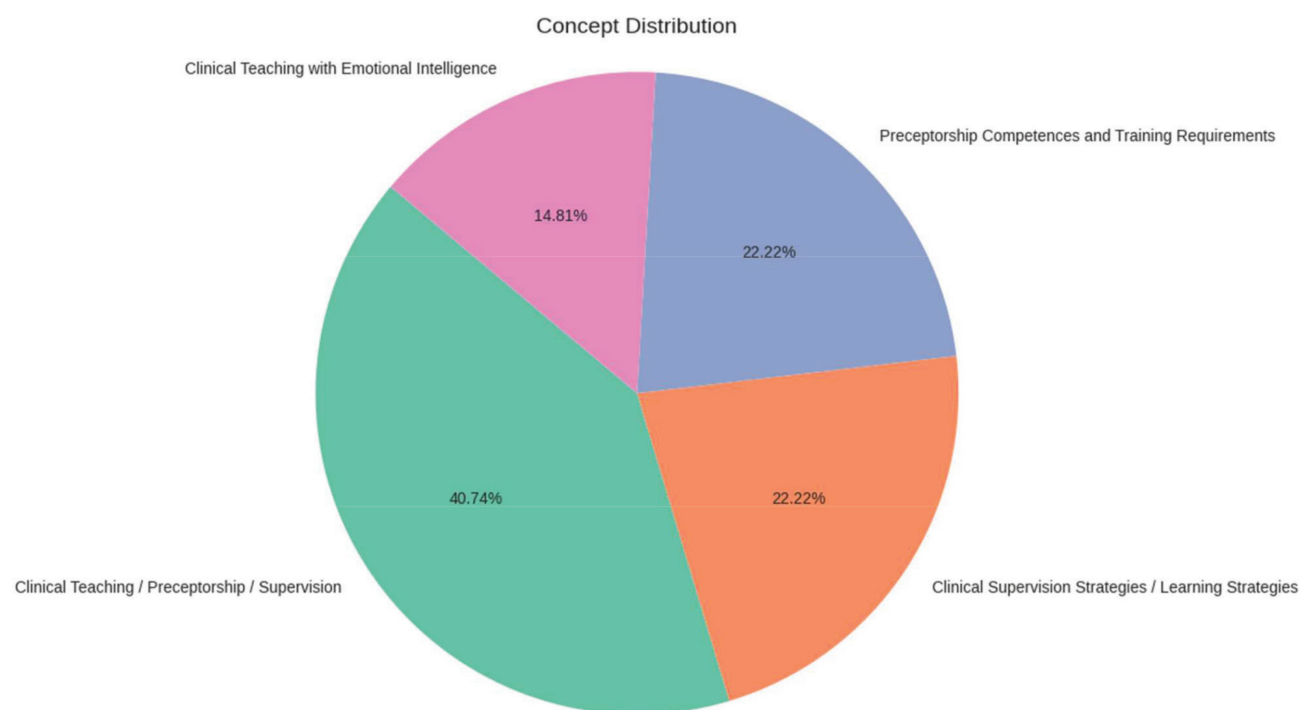


Chart 2: Concepts distribution

The related concepts that emerged were: Structure/resources for preceptorship, process of preceptorship, outcome of preceptorship¹⁴; Advanced practice¹⁶, Critical thinking¹⁷; Dundee 3 Circles Clinical Teaching Model, Daniel Goleman's Emotional Intelligence Theory¹⁸; Daniel Goleman Emotional Intelligence Model^{18,35}; Enhanced ability to incorporate theory into practice, increased self-confidence, increased satisfaction and retention of students²³; Clinical knowledge and skills, professionalism, communication²⁴; Preceptorship training program³¹; Personal development, learning outcomes and patient care³⁵; Perceptions³⁶; Quality indicators³⁷.

About the data recollection instruments, the values of interviews^{14,17,18,21,26,27,28} and questionnaires^{15,}

^{25,31,32,34,36,38} were equally distributed ($n=7/26\%$); the H study²⁰ used a mixed data recollection instrument ($n=1/3,5\%$); in the R²⁹ study was used statements recollection ($n=1/3,5\%$); and in the most studies it didn't apply^{6,8,16,19,22,23,24,30,33,35,37} ($n=11/41\%$).

Review Findings

The included studies identified multiple strategies that contributed to teaching with EI in internship context. The information was extracted according to our published data extraction tool under the section "Results".

We categorized the strategies into 21 groups based on coherence between them, as displayed in table 4.

Table 3. Strategies of Emotional Intelligence competences used by the clinical teachers

Strategies of Emotional Intelligence competences	Studies	Distribution (n/%)
Encourages and motivates students' development through interactive feedback	B, E, F, G, H, I, K, L, M, O, P, Q, T, U, V, W, X, Z, AA	19/70,37%
Develops a respectful, safe and trustworthy relationship with the student	D, E, F, G, H, J, O, S, T, V, W, X, Y, Z, AA	15/55,55%
Provide emotional support	A, C, F, G, J, M, O, P, V, W, Y, AA	12/44,44%
Effective communication	A, E, F, H, I, L, T, V, W, X, Z, AA	12/44,44%
Show availability and provide presence	B, C, E, F, G, J, M, P, Q, T, V, X	12/44,44%
Performs a role model aligned with the values of the practice inspiring students	B, D, E, H, L, S, V, X, Z	9/33,33%
Sets realistic expectations, shows flexibility by adapting plans to circumstances, students' needs and learning objectives	E, L, O, Q, R, T, U, V, X, Y, Z	11/40,74%
Creates a positive and safe learning environment	F, G, H, I, K, L, Q, V, W, X, AA	11/40,74%
Pays attention to students' concerns, feelings, social and emotional learning environment and assists with socialization	E, F, G, T, V, X, Y	7/25,92%
Optimise enthusiasm, stimulates curiosity and independence	E, O, Q, S, X, Y	6/22,22%
Shows leader skills	F, L, V, X, Z	5/18,51%
Promotes teamwork and good working relations	D, F, Q, V, X	5/18,51%
Attends to students' comfort, safety and needs	E, F, G, T	4/14,81%
Involves the student in the learning process and assigns meaningful activities	F, Q, X, Y	4/14,81%
Teaches with calm and patience	E, O, Y	3/11,11%
Promotes solve-problem skills	J, L, Z	3/11,11%
Coach role	F, Y	2/7,40%
Shares personal experiences	F, Y	2/7,40%
Welcomes the students	H, T	2/7,40%
Shows effective conflict management	I, U	2/7,40%
Goal-orientation in mentoring	F	1/3,70%

The most cited strategy is encouragement and motivation of students' development through interactive feedback ($n=19/70,37\%$)^{6,8,15,18,19,20,21,23,24,25,27,28,29,32,33,34,35,37,38}. The second most cited strategy relates to development of a respectful, safe and trustworthy relationship with the students ($n=15/55,55\%$)^{6,8,17,18,19,20,22,27,31,32,34,35,36,37,38}. The third most cited with 44,44% of representation are providing emotional support ($n=12$)^{6,8,14,16,19,22,25,27,28,34,36,38}, effective communication ($n=12$)^{6,14,18,19,20,21,24,32,34,35,37,38}, and show availability and provide presence ($n=12$)^{6,8,15,16,18,19,22,25,28,29,32,35}. The representativeness of the other strategies can be observed in the table above.

Related to the strategies used are the mentor attributes, like: approachable, communication skills, fair, empathic, kind, flexible, patient, supportive, fair, empathic, compassionate, self-awareness and effective emotional management, flexible, active listener, problem solver, protector, good sense of humour, motivated, responsible, having professional initiative, positive attitude, trustworthiness, sociable, ethical, willingness to teach and train, open to receiving feedback, expects positive results from themselves and others^{6,8,18,19,20,21,23,26,28,29,32,33,34,35,36,37}.

Also, the EI factors hindering the learning process mentioned are the supervisor's attitude, lack of feedback, communication problems, feeling humiliated, and lack of support¹⁷.

Discussion

To the authors' knowledge, this is the first scoping review to dedicated to the emotional intelligence competences used by clinical teachers in internship contexts.

Self-Awareness Competence

This domain relates to the teachers' attributes. Al Jaber, Alzouebi, and Abu Khurma study found that students who view their teachers as more self-aware report greater satisfaction with their academic performance, supporting evidence that teacher self-awareness benefits student-teacher relationships³⁹.

Sabah and Marei found that pre-service science teachers valued mentors who were supportive, approachable, positive, confident, and attentive listeners⁴⁰.

Self-Management Competence

Setting realistic expectations and adapting plans to students' needs and learning goals are key elements of effective pedagogy. Such flexibility reinforces goal-orientation in mentoring, enabling clinical teachers to adjust strategies to support meaningful learner progress⁴¹.

A systematic review found strong theoretical support for the view that teachers' emotion regulation and management of psychological stress shape the quality of teacher-student interactions, promote occupational well-being, and ultimately contribute to positive student development⁴².

Afrifa, Fianko, and Dzogbewu report significant positive associations between self-awareness and leadership effectiveness, and between self-management and leadership effectiveness, identifying both as key predictors of successful leadership⁴³. According to Goleman, teachers lead the learning process, so this approach can be used for clinical teaching in internships.

Social Awareness Competence

By modelling professional values and attending consistently to students' comfort, safety, and individual needs, clinical teachers build trust and credibility that support learners' development. Their sensitivity to students' concerns and emotions further strengthens socialisation and belonging, contributing to a positive and secure learning environment.

Wang, Husu, and Toom's systematic review proposes a framework for mentoring competence in in-service teacher education. Their analysis identifies three aspects of mentors' social competence—bridging mentor-mentee distance, designing interactive activities, and extending professional networks—the first two strengthening mentor-mentee connections and the third supporting mentees' wider professional relationships. The mentioned teachers' social competences are aligned with the Golemans' EI model⁴⁴.

Relationship Management Competence

A strong teacher–student relationship underpins effective mentoring. Alonzo, Ellis, and Nguyen developed a seven-factor, empirically derived framework that highlights key mentor attributes, including building effective relationships, offering direction and support, adopting a progressive mindset, sharing resources, developing professional knowledge, and facilitating pre-service teachers' learning. Their study illustrates how clinical teachers' attributes are expressed through observable behaviours⁴⁵.

Yang, Gao, and Li found that a supportive mentoring style positively predicts master's students' innovative behaviour, with academic aspiration playing a potential mediating role⁴⁶.

Following that approach, Bao finds that teachers who lead with empathy and emotional intelligence foster innovation and success by leveraging both cognitive and emotional factors⁴⁷.

The evidence points to relational skills as predictors of pedagogical skills and the arguments discussed are congruent with the Golemans' EI model.

Conclusion

This SR maps and describes research on EI competencies used by clinical teachers in internships, providing an aggregated and synthesised overview of the related concepts. This makes it possible to look at practice from an evidence-based perspective.

This paper was the first review to address the EI competencies in clinical teaching through a deductive approach. A broad survey was conducted. Twenty-seven studies from wide geographical locations were included and allowed us to conclude that clinical teachers foster students' development by offering interactive feedback that stimulates engagement and growth, while simultaneously building a respectful, safe and trustworthy relationship that supports effective learning. This relational foundation is strengthened through the provision of emotional support and clear, effective communication, ensuring

that students feel understood and guided throughout the process. By demonstrating genuine availability and maintaining a consistent, supportive presence, clinical teachers create an environment in which learners feel encouraged, valued and able to progress with confidence. These strategies align with the competences designated in Daniel Golemans' Emotional Intelligence model. Clinical teachers' attributes allow them to enhance EI competences that optimize the students' outcomes.

About study limitations, one notable challenge was the large volume of records resulting from searching the databases and the fact that we are a small team, so we chose to scrutinise only the first 200 records of each search. Additionally, recent studies on EI competencies and clinical teaching failed to provide a comprehensive discussion of the topic.

The contribution to future research lies in understanding the concepts related to emotional intelligence. and clinical teaching allows understanding the complexity of the phenomenon and eventually conducting correlational studies. This study also enables researchers to substantiate further primary studies directed at how and which EI strategies are the most effective in clinical teaching.

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Conflicts of Interest: There is no conflict of interest in this project.

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Electronic gadgets use and its impact on Health, Social Relationship, and Academic Performance among Nursing Students

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Abstract

Introduction: Electronic gadgets, including smartphones, tablets, laptops, and televisions, are essential in nursing students' lives, functioning as educational tools, stress relievers, and social connectors, yet they can also be sources of distraction.

Material and Methods: This study evaluated the impact of electronic gadget use on nursing students' health, social relationships, and academic performance. A descriptive research design was employed, involving 236 BSc Nursing students from KGMU College of Nursing across 1st, 2nd, and 3rd years. Data were gathered using a socio-demographic profile, an electronic gadget screening tool, and a structured questionnaire.

Results: The findings indicated that students with good academic performance were more prone to excessive cell phone use. Those with satisfactory academic performance showed a higher likelihood of excessive cell phone use (OR = 1.158). Students with poor academic performance were more likely to engage in excessive television viewing (OR = 1.297, $p > 0.05$) and internet use (OR = 1.550, $p > 0.05$), while those with satisfactory performance were less likely to overuse television (OR = 0.673, $p > 0.05$) or the internet (OR = 0.537, $p > 0.05$). These results lacked statistical significance.

Conclusion: Electronic gadgets significantly influence nursing students, facilitating learning and communication but also contributing to health issues like digital eye strain and anxiety, reduced social interactions, and academic distractions when used excessively. Nursing educators and institutions should encourage balanced gadget use to improve student well-being and academic outcomes.

Keywords: Electronic gadgets, health impact, social relationships, academic performance, internet & television usage.

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Introduction

In the 21st century, electronic gadgets have transitioned from luxury items to essential tools, becoming deeply embedded in the everyday routines of students across the globe. Among these, nursing students stand out as a unique group—tasked not only with mastering complex theoretical knowledge^[1] but also with developing critical clinical skills and emotional intelligence. For them, gadgets such as smartphones, tablets, laptops, and televisions are not just entertainment devices; they are educational aids, stress relievers, social lifelines, and sometimes, unfortunately, sources of distraction^[2]. The dual-edged nature of electronic gadgets presents both opportunities and challenges that warrant careful examination, especially within the context of professional health education^[3].

Globally, the rise in electronic gadget usage is staggering. As of 2024, there are over 5.6 billion mobile phone users, with a significant portion being students and young professionals^[4,5]. India alone accounts for over 560 million users^[6], making it one of the fastest-growing digital consumer markets^[7] (Telecom Regulatory Authority of India, 2023). With the National Digital Education Architecture (NDEAR) and initiatives like ePathshala and SWAYAM, gadgets have become integral to academic access and delivery in India^[16]. However, the surge in usage has also raised red flags about the associated negative impacts, particularly when gadget use becomes excessive or poorly regulated. Multiple studies have documented the health^[8] implications of excessive gadget use, including digital eye strain, poor sleep hygiene, reduced physical activity, and even mental health disturbances such as anxiety, irritability, and depressive symptoms^[9,10]. Students, especially those in demanding disciplines like nursing, are at an increased risk due to prolonged study hours, night shifts, and an often-sedentary lifestyle. Compounding these issues is the phenomenon of technofence^[11] where constant device notifications interfere with interpersonal relationships and social bonding. Nursing students, who must cultivate strong communication and empathy skills, may find these areas compromised

by habitual digital distractions^[12]. While digital tools have revolutionized access to learning materials, their misuse often leads to diminished concentration, academic procrastination, and lowered academic performance^[13,14]. On the contrary, those who use gadgets primarily for structured academic tasks often show improved performance—highlighting the importance of purposeful vs passive usage.

Most Indian studies either focus on general health impacts or limit themselves to smartphone addiction scales without correlating the data to academic or social domains. Furthermore, very few adopt a comprehensive approach that simultaneously examines health, social interactions, and academic outcomes.

Recognizing this need, the present study seeks to assess the level of electronic gadget usage and its multifaceted impact—on health, social relationships, and academic performance—among B.Sc. Nursing students at King George's Medical University (KGMU), Lucknow. By exploring these dimensions in an integrated manner, this research aims to generate actionable insights that can inform institutional policies, student support services, and curriculum design, ensuring a healthier and more productive educational environment for future nursing professionals.

Materials & Methods

Objectives of The Study

Primary Objectives

- To find out the level of electronic gadgets usage among the nursing students of college of Nursing, KGMU, Lucknow.
- To find out the impact of electronic gadgets usage on health, social relations and academic performance among the nursing students of college of nursing, KGMU, Lucknow.

Secondary Objective

To find out association between electronic gadget usage and socio-demographic variables among the nursing students of college of nursing, KGMU, Lucknow.

Study Design

A descriptive research design was adopted to evaluate the level of electronic gadget usage and its impact on health, social relationships, and academic performance among undergraduate nursing students.

Study Setting

The study was conducted at the KGMU College of Nursing, King George's Medical University (KGMU), Lucknow, a government teaching institution in Northern India.

Study Population and Sampling

The target population included all B.Sc. Nursing students enrolled in the 1st, 2nd, and 3rd years of the B.Sc. Nursing program at KGMU.

Sampling Method: A non-probability purposive sampling technique was used to recruit participants who met the inclusion criteria.

Sample Size: A total of 236 students participated in the study.

Inclusion Criteria

- Students currently enrolled in the 1st, 2nd, or 3rd year of B.Sc. Nursing at KGMU.
- Students willing to provide informed consent and participate in the study.
- Students available during the scheduled period of data collection.

Exclusion Criteria

- Students from the outgoing batch (B.Sc. Nursing 4th year).
- Students absent during the data collection phase

Ethical Considerations

Prior to data collection, ethical clearance was obtained from the Institutional Ethics Committee

(No. 1505/Ethics/2023, Ref. Code XX-PGTSC-IIC/P6 dated 06/09/2023) and KGMU College of Nursing authorities. Written consent was obtained from all participants, and anonymity and confidentiality of data were strictly maintained.

Data Collection Tools

A structured tool comprising five components was used for data collection:

1. Tool 1: Socio-Demographic Profile

Captured variables such as age, gender, academic year, family income, parental education and occupation, birth order, family type, and access to electronic gadgets. Socio demographic tool was self-structured and was validated by 5 Nursing experts of different specialties.

2. Tool 2: Electronic Gadget Usage Screening Scale

A 5-point Likert scale to assess the frequency and level of gadget usage across four domains: mobile phones, television, video games, and internet. Scores ranged from 1 (rarely) to 5 (always), with overall interpretation as Average use (1-17 score), Moderate use (18-34 score) and Excessive Use (35-50 score).^[15]

3. Tool 3: Health Impact Assessment Questionnaire

Included questions on physical, physiological, and psychological health related to gadget use, with scoring categories as Mild impact (0-21 score), Moderate impact (22-42 score) and Severe impact (43-63score).^[16]

4. Tool 4: Social Relationship Scale

A 5-point Likert scale (20 items) to assess the level of social interaction with family and peers with scoring categories as Poor interaction (20-49 score), Moderately adequate interaction (50-79 scores) and adequate interaction (80-100 score).^[15]

5. Tool 5: Academic Performance Assessment Tool

Developed by the researchers with expert validation. Academic performance was assessed using recent internal and external examination scores, assignment submissions, and formative assessments. The scoring criteria was Poor (5-10 score), Satisfactory (11-15 score) and Good (16-20 score). Academic Performance Assessment Tool was self-structured and was validated by 5 Nursing experts of different specialties.

Validity and Reliability

Content validity was ensured through evaluation by five subject experts in nursing education. Reliability testing was conducted using the test-retest method and Cronbach's alpha, ensuring acceptable internal consistency ($\alpha > 0.75$) across all scales.

Data Collection Procedure

Data were collected over three consecutive days using an online Google Form, which contained all five tools. Each academic year was allocated one day for survey completion. Students were briefed on the study objectives, and participation was confirmed via digital informed consent.

Data Analysis

Data were analysed using SPSS version 25.0. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize the data. Inferential statistics, including Chi-square tests and ordinal regression analysis, were used to examine associations between gadget usage and outcome variables (health, social interaction, academic performance).

Results

Section: A: Demographic Characteristics of Participants

A total of 236 B.Sc. Nursing students participated in the study, representing the 1st, 2nd, and 3rd

years of the program at the College of Nursing, KGMU, Lucknow. The mean age of participants was within the range of 21-23 years, which constituted the largest age group (44.5%), followed by 19-21 years (38.6%). Students aged 17-19 years and those above 25 years each represented 3.8% of the sample. Females accounted for the majority (64.0%), while males comprised 36.0%. Most participants (63.1%) reported a monthly family income of more than ₹9001, with the least proportion (11.0%) in the ₹5001-₹7000 bracket. Nuclear families predominated (75.0%), followed by joint (21.6%) and extended families (3.4%) (Table 1).

Table 1. Frequency and Percentage of Demographic variables

Age groups	N	Percentage
17 - 19 years	9	3.8%
19- 21 years	91	38.6%
21-23 years	105	44.5%
23- 25 years	22	9.3%
25 years and above	9	3.8%
Gender	N	Percentage
Female	151	64.0%
Male	85	36.0%
Monthly Income	N	Percentage
Rs. 3000 to 5000	28	11.9%
Rs. 5001 to 7000	26	11.0%
Rs. 7001 to 9000	33	14.0%
Rs. 9001 and above	149	63.1%
Type of Family	N	Percentage
Extended Family	8	3.4%
Joint Family	51	21.6%
Nuclear Family	177	75.0%

SECTION II: Level of Electronic Gadget Usage

The assessment of gadget use revealed that **mobile phone** usage was predominantly at a **moderate level** (70.3%), with 23.3% reporting

average use and only 6.4% reporting excessive use. **Television viewing** was mostly in the **average-use** category (56.4%), with 41.9% reporting moderate and only 1.7% excessive use. **Video games**, 78.4%

of students were average users, 20.8% moderate users, and only 0.8% excessive users. **Internet use** showed a more balanced distribution, with 54.2% moderate, 37.7% average, and 8.1% excessive usage.

Table 2. Distribution of level of use of Gadgets

	Cell Phone		Television		Games		Internet	
Level	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Average Use	55	23.3	133	56.4	185	78.4	89	37.7
Excessive Use	15	6.4	4	1.7	2	0.8	19	8.1
Moderate Use	166	70.3	99	41.9	49	20.8	128	54.2
Total	236	100	236	100	236	100	236	100

Section III (a): Electronic gadgets use and its Impact on Health

The health impact analysis showed that 60.6% of students experienced a **moderate** impact from gadget use, 34.7% experienced a severe impact, and only 4.7% reported mild effects. Chi-square analysis revealed no statistically significant association between health status and the use of mobile phones, television, or video games ($p > 0.05$). However, **internet use was significantly associated with health outcomes** ($\chi^2 = 13.090$, $p = 0.006$), indicating that patterns of internet use may have a measurable influence on health.

Table 3. Frequency Distribution of Health Status

Health	Frequency	Percent
Mild	11	4.7
Moderate	143	60.6
Severe	82	34.7
Total	236	100

Section III(b): Electronic gadgets use and its Impact on Social Relationships

Most participants (64.0%) demonstrated **moderate** social interaction, while 30.9% had poor interaction and only 5.1% reported adequate interaction. No statistically significant associations were observed between social interaction levels and the use of mobile phones, television, video games, or the internet ($p > 0.05$).

Table 4. Frequency Distribution of Social Interaction

Social Interaction	Frequency	Percent
Poor	73	30.9
Moderate	151	64
Adequate	12	5.1
Total	236	100

Section III (c): Electronic gadgets use and Impact on Academic Performance

The majority of students (77.5%) reported **good** academic performance, 20.8% reported satisfactory performance, and only 1.7% reported poor performance. No statistically significant associations were found between academic performance and the usage of mobile phones, television, video games, or internet ($p > 0.05$).

Table 5. Frequency Distribution of Academic Performance

Academics Performance	Frequency	Percent
Poor	4	1.7
Satisfactory	49	20.8
Good	183	77.5
Total	236	100

Section IV: Association between Electronic Gadget Usage and socio-demographic Variables

Significant associations ($p < 0.05$) were observed between:

- **Gender** and level of mobile phone usage.
- **Gender** and level of video game usage.
- **Attendance at social gatherings/religious places** and level of video game usage.
- **Type of family** and level of mobile phone usage.

Section V (a): Cell Phone Use and Health, Social Interaction, and Academic Performance

- Students with mild health problems were more likely to have higher levels of cell phone use compared to those with severe health problems ($OR = 2.015$), but this result was not statistically significant ($p = 0.344$).
- Students with poor ($OR = 0.287$) and moderate ($OR = 0.370$) social interaction were less likely to use cell phones excessively compared to those with adequate social interaction.
- Students with satisfactory academic performance had slightly higher odds of excessive cell phone use ($OR = 1.158$) compared to students with good academic performance. This may suggest that cell phones are also used for academic purposes, such as communication and learning.

Section V (b): Television Viewing and Health, Social Interaction, and Academic Performance

- Students with severe health problems were more likely to watch television excessively compared to those with mild ($OR = 0.582$) and moderate ($OR = 0.628$) health problems. However, these results were not statistically significant ($p > 0.05$).
- Students with poor ($OR = 2.265$) and moderate ($OR = 2.341$) social interaction were more likely

to watch television excessively compared to those with adequate social interaction, although these findings were not statistically significant.

- Students with poor academic performance had higher odds of excessive television use ($OR = 1.297$). In contrast, students with satisfactory academic performance had lower odds ($OR = 0.673$) compared to those with good academic performance.

Section V (c): Internet Use and Health, Social Interaction, and Academic Performance

- Students with mild health problems were more likely to use the internet excessively compared to those with severe health problems ($OR = 1.741$), but this was not statistically significant. However, students with moderate health problems were significantly less likely to use the internet excessively compared to those with severe health problems ($OR = 0.493$, $p < 0.05$).
- Students with poor ($OR = 0.605$) and moderate ($OR = 0.680$) social interaction were less likely to use the internet excessively compared to those with adequate social interaction.
- Students with poor academic performance had higher odds of excessive internet use ($OR = 1.550$), while students with satisfactory academic performance had lower odds ($OR = 0.537$) compared to those with good academic performance. These results were not statistically significant ($p > 0.05$).

Discussion

A similar study "To assess the impact of electronic gadgets use with academic performance among secondary school students" conducted by Noratikah Othman on 233 students of SMK school, Malaysia concluded that majority of students who spent more time on electronic gadget use has high level of dependency towards gadget, poor academic achievement and good health status.^[17]

A similar descriptive study conducted among adolescents in Mangaluru by Venissa Josna Pinto reported that 60% of students used electronic gadgets at a moderate level, while 40% demonstrated average usage. In terms of academic performance, 57% of students showed average performance, 33% had good performance, and 10% had poor performance. Notably, 98% of adolescents exhibited poor family interaction. The study further revealed a significant negative relationship between excessive gadget use, academic performance, and family interaction, indicating that increased gadget use adversely affects both scholastic outcomes and interpersonal relationships^[18]

Gadget Usage Patterns

The study revealed that most students engaged in moderate mobile phone¹⁵ (70.3%) and internet usage (54.2%) with excessive use reported by only 6.4% and 8.1%, respectively. This pattern suggests a balanced approach to gadget use within the rigorous academic environment of the institute, possibly driven by structured access to digital tools like ePathshala and SWAYAM.

Conclusion

In conclusion, the study highlights the significant impact of electronic gadget usage on nursing students' health, social relationships, and academic performance. While these devices facilitate learning and communication, excessive use correlates with health issues such as eye strain and anxiety, alongside challenges in maintaining meaningful social interactions. Furthermore, academic performance can be hindered by distractions and decreased focus. It is essential for nursing educators and institutions to promote balanced gadget use, encouraging students to leverage technology effectively while also prioritizing their well-being and interpersonal connections. Future research should explore strategies for healthier gadget habits among students.

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Breastfeeding Experiences and Emotional Responses of Postpartum Mothers with Premature Infants in the NICU: Implications for Nursing Education and Clinical Practice

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Abstract

Background: Breastfeeding premature infants in the Neonatal Intensive Care Unit (NICU) presents significant physiological and psychological challenges for postpartum mothers. Nurses play a critical role in supporting breastfeeding and maternal adaptation during infant hospitalization; however, evidence suggests that gaps remain in nursing education regarding lactation management, emotional support, and family-centered care for mothers of premature infants. Therefore, this study aimed to explore the experiences of postpartum mothers in breastfeeding premature infants during hospitalization in the NICU and identify implications for nursing education.

Research Method: This qualitative phenomenological study involved five postpartum mothers who had experience breastfeeding premature infants during mother-infant separation. Participants were selected purposively. Data were collected through in-depth semi-structured interviews during home visits. Interview recordings were transcribed verbatim and analyzed manually using thematic analysis by repeatedly listening to the recordings, reading the transcripts, identifying meaningful statements, coding the data, and grouping similar codes into themes and subthemes.

Results: Analysis of the interview data generated two major themes: breastfeeding experiences and maternal emotional responses. Mothers described challenges related to delayed or insufficient milk production, stress, fatigue, infant feeding difficulties, and mother-infant separation during NICU hospitalization. Some participants successfully maintained milk production through regular pumping strategies. Emotional responses included sadness, anxiety, panic, and psychological distress, which were perceived to influence breastfeeding outcomes. Physical barriers such as sore and flat nipples further complicated breastfeeding practices.

Conclusion: The findings highlight the need for nursing curricula to strengthen competencies in lactation management, psycho-emotional support, therapeutic communication, and family-centered neonatal care. Integrating these components

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into undergraduate nursing education and clinical simulation training may improve nurses' preparedness to support mothers of premature infants during NICU hospitalization and transition to home care.

Keywords: *Premature Infants, NICU, Mothers' Experiences, Breastfeeding, Emotional Responses*

Introduction and Background

Preterm birth is defined as childbirth occurring before 37 weeks of gestation and remains a global health issue that has not yet received sufficient attention and funding. Despite the growing burden of preterm birth, nursing education policies and curricula in many settings still place limited emphasis on specialized training related to breastfeeding support, emotional care, and family-centered management of premature infants¹². The lack of comprehensive information regarding the scope and impact of preterm birth also poses a barrier to its effective management³. The latest report from the March of Dimes Foundation in the United States, based on data analysis from the WHO, estimates that approximately 13.4 million babies were born prematurely in 2020⁴. Meanwhile, approximately 900,000 infants died due to complications of preterm birth in 2019⁵.

In addition to having a high risk of mortality, premature infants who survive often experience long-term complications, such as developmental delays, intellectual disabilities, and visual and hearing impairments⁶. One important intervention recommended to improve the survival and quality of life of premature infants is the provision of breast milk⁷. Breast milk has been proven to provide significant benefits in reducing morbidity and mortality in premature infants, including lowering the risk of respiratory infections, necrotizing enterocolitis (NEC), and retinopathy of prematurity (ROP), as well as supporting the development of the infant's immune and cognitive systems. The World Health Organization (WHO) and the American Academy of Pediatrics strongly recommend exclusive breastfeeding during the first six months of life⁸, especially for premature infants who are more vulnerable to various health complications⁹.

However, despite the well-recognized benefits of breastfeeding, the practice of providing breast milk

to premature infants still faces various challenges, both in developed and developing countries. One of the main challenges is the policies and practices in neonatal intensive care units (NICU), which often result in the separation of mothers and their infants after birth⁹. This separation not only disrupts the initiation of early breastfeeding but also negatively affects the emotional bonding between mother and infant and hinders the establishment and maintenance of breast milk production¹¹. Mothers who are separated from their infants must express breast milk manually or use a pump, which is not as effective as direct breastfeeding in stimulating milk production. As a result, many mothers experience decreased milk production, breast engorgement, stress, fatigue, and ultimately discontinue breastfeeding¹².

In addition to physiological and psychological factors, breastfeeding challenges in premature infants are also influenced by social, cultural, and structural factors¹³. Unsupportive infant feeding norms, gender inequality, the marketing of infant formula, and the lack of support from healthcare professionals as well as the surrounding environment further exacerbate this condition¹⁴. Studies show that mothers of premature infants tend to have a strong intention to breastfeed however, their breastfeeding success rates are lower compared to mothers of full-term infants¹⁵. These challenges are further exacerbated by inadequate breastfeeding education and psychosocial support provided to mothers and their families, particularly during hospitalization and the transition period from hospital to home. Limited access to breastfeeding information, emotional counseling, and ongoing professional guidance may reduce mothers' confidence and ability to maintain breastfeeding after NICU discharge^{15,17}.

This situation is also reflected in national and local contexts. Based on WHO data from 2018, the global coverage of exclusive breastfeeding remains at 38%.

In Indonesia, although 96% of women have breastfed, only 42% of infants under six months of age receive exclusive breastfeeding¹⁸. Indonesia ranks fifth in the world in terms of the number of preterm births, with approximately 675,700 cases each year¹⁹. In Banda Aceh City, data from the 2022 Health Profile reported that the coverage of exclusive breastfeeding was 64.9%, with Lampulo Community Health Center having the lowest rate (57.1%). Meanwhile, the highest coverage of Early Initiation of Breastfeeding (IMD) was found in Banda Aceh City (69.7%), and the lowest was at Kuta Alam Community Health Center (61.7%)²⁰. Data from the Aceh Government Mother and Child Hospital in 2025, specifically for Banda Aceh and Aceh Besar, show that for births at <37 weeks of gestation, there were 9 premature infants in January, 8 in February, 9 in March with 1 death, 8 in April, and 3 in May with 1 death. The average length of hospital stay is about one week; however, for infants with a birth weight below 1000 grams, the length of stay can extend up to three weeks.

These figures indicate that efforts to improve breastfeeding practices, particularly for premature infants, still face significant challenges. Previous studies in China have highlighted that mothers of premature infants who experience separation during NICU care encounter various barriers to breastfeeding, including perceptions of insufficient breast milk, infants preferring bottle feeding over direct breastfeeding, and a lack of information and support on how to breastfeed after discharge from the hospital⁵.

However, there are still limited studies that specifically explore the breastfeeding experiences of mothers with premature infants, particularly in local contexts such as Aceh. In fact, mothers' experiences in caring for and breastfeeding premature infants in the NICU are highly complex, involving emotional distress, adaptation to a new maternal role, and interactions with the healthcare system. This condition highlights the importance of strengthening nurses' competencies in providing psycho-emotional support, lactation management, and family-centered care for mothers with premature infants in the NICU. Nevertheless, gaps remain in

nursing education curricula and clinical training regarding evidence-based breastfeeding support and therapeutic communication for mothers experiencing separation from their infants. Therefore, exploring the experiences of postpartum mothers in breastfeeding premature infants is important not only for improving neonatal nursing practice but also for informing nursing education. Findings from this study may provide evidence to strengthen nursing curricula, clinical simulation activities, and competency-based training related to lactation management, therapeutic communication, maternal emotional support, and family-centered care for mothers with premature infants in NICU settings. By understanding mothers' lived experiences, nursing educators can better prepare future nurses to address the complex physiological and psychological needs of this population.

Research Methods

This study used a qualitative phenomenological approach to explore the experiences of postpartum mothers in breastfeeding premature infants during NICU hospitalization. The study was conducted in Banda Aceh, Indonesia, and data were collected through home visits after hospital discharge. Participants were recruited using purposive sampling. Eligible participants were postpartum mothers who had experience breastfeeding premature infants treated in the NICU of the Aceh Government Mother and Child Hospital and were willing to share their experiences. Recruitment continued until data saturation was reached, resulting in five participants. Data were collected through in-depth semi-structured interviews using an interview guide developed from the study objectives and relevant literature. Interviews explored breastfeeding experiences, emotional responses, barriers, coping strategies, and support received during NICU hospitalization. Each interview lasted approximately 30–60 minutes, was audio-recorded with consent, and supplemented with field notes. Ethical approval was obtained from the Health Research Ethics Committee of the Faculty of Nursing, Universitas Syiah Kuala, Banda Aceh (No. 112007010725/2025). All participants received

information about the study and provided written informed consent before participation. Interview recordings were transcribed verbatim and analyzed manually using Braun and Clarke's thematic analysis approach²¹. The researchers repeatedly reviewed the recordings and transcripts, identified meaningful statements, developed codes, and grouped similar codes into categories, themes, and subthemes. Themes were refined through ongoing discussion among the research team to ensure the credibility and trustworthiness of the findings.

Results

Thematic analysis of the interview transcripts resulted in two overarching themes: (1) Breastfeeding Experiences Among Mothers with Preterm Infants and (2) Maternal Emotional Responses. These themes were identified through repeated reading of the transcripts, coding of meaningful statements, grouping of similar codes into categories, and refinement of categories into themes and subthemes.

a. Breastfeeding Experiences Among Mothers with Preterm Infants

The findings showed that breastfeeding premature infants was a complex process influenced by maternal, infant, and environmental factors. One of the most frequently reported challenges was inadequate breast milk production, particularly during the early postpartum period. Mothers described stress, fatigue, and separation from their infants during NICU hospitalization as factors that affected breastfeeding practices and milk-production.

Several participants reported that stress reduced their milk supply:

"I felt stressed because my baby was not with me, and my milk flow became reduced." (P1)

"Because of stress, my milk supply went down." (P3)

Fatigue was also perceived as a contributing factor:

"Because I was tired, my breast milk really declined and only a little would come out." (P3)

Mother-infant separation during NICU hospitalization created additional difficulties because mothers had to express and deliver breast milk instead of breastfeeding directly.

"I had to express my milk, store it in the refrigerator, and bring it to the hospital every two days." (P1)

"I expressed breast milk and brought it to the hospital because I was not allowed to enter the NICU." (P4)

Some mothers experienced difficulties maintaining milk production, whereas others successfully continued expressing milk despite separation from their infants.

"At first there was very little milk, but I kept expressing it and bringing it to the NICU." (P5)

The infant's physiological condition was also described as a barrier to breastfeeding. Premature infants often had weak sucking ability and required alternative feeding methods.

"My baby's sucking ability was weak, so the milk had to be given through a tube." (P5)

"The baby did not want breast milk and was given formula milk." (P2)

These findings indicate that breastfeeding experiences among mothers of premature infants were influenced by maternal psychological conditions, mother-infant separation, and the infant's feeding ability.

b. Maternal Emotional Responses

The second theme described mothers' emotional responses during the breastfeeding process. Participants commonly reported feelings of sadness, anxiety, panic, stress, and helplessness associated with their infant's condition and breastfeeding difficulties.

Stress was frequently reported during the period of separation from the infant.

"I felt stressed because my baby was hospitalized and not with me." (P1)

"I was stressed, and my breast milk decreased." (P3)

Some mothers described feelings of panic when the infant was unable to receive breast milk.

"I felt very panicked because the baby did not want breast milk." (P2)

Mothers also expressed concern when their milk production was insufficient.

"There wasn't enough milk, and the baby kept crying." (P2)

Physical discomfort associated with breastfeeding further contributed to emotional distress.

"My nipples became sore and cracked until they bled." (P3)

"When pumping, only a small amount of milk came out, which felt challenging." (P5)

Another challenge involved anatomical difficulties that affected breastfeeding.

"My nipple was flat, so it was difficult for the baby to latch properly." (P5)

These findings demonstrate that mothers' emotional responses were closely linked to breastfeeding challenges, infant health conditions, and physical discomfort experienced during lactation.

Discussions

The findings of this study highlight the complex and multidimensional nature of breastfeeding experiences among postpartum mothers of premature infants in the NICU. The two themes identified, namely breastfeeding experiences and maternal emotional responses, demonstrate the interaction between physiological, psychological, and environmental factors that influence breastfeeding outcomes. These findings have important implications for nursing education and clinical practice, particularly in strengthening competencies related to lactation support, therapeutic communication, emotional assessment, and family-centered neonatal care. Nursing students and neonatal nurses should be equipped with the knowledge and skills necessary

to provide comprehensive breastfeeding support for mothers of premature infants. Therefore, nursing education programs should incorporate simulation-based learning, evidence-based lactation management, and family-centered care approaches to enhance nurses' preparedness in supporting mothers during hospitalization and the transition to home care.

1. Breastfeeding Experiences among Mothers of Premature Infants

The findings of the study show that most mothers experience barriers in breast milk production, particularly in the early postpartum phase. This condition is influenced by stress, fatigue, and separation between mother and infant due to NICU care. Physiologically, breast milk production is strongly affected by the hormones prolactin and oxytocin, which can be inhibited when the mother experiences stress or anxiety. This is consistent with the theory that the mother's psychological condition plays an important role in the milk ejection reflex (let-down reflex).

In addition, the condition of premature infants who have a weak sucking ability prevents mothers from breastfeeding directly, so alternative methods such as breast milk expression are required. This process often makes mothers feel that their milk production is not optimal, as the amount of milk expressed is initially small. However, some mothers demonstrate adaptive ability by continuing to pump breast milk regularly and sending it to the NICU, which ultimately helps to increase breast milk production.

Conversely, some mothers experienced smooth breast milk production despite being separated from their babies. This indicates variations in experience influenced by the mother's physical and psychological conditions, as well as the support they received. These findings indicate that the success of breastfeeding in mothers with premature infants depends not only on the infant's condition but also on the mother's ability to adapt to the situation she faces.

2. Emotional Responses of Mothers in

Breastfeeding Preterm Infants

This study also found that mothers experienced various emotional responses, such as sadness, panic, and stress.

Feelings of sadness mainly arose due to separation from the baby since birth and limited access to see and breastfeed the baby directly. This condition may affect the mother-infant bonding, which is ideally established from the moment of birth.

In addition, feelings of panic and anxiety arise due to the infant's health condition, which requires intensive care, including the use of respiratory support and delayed breastfeeding. Uncertainty regarding the baby's condition, as well as limited information received, further worsens the mother's psychological state. Stress experienced by mothers not only has an emotional impact but also directly affects breast milk production. Some participants reported that stress caused a decrease in milk supply or even prevented milk from coming out. This strengthens the relationship between psychological conditions and lactation success.

In addition to emotional factors, this study also found physical barriers such as sore or cracked nipples and flat nipples, which further complicate the breastfeeding process. These conditions can cause pain and discomfort, thereby affecting the mother's motivation to provide breast milk.

This study has several limitations. First, the number of participants was relatively small and limited to postpartum mothers from a single hospital setting, which may restrict the transferability of the findings to other populations and healthcare settings. Second, the data were based on participants' self-reported experiences and perceptions, which may be influenced by recall bias and subjective interpretation. In addition, the study only explored mothers' perspectives and did not include the views of family members or healthcare professionals involved in breastfeeding support. Despite these limitations, this study provides valuable insights into the breastfeeding experiences and emotional

responses of mothers with premature infants and contributes to the development of nursing education and clinical practice related to breastfeeding support in NICU settings.

Conclusion

The experiences of postpartum mothers in breastfeeding premature infants treated in the NICU were influenced by interconnected physiological, psychological, and environmental factors. Mothers encountered various challenges related to breast milk production, including delayed lactation, reduced milk supply, stress, fatigue, mother-infant separation, and the weak sucking ability of premature infants. At the same time, emotional responses such as sadness, panic, and stress affected breastfeeding practices and lactation outcomes, while physical barriers such as sore and flat nipples further complicated the breastfeeding process.

The findings highlight the importance of comprehensive breastfeeding support for mothers of premature infants through emotional support, effective communication, and evidence-based lactation management provided by healthcare professionals, particularly nurses. These findings are valuable for nursing education because they provide insights into the complex needs of mothers with premature infants and emphasize the importance of preparing future nurses to deliver holistic, family-centered, and breastfeeding-focused care in NICU settings.

To strengthen nursing competencies, nursing curricula in Indonesia should incorporate targeted educational content related to neonatal lactation management, psycho-emotional support, therapeutic communication, family-centered care, and simulation-based learning for NICU practice. Strengthening these components within nursing education and clinical training programs may enhance nurses' preparedness to support mothers of premature infants during hospitalization and the transition to home care, ultimately contributing to improved breastfeeding outcomes and maternal well-being.

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Factors Associated with Knowledge and Attitudes Toward Family Planning Among Married Women Aged 18–39 Years in Urban Yangon, Myanmar: A Socio Ecological Model Based Cross-Sectional Study

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Abstract

Background: Knowledge and attitudes toward family planning (FP) influence contraceptive utilization and reproductive health outcomes. Despite increasing contraceptive use in Myanmar, unmet need for FP remains substantial in urban Yangon. Evidence on factors shaping FP knowledge and attitudes is limited, although such evidence is important for designing culturally appropriate FP programs in Myanmar. This study examined factors associated with FP knowledge and attitudes among married women in urban Yangon using the Socio - Ecological Model framework.

Methods: A cross-sectional survey was conducted among 273 married women aged 18–39 years from four randomly selected urban townships in Yangon, Myanmar. Participants were recruited online using non-probability convenience sampling through a structured self-administered questionnaire. Descriptive statistics summarized participant characteristics and FP knowledge and attitude levels. Logistic regression analyses were performed to identify factors associated with FP knowledge and attitudes, and adjusted odds ratios (aORs) with 95% confidence intervals (CIs) were reported.

Results: Overall, 51.6% of participants had good FP knowledge, while only 9.9% showed favorable attitudes toward FP. Women with living children had lower odds of good FP knowledge, whereas high cultural influence was positively associated with both good FP knowledge (aOR = 3.095, 95% CI: 2.106–4.550) and positive FP attitudes (aOR = 3.268, 95% CI: 1.713–6.237). Positive FP attitudes were also more likely among women married for 4–7 years (aOR = 1.973, 95% CI: 1.006–3.870) and those with good FP knowledge (aOR = 3.313, 95% CI: 1.764–6.223).

Conclusion: Cultural norms and FP knowledge were strong predictors of positive attitudes, while women with living children were less likely to possess good FP knowledge. These findings have important implications for FP programming

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in Myanmar, suggesting that interventions should combine education with culturally supportive and community-based strategies to strengthen FP knowledge, improve attitudes, and ultimately support contraceptive uptake among married women in urban settings.

Keywords: family planning; knowledge; attitudes; Socio - Ecological Model; married women; urban Yangon; Myanmar

Introduction

Family planning (FP) is fundamental to reproductive health, enabling individuals to determine the timing and number of children, thereby reducing unintended pregnancies and maternal morbidity and mortality^[1]. By preventing unintended pregnancies, contraception also lowers the incidence of unsafe abortion and associated health risks^[2]. Despite global progress, an estimated 164 million women of reproductive age have an unmet need for contraception, often due to limited access, fear of side effects, and cultural or gender-related barriers^[3]. In Southeast Asia, FP programs have contributed to reductions in fertility rates and maternal mortality, yet disparities in access, knowledge, and utilization of contraceptive services persist across populations^[4, 5]. Social norms, limited reproductive health education, misconceptions regarding side effects, and unequal gender dynamics continue to hinder contraceptive uptake^[6]. Therefore, accurate FP knowledge and positive attitudes toward contraception are essential for informed reproductive decision-making and effective FP practice^[6, 7]. In particular, individuals with comprehensive understanding of fertility and contraceptive methods are more likely to adopt safe and effective FP behaviors^[8].

In Myanmar, contraceptive prevalence has increased over time, but significant gaps remain. A recent survey conducted in Yangon Region reported an overall contraceptive prevalence of 67.2%, while contraceptive prevalence among urban married women was 63.0%, with an unmet need for FP of approximately 22.6% in urban areas^[9]. These findings indicate that many women in Yangon who wish to delay or avoid pregnancy are still not using contraception. Studies in Myanmar have shown that misconceptions about contraceptive side effects, limited reproductive health literacy, and sociocultural influences continue to affect women's

contraceptive decisions and attitudes toward FP^[10, 11]. Studies from Myanmar and neighboring countries also demonstrated that women with inadequate FP knowledge or unfavorable attitudes were less likely to utilize modern contraceptive methods consistently, with socio-demographic factors influencing these outcomes^[12-14]. However, evidence regarding determinants of FP knowledge and attitudes among women residing in urban Yangon remains limited.

Differences between rural and urban settings in Myanmar further highlight the importance of contextualizing FP practices. Urban women generally have better physical access to health facilities, media exposure, and educational opportunities compared with rural women^[9]. However, urban populations may also experience social pressures, financial constraints, migration-related challenges, and changing gender expectations that influence reproductive decision-making^[15]. In rural Myanmar, FP utilization is often constrained by geographical barriers, lower educational attainment, traditional beliefs, and limited availability of reproductive health services^[16]. Although urban women may have greater awareness of contraceptive methods, misconceptions, partner influence, and social stigma can still affect contraceptive use^[9]. These differences suggest that FP knowledge and attitudes are shaped by both service accessibility and sociocultural factors.

In urban Yangon, understanding FP behavior is especially important because reproductive decisions are often shaped by changing social expectations, partner involvement, and the realities of accessing services in densely populated settings^[14]. Even when women are aware of FP methods, misconceptions, family expectations, and community attitudes may influence whether contraception is viewed as acceptable and beneficial^[17]. Examining FP knowledge and attitudes through a social ecological perspective

may therefore provide a clearer understanding of how individual beliefs interact with interpersonal and contextual influences in shaping contraceptive-related decision-making [18].

This study applies the Socio - Ecological Model (SEM) to examine predictors of FP knowledge and attitudes. The SEM recognize that health behaviors are influenced by multiple interacting levels, including personal, interpersonal, community, and societal factors [19, 20]. In the context of contraception, women's FP knowledge and attitudes are shaped not only by individual characteristics, but also by social support, cultural norms, and the broader social environment. Previous studies have shown that social norms, partner involvement, community perceptions, and cultural beliefs significantly influence contraceptive behavior and reproductive health outcomes [20, 21]. The findings of this study will inform development of targeted interventions for reproductive health and policy reform in nursing education strategies in Myanmar.

Methods

Study Design

A cross-sectional survey was conducted in October 2025 among married women aged 18-39 years residing in urban Yangon, Myanmar. The study aimed to examine factors associated with FP knowledge and attitudes using the SEM framework.

Study Setting

The study was conducted in selected urban townships of Yangon, the largest and most densely populated city in Myanmar. Yangon represents a highly relevant setting for FP research because of its rapid urbanization, diverse migrant population, and persistent disparities in reproductive health service utilization. Four urban townships were randomly selected, and the final sample was proportionally allocated according to the distribution of married women of reproductive age based on the 2019 Myanmar Inter-censal Survey data [22].

Sampling Procedure

The minimum required sample size was calculated using a single population proportion formula with a 95% confidence level, 5% margin of error, and adjustment for non-response based on previous prevalence estimates of unmet need for FP [9, 23]. The calculated minimum sample size was 272 participants. A total of 273 married women were ultimately included in the analysis.

Although urban townships were selected randomly, convenience sampling was used to recruit participants through an online self-administered questionnaire. This approach was adopted because of significant logistical and security challenges related to the ongoing socio-political conflict in Myanmar and disruptions caused by the 2025 earthquake, which limited safe access to households and community-based data collection. Eligible participants were married women aged 18-39 years who had been residing in urban Yangon during the study period and were able to read and understand the Burmese language. Women who were unwilling to participate or unable to complete the questionnaire were excluded from the study.

Data Collection Process

Participants were recruited through public digital platforms, including Facebook and TikTok community groups, and messaging applications such as Messenger, Viber, and Telegram. The survey collected socio-demographic and reproductive characteristics, as well as social support and cultural norms. Dependent variables included FP knowledge and attitudes, representing key SEM intrapersonal domains [24]. FP knowledge items assessed understanding of contraceptive methods, fertility awareness, side effects, and service utilization, adapted from a Myanmar FP study and categorized using Bloom's cutoff points [25, 26]. FP attitudes were measured using Likert-scale items adapted from previous studies in Jordan and Turkey to assess perceptions and beliefs and categorized into three levels as "Unfavorable", "Neutral" and "Favorable" [27, 28]. Questions on social support and

cultural norms were adapted from previous FP research and the Myanmar Demographic and Health Survey (DHS)^[24, 29].

Content validity was assessed by three experts in public health and reproductive health using the Index of Item-Objective Congruence (IOC). Most items achieved IOC scores above 0.5, while items scoring below 0.5 were revised according to expert recommendations. Face validity was assessed through pilot testing among married women from an urban Yangon township with similar characteristics to the target population. Reliability was evaluated for internal consistency using Cronbach's alpha for FP attitude and Kuder-Richardson 20 (KR-20) for FP knowledge, social support, and cultural norms, with all scales achieving coefficients above 0.7^[30]. The questionnaire was translated into Burmese, back-translated into English, and pilot-tested to ensure clarity and cultural relevance.

Data Analysis

In total, data from 273 women were analyzed. Descriptive statistics (frequencies, percentages) summarized participant characteristics, and prevalence of knowledge and attitude levels. For logistic regression, knowledge and attitude scores were dichotomized into "Good/Poor" and "Positive/Negative" groups, respectively. Recategorization was performed to simplify interpretation of the regression models, improve statistical stability, and ensure adequate sample distribution across comparison groups, particularly when ordinal categorical outcomes with relatively small subgroup frequencies may reduce model precision and statistical power in multivariable analysis^[31, 32]. Nevertheless, the potential limitation of information loss due to dichotomization was acknowledged during interpretation of findings.

Firstly, simple binary logistic regressions were conducted for each independent variable with each outcome. To adjust for potential confounders, variables with $p < 0.05$ in the bivariate analysis were entered into separate multivariable logistic regression models for knowledge and attitude

outcomes. Adjusted odds ratios (aORs) with 95% confidence intervals (CIs) with $p < 0.05$ were reported. All analyses were performed using Statistical Package for the Social Sciences (SPSS). Model diagnostics were additionally assessed to ensure the appropriateness of the regression models. Multicollinearity among independent variables was evaluated using variance inflation factor (VIF) and tolerance statistics, ensuring VIF values remained below 5 and tolerance values above 0.2 before inclusion in the final models. Model fitness was confirmed using the Hosmer-Lemeshow goodness-of-fit test ($p > 0.05$), and standard assumptions were assessed to ensure the robustness of the analyses.

Ethical Consideration

Ethical approval for the study was granted by the Research Ethics Review Committee for Research Involving Human Participants, Group I, Chulalongkorn University (Approval No. 279/68; October 9, 2025). Participation in the study was entirely voluntary, and electronic informed consent was obtained from all participants before completion of the survey. No personal identifiers were collected, and all data were securely maintained to protect participant confidentiality.

Results

Table 1 shows that most participants were aged 30-39 years (56.4%), with a median age of 30 years. More than half had completed college or university education (54.9%), and 65.6% were non-manual workers. Monthly household income was mainly between 500,000 and 999,999 MMK (49.4%), while 46.2% earned less than 500,000 MMK. Nearly half of participants had been married for 3 years or less (46.5%), with a median marital duration of 4 years. Most had never experienced unintended pregnancy (82.1%), and 49.4% preferred two children. More than half had no living children (56.0%), while 33.7% had one child.

Table 1. Number and Percentage Distribution of Socio-demographic and Reproductive Characteristics

Socio-demographic & Reproductive Characteristics	Study Participants (n = 273)	
	No.	Percentage (%)
Age Group (Years)		
18-29	119	43.6
30-39	154	56.4
Education Level		
Up to Middle school	26	9.6
High School	97	35.5
College/ University	150	54.9
Occupation Status		
Unemployed	18	6.6
Manual Worker	62	22.7
Non-manual Worker	179	65.6
High-level Professional	14	5.1
Monthly Household Income		
< 500,000 MMK	126	46.2
500,000 – 999,999 MMK	135	49.4
≥ 1,000,000 MMK	12	4.4
Marital Duration		
≤ 3	127	46.5
4-7	94	34.4
≥ 8	52	19.1
Unintended Pregnancy		
No	224	82.1
Yes	49	17.9
Desire Number of Children		
None	16	5.9
1	71	26.0
2	135	49.4
> 2	51	18.7
Number of Living Children		
None	153	56.0
1	92	33.7
≥ 2	28	10.3

Exchange Rate (USD \$1 = 4,400 MMK)

Figure 1 presents the distribution of social support and cultural norm influences among the study participants. More than half of the respondents reported having good social support (58.6%), while

41.4% had poor social support. Regarding cultural norms, a majority of participants (61.5%) experienced high cultural influence related to FP, whereas 38.5% reported low cultural influence.

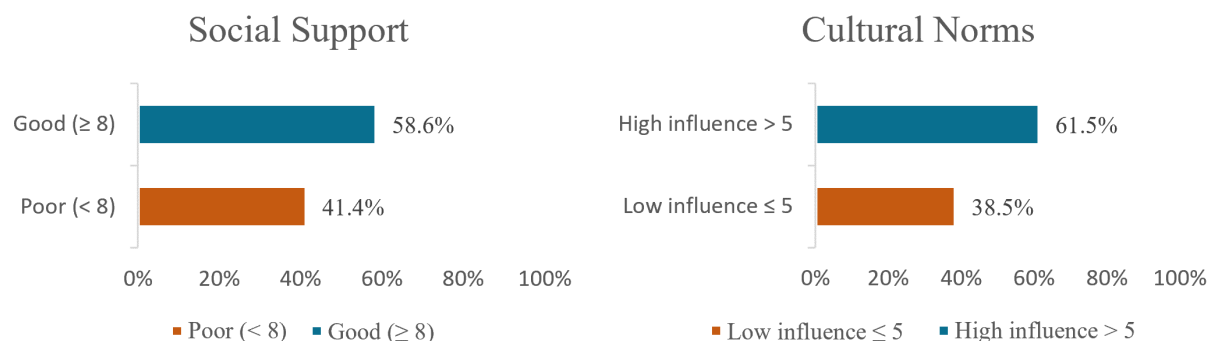


Figure 1: Number and Percentage Distribution of Social Support and Cultural Norms

Figure 2 illustrates the distribution of knowledge and attitudes toward FP among the study participants. More than half of the respondents (51.6%) demonstrated good knowledge regarding FP, while 35.2% had moderate knowledge and 13.2% had poor knowledge.

Regarding attitudes toward FP, approximately half of the participants (50.9%) showed a neutral attitude, whereas 39.2% had an unfavorable attitude and only 9.9% demonstrated a favorable attitude. Although FP knowledge levels were generally high, positive attitudes toward FP remained limited among the participants.

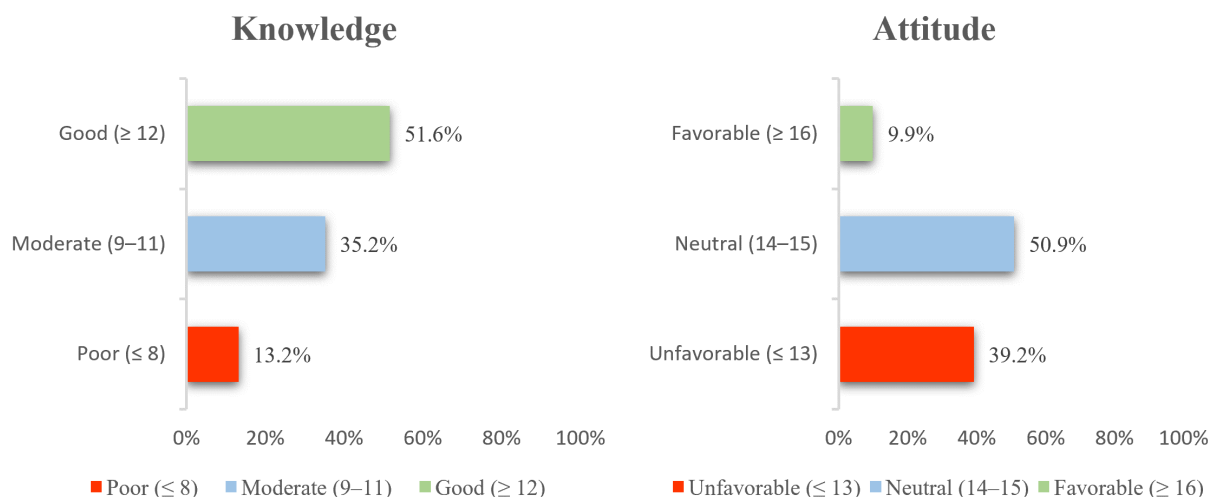


Figure 2: Number and Percentage Distribution of Knowledge and Attitude

Table 2 presents the findings from the simple binary logistic regression analysis of factors associated with FP knowledge and attitudes among married women aged 18-39 years in urban Yangon.

For FP knowledge, the number of living children and cultural norms were significant factors. Participants with two or more living children were less likely to have good knowledge than women with no

living children (COR = 0.400, 95% CI: 0.176–0.908, $p = 0.028$). In contrast, participants reporting high cultural influence were 2.23 times more likely to have

good FP knowledge compared to those with low cultural influence (COR = 2.231, 95% CI: 1.608–3.094, $p < 0.001$).

Table 2. Simple binary logistic regression analysis of factors associated with Knowledge and Attitude towards Family Planning

Variables	Knowledge				Attitude			
	Poor n (%)	Good n (%)	COR ¹ (95% CI ²)	p-value	Negative n (%)	Positive n (%)	COR ¹ (95% CI ²)	p-value
Age (years)								
18-29	59(49.6)	60(50.4)	Ref		53(44.5)	66 (55.5)	Ref	
30-39	73(47.4)	81(52.6)	1.110 (0.809-1.522)	0.519	54(35.1)	100(64.9)	1.487 (0.911-2.428)	0.113
Education								
Up to Middle school	16(61.5)	10(38.5)	Ref	0.591	8(30.8)	18(69.2)	Ref	0.358
High School	47(48.5)	50(51.5)	1.064 (0.714-1.584)	0.761	43(44.3)	54(55.7)	0.558 (0.222-1.406)	0.216
College/ University	69(46.0)	81(54.0)	1.174 (0.852-1.618)	0.328	56(37.3)	94(62.7)	0.746 (0.304-1.828)	0.522
Occupation Status								
Unemployed	6(33.3)	12(66.7)	Ref	0.833	6(33.3)	12(66.7)	Ref	0.796
Manual Worker	28(45.2)	34(54.8)	1.214 (0.736-2.002)	0.447	25(40.3)	37(59.7)	0.740 (0.245-2.231)	0.593
Non-manual Worker	90(50.3)	89(49.7)	0.989 (0.738-1.326)	0.940	72(40.2)	107(59.8)	0.743 (0.267-2.070)	0.570
High-level Professional	8(57.1)	6(42.9)	0.750 (0.260-2.162)	0.594	4(28.6)	10(71.4)	1.250 (0.274-5.705)	0.773
Monthly Household Income								
< 500,000 MMK	65(51.6)	61(48.4)	Ref	0.182	44(34.9)	82(65.1)	Ref	0.105

Continue....

500,000 – 999,999 MMK	59(43.7)	76(56.3)	1.288 (0.917-1.810)	0.145	55(40.7)	80(59.3)	0.780 (0.472-1.289)	0.333
≥ 1,000,000 MMK	8(66.7)	4(33.3)	0.500 (0.151-1.660)	0.258	8(66.7)	4 (33.3)	0.268 (0.076-0.941)	*0.040
Marital Duration								
≤ 3	66(52.0)	61(48.0)	Ref	0.250	61(48.0)	66(52.0)	Ref	*0.021
4-7	39(41.5)	55(58.5)	1.410 (0.936-2.126)	0.101	29(30.9)	65(69.1)	2.072 (1.184-3.624)	*0.011
≥ 8	27(51.9)	25(48.1)	0.926 (0.537-1.595)	0.782	17(32.7)	35(67.3)	1.903 (0.968-3.741)	0.062
Unintended Pregnancy								
No	104(46.4)	120(53.6)	Ref		95(42.4)	129(57.6)	Ref	
Yes	28(57.1)	21(42.9)	0.750 (0.426-1.321)	0.319	12(24.5)	37(75.5)	2.271 (1.124-4.586)	*0.022
Desire Number of Children								
None	3 (18.7)	13 (81.3)	Ref	0.722	3(18.8)	13(81.2)	Ref	*0.034
1	36 (50.7)	35 (49.3)	0.972 (0.611-1.548)	0.906	21(29.6)	50(70.4)	0.549 (0.142-2.130)	0.386
2	64 (47.4)	71 (52.6)	1.109 (0.791-1.555)	0.547	57(42.2)	78(57.8)	0.316 (0.086-1.160)	0.082
> 2	29 (56.9)	22 (43.1)	0.759 (0.436-1.320)	0.329	26(51.0)	25(49.0)	0.222 (0.056-0.873)	*0.031
Number of Living Children								
None	67 (43.8)	86 (56.2)	Ref	0.089	57(37.3)	96(62.7)	Ref	0.752
1	45 (48.9)	47 (51.1)	1.044 (0.694-1.572)	0.835	38(41.3)	54(58.7)	0.844 (0.497-1.432)	0.529
≥ 2	20 (71.4)	8 (28.6)	0.400 (0.176-0.908)	*0.028	12(42.9)	16(57.1)	0.792 (0.350-1.792)	0.575

Continue....

Social Support								
Poor (< 8)	51 (45.1)	62 (54.9)	Ref		47(41.6)	66(58.4)	Ref	
Good (≥ 8)	81 (50.6)	79 (49.4)	0.975 (0.715-1.330)	0.874	60(37.5)	100(62.5)	1.187 (0.725-1.942)	0.495
Cultural Norms								
Low influence ≤ 5	80 (76.2)	25 (23.8)	Ref		67(63.8)	38(36.2)	Ref	
High influence > 5	52 (31.0)	116 (69.0)	2.231 (1.608-3.094)	*<0.001	40(23.8)	128(76.2)	5.642 (3.310-9.618)	*<0.001
FP Knowledge								
Poor	-	-	-	-	76(57.6)	56(42.4)	Ref	
Good	-	-	-	-	31(22.0)	110(78.0)	4.816 (2.842-8.159)	*<0.001

¹Crude Odds Ratio, ²95% Confidence Interval, *p-value less than 0.05

Regarding FP attitudes, monthly household income, marital duration, unintended pregnancy, desire number of children, cultural norms, and FP knowledge were statistically significant. Participants with a monthly household income of ≥1,000,000 MMK were less likely to have a positive attitude than those having < 500,000 MMK (COR = 0.268, 95% CI: 0.076–0.941, $p = 0.040$). Women married for 4-7 years were twice as likely to have a positive attitude than those married for ≤3 years (COR = 2.072, 95% CI: 1.184–3.624, $p = 0.011$). Participants with a history of unintended pregnancy were more likely to have a positive attitude than those without unintended pregnancy (COR = 2.271, 95% CI: 1.124–4.586, $p = 0.022$). Desire for more than two children was significantly associated with lower odds of having a positive attitude than those desired no children (COR = 0.222, 95% CI: 0.056–0.873, $p = 0.031$). Participants with high cultural influence were 5.64 times more likely to have a positive attitude than those with low cultural influence (COR = 5.642, 95% CI: 3.310–9.618, $p < 0.001$). Participants with good knowledge were 4.82 times more likely to have a positive attitude

compared with those with poor knowledge (COR = 4.816, 95% CI: 2.842–8.159, $p < 0.001$).

Table 3 presents the multiple binary logistic regression results after adjusting for potential confounders and including variables with $p < 0.5$ in the simple binary logistic regression analysis. The number of living children and cultural norms remained significantly associated with FP knowledge in the adjusted model. Participants with one living child were less likely to have good knowledge compared with those who had no living children (aOR = 0.581, 95% CI: 0.363–0.929, $p = 0.023$). Similarly, participants with two or more living children had significantly lower odds of having good knowledge compared with participants with no living children (aOR = 0.204, 95% CI: 0.084–0.492, $p < 0.001$). Cultural norms showed a strong positive association with FP knowledge. Participants who reported high cultural influence were approximately three times more likely to have good knowledge compared with those who reported low cultural influence (aOR = 3.095, 95% CI: 2.106–4.550, $p < 0.001$).

Table 3. Multiple binary logistic regression analysis of factors associated with Knowledge and Attitude towards Family Planning

Variables	Knowledge				Attitude			
	aOR ¹	95% CI ²		<i>p</i> -value	aOR ¹	95% CI ²		<i>p</i> -value
		LL	UL			LL	UL	
Monthly Household Income	-	-	-	-			Ref	0.202
< 500,000 MMK	-	-	-	-	0.703	0.387	1.277	0.247
500,000 – 999,999 MMK	-	-	-	-	0.325	0.082	1.283	0.109
≥ 1,000,000 MMK	-	-	-	-				0.077
Marital Duration								
≤ 3	-	-	-	-			Ref	
4-7	-	-	-	-	1.973	1.006	3.870	*0.048
≥ 8	-	-	-	-	2.180	0.914	5.199	0.079
Unintended Pregnancy								
No	-	-	-	-			Ref	
Yes	-	-	-	-	2.272	0.939	5.496	0.069
Desire Number of Children								
None	-	-	-	-			Ref	0.014
1	-	-	-	-	0.965	0.220	4.226	0.962
2	-	-	-	-	0.350	0.086	1.419	0.142
> 2	-	-	-	-	0.277	0.061	1.256	0.096
Number of Living Children								
None			Ref	*<0.001		-	-	
1	0.581	0.363	0.929	*0.023		-	-	
≥ 2	0.204	0.084	0.492	*<0.001		-	-	
Cultural Norms								
Low influence ≤ 5			Ref				Ref	
High influence > 5	3.095	2.106	4.550	*<0.001	3.268	1.713	6.237	*<0.001
FP Knowledge								
Poor	-	-	-	-			Ref	
Good	-	-	-	-	3.313	1.764	6.223	*<0.001

¹Adjusted Odds Ratio, ²95% Confidence Interval, * *p*-value less than 0.05

Regarding attitudes toward FP, marital duration, cultural norms, and FP knowledge remained significant in the adjusted analysis. Participants with marital duration of 4-7 years were nearly two times more likely to have a positive attitude toward FP compared with those who had been married for 3 years or less (aOR = 1.973, 95% CI: 1.006-3.870, $p = 0.048$). Participants with high cultural influence were 3.27 times more likely to have a positive attitude compared with participants with low cultural influence (aOR = 3.268, 95% CI: 1.713-6.237, $p < 0.001$). In addition, FP knowledge demonstrated a significant positive association with attitude toward FP. Participants with good knowledge were more than three times more likely to have a positive attitude toward FP compared with those who had poor knowledge (aOR = 3.313, 95% CI: 1.764-6.223, $p < 0.001$).

Discussion

This study found that although more than half of married women in urban Yangon demonstrated good FP knowledge, only a small proportion reported favorable attitudes toward FP. This gap between knowledge and attitude resembles findings from other settings. A study conducted in Ethiopia reported that although women had moderate FP awareness, favorable attitudes toward contraception remained limited [33]. By comparison, Ethiopian study found only 43.4% of women with good knowledge and 52.3% with favorable attitudes [33]. These findings suggest that knowledge alone may not necessarily translate into positive perceptions or acceptance of contraception, and that other interpersonal, social, and cultural influences may contribute to shaping attitudes toward FP [34].

Women's reproductive experience appeared to influence their knowledge levels [7]. After adjustment for potential confounders, women with living children were less likely to demonstrate good FP knowledge than those without children, particularly women with two or more living children. Although this finding differs from several previous studies, a possible explanation is that younger or nulliparous women are more exposed to educational content

through schools, social media, or premarital counseling and may actively seek FP information to avoid unintended first pregnancies [35]. Women who have already achieved their desired family size may perceive less need to seek additional FP information [36]. However, these interpretations should be viewed cautiously because the cross-sectional design cannot establish causality. The findings suggest that FP education and counseling should target not only younger or childless women but also parous women who may require ongoing reproductive health support [37].

Cultural influence emerged as one of the strongest factors associated with both FP knowledge and attitudes. Participants reporting high cultural influence were more likely to have good FP knowledge and positive attitudes compared with those reporting lower cultural influence. In this study, the cultural norms reflected supportive interpersonal and community influences toward FP, including partner approval, family encouragement, and socially acceptable discussions regarding contraception. This differs from studies in some settings where restrictive cultural or religious beliefs acted as barriers to contraceptive use [3]. From the SEM perspective, these findings highlight how interpersonal and community-level environments may shape individual reproductive health knowledge and attitudes [38, 39]. Women living in supportive social and cultural environments may have greater opportunities to access FP information, communicate openly with partners, and develop positive perceptions toward contraception [17, 40]. A study in Myanmar similarly emphasized the importance of partner communication and community support in influencing contraceptive behavior [41]. These findings suggest that supportive social norms within urban Yangon may facilitate greater acceptance of FP-related information and attitudes.

Among socio-demographic factors, women with marital duration of 4-7 years were more likely to report positive FP attitudes than those married for 3 years or less. A possible explanation is that women in longer marital relationships may have greater exposure to reproductive health counseling,

experience with pregnancy planning, or readiness to limit or space births after achieving desired family size ^[1]. In contrast, educational level and household income were not significantly associated with FP knowledge or attitudes in the final models. This finding differs from studies conducted in other low- and middle-income settings where higher education and socioeconomic status were associated with improved FP knowledge and contraceptive acceptance ^[33]. One possible explanation maybe the relatively homogeneous educational background of participants, most had at least high school education, reducing variability between groups.

Good FP knowledge was strongly associated with positive FP attitudes. Women with good knowledge had more than three times higher odds of reporting positive attitudes than women with poor knowledge. A similar study in Ethiopia reported that women with better contraceptive knowledge were more likely to demonstrate favorable FP attitudes ^[33]. Adequate knowledge may improve understanding of contraceptive benefits, reduce misconceptions regarding side effects, and increase confidence in contraceptive decision-making ^[42]. However, because of the cross-sectional nature of the study, it cannot be concluded that knowledge directly causes positive attitudes. The findings indicate a significant association between knowledge and attitudes that may interact with broader interpersonal and sociocultural influences described in the SEM framework ^[39]. These findings support the importance of strengthening reproductive health education together with supportive community and partner engagement strategies ^[43].

In many low- and middle-income countries, including Myanmar, responsibility for FP has traditionally been placed primarily on women, while male involvement in contraceptive decision-making and reproductive health education remains limited. This gendered pattern may contribute to unequal reproductive burdens, persistent misconceptions, and reduced partner support for contraception. Prior studies have shown that limited male participation and prevailing gender norms surrounding fertility

and childbearing can negatively affect women's FP attitudes and their use of contraceptive methods ^[41, 44]. Strengthening couple-based counseling, male engagement, and community-level reproductive health education may therefore help reduce gender-related barriers and improve shared reproductive decision-making.

Several associations observed in the study should be interpreted cautiously. For instance, unintended pregnancy and desire for more children were associated with FP attitudes in the bivariate analysis but did not remain significant after adjustment in the multivariable models. These findings may indicate that the observed relationships were influenced by other socio-demographic or cultural factors included in the adjusted analyses. Additionally, because the study used a cross-sectional design, temporal relationships between variables could not be established, and causal inferences cannot be drawn ^[10, 45].

There are some limitations in this study. Firstly, the cross-sectional design limits the ability to establish causal relationships between variables, and self-reported data may suffer from recall or social desirability bias. Although participants were recruited from randomly selected urban townships, online convenience sampling was used due to security constraints, ongoing socio-political instability, and disruptions following the 2025 earthquake. This approach may have introduced selection bias by favoring women with internet access and higher health literacy. As most participants had relatively high educational backgrounds, the findings may not fully represent all married women living in urban Yangon, particularly women from lower socioeconomic groups or with limited digital access. Therefore, the generalizability of the findings should be interpreted cautiously. Despite challenging conditions, this study reveals that improving FP knowledge alone is insufficient to foster positive contraceptive attitudes among urban married women in Yangon. Effective interventions should combine individual education with culturally sensitive counseling, partner involvement, and community-based approaches. Additionally, targeted efforts

are essential for women with living children, who exhibited lower FP knowledge. Finally, strengthening accurate FP information remains essential for reducing misconceptions and promoting positive attitudes.

Conclusion

This study demonstrated that although good FP knowledge was relatively common among married women in urban Yangon, favorable attitudes toward FP remained limited. Cultural support was significantly associated with both FP knowledge and attitudes, while women with living children were less likely to have good FP knowledge. Longer marital duration and good FP knowledge were also associated with positive FP attitudes, highlighting the influence of interpersonal and sociocultural factors on reproductive health perceptions. These findings emphasize the need to strengthen culturally sensitive FP counseling, community-based reproductive health promotion, communication skills, and partner engagement within nursing education and reproductive health programs. Nurses play an important role in providing accurate contraceptive information, addressing misconceptions, and supporting informed reproductive decision-making. At the policy level, strengthening FP education and counseling within nursing and public health systems, along with promoting community engagement, male participation, culturally appropriate reproductive health communication, and equitable access to FP information, may improve knowledge and attitudes toward contraception. Integrating comprehensive FP education into nursing education and primary healthcare services may further improve reproductive health outcomes among women in urban Myanmar.

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Effect of a Customized Medication Booklet on Patient Satisfaction Regarding Medication Information among Cardiology and Pulmonary Patients

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Abstract

Introduction: Patient satisfaction related to information about medications, potential side effects, and the important home care considerations is viewed as a significant indicator of quality of life. This improves patient compliance with long-term treatment and ultimately healthcare outcomes.

Aim: To determine the effect of a customized medication booklet on satisfaction regarding medication information among cardiology and pulmonary patients.

Methods: A quasi-experimental post-test-only design was conducted at Christian Medical College Vellore. Seventy four inpatients prescribed long-term medications (antihypertensives, bronchodilators, vasodilators, and anticoagulants) were recruited, with 37 participants each in the control and experimental groups. Samples were recruited using consecutive sampling technique. The control group received routine medication information and completed a self-reported satisfaction questionnaire. The experimental group received a validated, customized medication booklet in addition to routine information. Patient satisfaction regarding medication information was assessed on the third day using a five-point Likert scale. Data were analysed using an independent t-test and ANOVA to determine the effectiveness of the medication booklet.

Results: The experimental group showed a higher mean satisfaction score compared to the control group (77.14 ± 4.41 vs. 74.43 ± 7.79); however, the difference was not statistically significant ($p = 0.072$). Domain-wise analysis revealed significant improvements in Orientation to Pharmacy Services ($p = 0.001$) and Patient Education ($p < 0.001$) among participants who received the customized medication booklet.

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Conclusion: The customized medication booklet improved patient satisfaction, particularly in Orientation to Pharmacy Services and Patient Education, highlighting the value of structured medication information.

Keywords: Patient satisfaction, Medication information, Customized medication booklet.

Introduction

Patient satisfaction is a globally recognized indicator of healthcare quality and is widely used to evaluate the effectiveness, safety, and responsiveness of healthcare systems. It refers to the extent to which healthcare services meet or exceed patients' expectations regarding care delivery, communication, interpersonal relationships, and overall healthcare experience. In modern healthcare systems, patient satisfaction has evolved beyond a subjective measure of comfort to a key performance indicator linked to clinical quality, healthcare utilization, and institutional performance.⁽¹⁾

Globally, patient satisfaction is increasingly integrated into healthcare evaluation frameworks as part of quality improvement initiatives.⁽¹⁾ It reflects the patient's perception of care received and is influenced by both clinical outcomes and non-clinical factors such as communication, empathy, waiting time, accessibility, and the quality of information provided. Studies have shown that higher patient satisfaction is associated with improved treatment adherence, better continuity of care, and reduced hospital readmission rates, making it an essential component of patient-centered healthcare delivery.⁽²⁾

One of the most critical determinants of patient satisfaction is effective communication, particularly the provision of clear and comprehensive medication-related information.⁽³⁾ Medication information plays a central role in patient safety and treatment adherence, as it enables patients to understand the purpose of their medications, appropriate usage, potential side effects, and necessary precautions. Inadequate communication regarding medications may lead to misunderstanding, non-adherence, medication errors, and reduced confidence in treatment plans. Boudewyns et al. demonstrated that the format of medication information significantly influences patient comprehension and the ability to correctly apply medication instructions, highlighting

the importance of structured educational tools in improving understanding.⁽⁴⁾

Patients' informational needs regarding medications have been well documented in the literature. Borgsteede et al. reported that patients discharged from hospital settings consistently expressed a need for detailed information about their medications, including indications, benefits, side effects, and administration instructions.⁽⁵⁾ However, the study also highlighted that these informational needs are often unmet in routine clinical practice, leading to gaps in patient understanding and confidence in self-management. These unmet needs are further compounded by variations in individual preferences regarding the amount and type of information desired, indicating the need for personalized educational approaches.

Despite advances in healthcare delivery, several barriers continue to affect patient satisfaction and the effectiveness of medication education. At the patient level, factors such as low health literacy, anxiety, and complexity of medication regimens can hinder understanding. At the provider level, communication gaps, workload pressure, and time constraints may limit the quality and depth of medication counselling. At the system level, inadequate staffing, lack of structured educational tools, and inconsistent discharge communication processes further contribute to variability in patient experience.⁽⁶⁾ Conversely, facilitators such as effective provider patient communication, structured education tools, and patient engagement strategies have been shown to improve satisfaction and medication adherence across healthcare settings.⁽⁷⁾

Medication related complications remain a significant concern in healthcare, particularly among outpatients and patients with chronic conditions. Gandhi et al. reported that drug-related complications are relatively common and may result in adverse clinical outcomes, highlighting the importance of

patient understanding and proper medication use in preventing harm.⁽⁸⁾ These findings emphasize the need for strengthened patient education strategies to improve medication safety and reduce preventable complications.

Cardiology and pulmonary patients represent a particularly vulnerable population due to the complexity and long-term nature of their medication regimens. These patients are often prescribed multiple drugs such as antihypertensives, anticoagulants, bronchodilators, and vasodilators, requiring strict adherence and careful monitoring.⁽⁹⁾ The complexity of these regimens increases the likelihood of confusion, non-adherence, and medication-related problems, thereby making effective medication education essential for this group.^(10,11)

Educational interventions such as written medication materials, including booklets, have been proposed as effective tools to enhance patient understanding. Structured educational tools provide standardized, consistent, and easily accessible information that patients can refer to at their convenience, reinforcing verbal counselling provided by healthcare professionals.^(12,13) Such interventions are particularly valuable in settings with high patient loads, where time for individualized counselling may be limited.

Therefore, there is a need to evaluate structured educational interventions that can improve patient satisfaction with medication information, particularly in high-risk populations such as cardiology and pulmonary patients. The present study was undertaken to assess the effect of a customized medication booklet on satisfaction regarding medication information among cardiology and pulmonary patients admitted to the wards of Christian Medical College, Vellore. The study also aimed to evaluate the association between satisfaction with medication information and selected socio-demographic and clinical variables.

The findings of this study are expected to contribute to existing literature by providing evidence on the effectiveness of structured medication

education tools in improving patient satisfaction. The results may have important implications for nursing practice by supporting the integration of standardized medication booklets into routine patient education, thereby enhancing communication, improving medication adherence, and strengthening patient-centered care. Furthermore, the study findings may inform nursing education by emphasizing the importance of structured communication strategies and patient education interventions in clinical training and practice.

Methods

Study Design and Setting

A quasi-experimental, non-equivalent control group post-test design was adopted to assess the effect of a customized medication booklet on patient satisfaction regarding medication information among cardiology and pulmonary patients. The study was conducted in the cardiology and pulmonary wards of Christian Medical College, Vellore, a tertiary care teaching hospital in South India.

Study Population

The study population included adult patients admitted to the cardiology and pulmonary wards who were receiving long-term medications.

Inclusion Criteria

Patients aged 18 years and above who were able to read, write, and comprehend English, Hindi, or Tamil were included. Patients prescribed long-term medications such as anticoagulants, bronchodilators, vasodilators, and antihypertensives were eligible for participation.

Exclusion Criteria

Critically ill, unconscious, and cognitively impaired patients were excluded from the study. Patients who were discharged immediately after receiving medications without adequate time for post-intervention assessment were also excluded.

Sample Size

The sample size was calculated using the standard formula for comparison of two independent means. The calculation was based on an expected mean difference of 20% in satisfaction scores between groups, with an assumed standard deviation of 30%, 80% statistical power, and a 5% level of significance. Based on this calculation, a total of 74 participants were required, with 37 participants in each group (control and experimental).

Intervention and Comparator

The intervention consisted of a customized medication booklet developed by the researcher. The booklet included structured information on medication name, indication, mechanism of action, dosage, route of administration, timing, common side effects, precautions, and key nursing considerations. The content was designed to be patient-friendly and tailored to commonly prescribed medications in cardiology and pulmonary units.

The control group received routine care, which included standard verbal medication information provided by nurses during medication administration and routine clinical interactions, without the use of the structured booklet.

Study Instrument

Part A- Sociodemographic and clinical variables:

Age, Sex, Occupation, Family income, Number of hospitalized days, Number of new drugs started, Prescribed medication duration.

Part B- Satisfaction questionnaire:

Patient satisfaction regarding medication information was assessed using a structured self-administered questionnaire consisting of 17 items across four domains:

1. Orientation to pharmacy services
2. Drug administration information
3. Patient education on medications
4. Documentation and communication clarity

Each item was rated on a 5-point Likert scale ranging from 1 (very dissatisfied) to 5 (very satisfied). Items marked as "not applicable" were excluded from scoring. The total score was summed and converted into a percentage, with higher scores indicating greater satisfaction.

The content validity of the tool was 0.9, established through expert review by faculty members in nursing and clinical practice, and minor modifications were made based on feedback to improve clarity and relevance.

Data Collection Procedure

After obtaining ethical clearance and informed consent, participants were recruited consecutively from cardiology and pulmonary wards. The control group received routine care. The experimental group received the customized medication booklet in addition to routine care. Post-intervention satisfaction was assessed using the structured questionnaire after exposure to the intervention.

Data collection for the control group was carried out by the Principal Investigator (PI). The intervention (customized medication booklet) was also administered by the PI to ensure consistency and fidelity of the intervention. For the experimental group, post-intervention data collection was conducted by the Co-Investigator to minimize potential bias and reduce the influence of the intervention provider on participants' responses. Participants were guided only for clarification of questionnaire items when required, without influencing their responses. Confidentiality was maintained throughout the study.

Statistical Analysis

Data were entered and analyzed using IBM SPSS Statistics (Version 27). Descriptive statistics were used to summarize socio-demographic and clinical characteristics. Categorical variables were presented as frequencies and percentages, while continuous variables were expressed as means and standard deviations or medians and inter-quartile ranges based on distribution.

Comparisons between the control and experimental groups were performed using independent t-tests for continuous variables and chi-square tests for categorical variables. The effect of the customized medication booklet on patient satisfaction was assessed using independent sample t-tests. Associations between satisfaction scores and socio-demographic and clinical variables were analyzed using independent t-tests or one-way ANOVA as appropriate. Correlation analysis (Pearson or Spearman) was used for continuous variables when applicable. A p-value of <0.05 was considered statistically significant.

Results

Participant Characteristics

A total of 74 pulmonary and cardiology patients were included, with 37 participants each in the control and experimental groups. Baseline socio-demographic and clinical characteristics were generally comparable between groups. Occupation differed significantly between the groups ($\chi^2 = 8.089$, $p = 0.018$), whereas age, sex, education, family income, duration of hospitalization, number of newly prescribed medications, and duration of medication use showed no significant differences (all $p > 0.05$) (Table 1).

Table 1. Distribution of Participants by Sociodemographic and Clinical Characteristics in the Control and Experimental Groups (N = 74)

Variables		Control N	Control %	Experiment n	Experiment %	X ²	p value
Age	20-40 yrs	11	29.8	7	18.9	6.003	0.111
	41-60 yrs	13	35.1	22	59.5		
	>60 yrs	13	35.1	8	21.6		
Sex	Male	26	70.2	24	64.9	0.247	0.619
	Female	11	29.8	13	35.1		
Education	Illiterate	4	10.8	7	18.9	3.563	0.168
	School education	21	56.8	13	35.1		
	Graduate	12	32.4	17	46.0		
Occupation	Unemployed	24	64.9	12	32.4	8.089	0.018
	Labourer	7	18.9	11	29.8		
	Professional	6	16.2	14	37.8		
Family income	<15000	24	64.9	17	46.0	2.680	0.102
	>15000	13	35.1	20	54.0		
Number of hospitalized days	4-6	25	67.6	23	62.2	0.265	0.876
	7-10	10	27.0	12	32.4		
	>10	2	5.4	2	5.4		
Number of new drugs started	<3 drugs	30	81.1	33	89.2	0.961	0.327
	> 3 drugs	7	18.9	4	10.8		

Effect of the Customized Medication Booklet on Satisfaction

satisfaction score than the control group (77.14 ± 4.41 vs. 74.43 ± 7.79); however, the difference did not reach statistical significance ($p = 0.072$) (Table 2).

The experimental group showed a higher mean

Table 2. Comparison of mean satisfaction scores between the control and experimental group

Groups	Mean	Standard Deviation	p value
Control Group (n=37)	74.43	7.79	0.072
Experimental Group (n=37)	77.14	4.41	

Domain-wise analysis revealed significantly higher scores in the experimental group for Patient Education (32.83 ± 2.35 vs. 28.91 ± 5.54 , $p < 0.001$). A significant difference was also observed for

Orientation to Pharmacy Services (21.18 ± 2.52 vs. 23.08 ± 2.12 , $p = 0.001$). No significant differences were observed in Drug Administration ($p = 0.217$) or Documentation ($p = 0.192$) (Table 3).

Table 3: Comparison of Domain-Wise Mean Satisfaction Scores Between the Control and Experimental Groups

DOMAINS	CONTROL GROUP		EXPERIMENTAL GROUP		t-VALUE	P-VALUE
	MEAN	SD	MEAN	SD		
Orientation to pharmacy services	23.08	2.12	21.18	2.52	3.48	0.001
Drug administration	17.59	2.26	18.13	1.35	-1.245	0.217
Patient education	28.91	5.54	32.83	2.35	-3.955	<0.001
Documentation	4.83	0.601	4.97	0.164	-1.318	0.192

The mean satisfaction scores were higher in the experimental group compared to the control group (Figure 1).

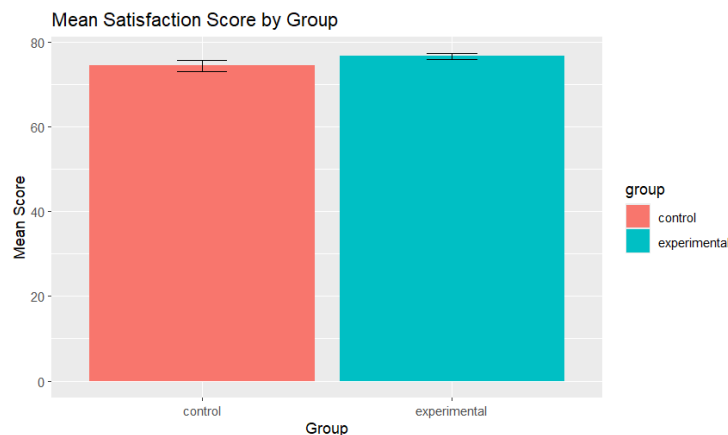


Figure 1: Mean Satisfaction Scores in the Control and Experimental Groups

Factors Associated with Satisfaction

Among the socio-demographic and clinical variables examined, prescribed medication duration was significantly associated with satisfaction

regarding medication information ($\chi^2 = 3.931$, $p = 0.047$). No significant associations were found for age, sex, education, occupation, family income, duration of hospitalization, or number of newly prescribed medications (all $p > 0.05$) (Table 4).

Table 4. Association between satisfaction regarding medication information and selected socio-demographic and clinical variables among cardiology patients

Variables		Satisfied n %		Highly satisfied n %		χ^2	P value
Age	20-40yrs	1	12.5	10	34.5	1.677	0.432
	41-60yrs	4	50.0	9	31.0		
	>60yrs	3	37.5	10	34.5		
Sex	Male	5	62.5	21	72.4	0.295	0.587
	Female	3	37.5	8	27.6		
Education	Illiterate	0	0	4	13.8	1.876	0.391
	School	6	75	15	51.7		
	Graduate	2	25	10	34.5		
Occupation	Unemployed	7	87.5	17	58.6	2.824	0.244
	Laborer	0	0.0	7	24.1		
	Professional	1	12.5	5	17.3		
Family income	<15000	5	62.5	19	65.5	0.025	0.874
	>15000	3	37.5	10	34.5		
Number of days Hospitalized	4-6					1.831	0.400
	7-10	6	75	19	65.5		
	>10 days	1	12.5	9	31.0		
		1	12.5	1	3.5		
Number of new drugs prescribed	<3	6	75	24	82.7	0.246	0.620
	>3	2	25	5	17.3		
Prescribed medication duration	<1yr	7	87.5	14	48.3	3.931	0.047
	>1yr	1	12.5	15	51.7		

The density distribution of satisfaction scores between the control and experimental groups is presented in Figure 2.



Figure 2: Density Plot of Satisfaction Scores in the Control and Experimental Group

A box plot comparing total satisfaction scores between the groups is shown in Figure 3.

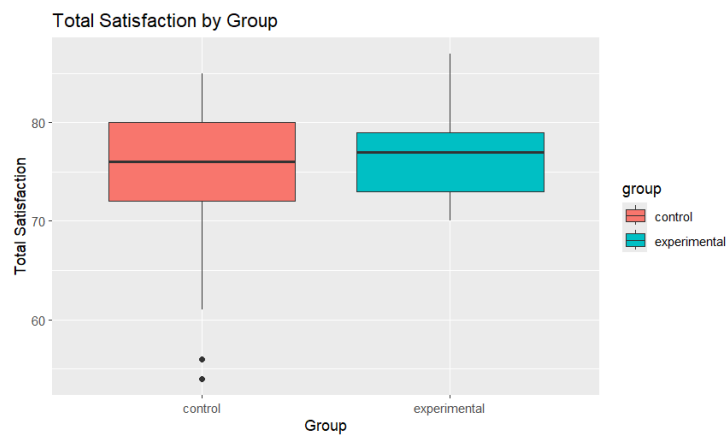


Figure 3: Box Plot Comparing Total Satisfaction Scores Between the Control and Experimental Groups

Discussion

The findings of the present study revealed that the experimental group demonstrated a higher mean satisfaction score (77.14 ± 4.41) compared to the control group (74.43 ± 7.79). Although the difference was not statistically significant ($p = 0.072$), participants who received the customized medication booklet reported better satisfaction regarding medication information. These findings suggest a positive trend toward improved satisfaction among patients exposed to the intervention. The findings of the present study are supported by a study conducted in Vietnam, which reported that 52% of patients were satisfied with medication related information and emphasized the importance of providing

comprehensive medication information to improve patient satisfaction⁽¹⁵⁾. Similarly, higher satisfaction scores were observed among participants who received the customized medication booklet in the present study. The findings are also supported by a randomized controlled trial conducted in Qatar among patients with type 2 diabetes mellitus. The study demonstrated that patients who received customized consumer medication information showed significantly better health-related outcomes compared to the control group, with improvements in quality-of-life measures ($p = 0.019$) and EQ-VAS scores ($p = 0.003$)⁽¹⁶⁾.

Domain-wise analysis revealed statistically significant differences in Orientation to Pharmacy

Services ($p = 0.001$) and Patient Education ($p < 0.001$). These findings indicate that the customized medication booklet was particularly effective in improving patient understanding and education regarding medications. The findings are supported by a study conducted in Sri Lanka, which reported that patients who received written medication information demonstrated significantly better knowledge regarding their medications compared to those who received verbal information alone ($p < 0.05$)⁽¹⁷⁾. Likewise, Boudewyns et al. reported that patients receiving simplified medication information handouts demonstrated better comprehension than those receiving standard medication guides⁽⁴⁾. These findings suggest that well-designed written educational materials can improve patients' understanding of medications and contribute to higher satisfaction. The findings are further supported by Sze et al. (2020), who reported that patients were generally satisfied with information regarding medication use but less satisfied with information about potential medication-related problems⁽¹⁸⁾. The authors emphasized the importance of providing comprehensive and individualized medication information. Similarly, the present study found higher satisfaction scores among patients who received the customized medication booklet, indicating that structured medication information can improve patient satisfaction. The present study examined the association between satisfaction regarding medication information and selected socio-demographic and clinical variables.

Among all variables studied, prescribed medication duration showed a statistically significant association with satisfaction regarding medication information ($\chi^2 = 3.931$, $p = 0.047$). Participants receiving medications for more than one year demonstrated higher satisfaction levels compared to those receiving medications for less than one year. These findings are consistent with a study conducted in the Netherlands among cardiology, oncology, and rheumatology patients, which reported that patients preferred medication information that was individualized, comprehensive, reliable, understandable, and accessible⁽¹⁹⁾. The

study emphasized that medication information should be tailored to patients' needs. Consistent with these findings, the present study observed higher satisfaction levels among patients receiving personalized medication information through the customized medication booklet.

Conclusion

The present study assessed the effect of a customized medication booklet on satisfaction regarding medication information among cardiology and pulmonary patients. The findings indicated that patients who received the customized medication booklet demonstrated higher overall satisfaction scores compared to those who received routine care. However, the difference in overall satisfaction between the groups was not statistically significant.

Domain-wise analysis revealed statistically significant improvements in the experimental group in the areas of orientation to pharmacy services and patient education. In addition, duration of prescribed medication use was found to be significantly associated with satisfaction regarding medication information.

The study highlights the importance of structured and individualized medication education in improving patient understanding and selected aspects of satisfaction. The customized medication booklet may serve as a useful adjunct to routine verbal counselling in enhancing patient education in inpatient settings.

These findings have important implications for nursing practice and education, emphasizing the need for standardized, patient-centered educational tools to support effective communication of medication-related information. However, further research with larger sample sizes and multi-centre designs is recommended to establish the broader effectiveness and generalization of this intervention.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Ethical clearance for the study was obtained from the Institutional Ethics Committee before data collection (CMC College of Nursing Research Committee 2/1632022 dated 16.3.22). Written informed consent was obtained from all participants before their enrolment in the study. Confidentiality and anonymity of the participants were maintained throughout the study.

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Comparison of Learning between Japanese Nursing Students and International Students Studying Care and Welfare in A Joint Class Aimed at Cross-Cultural Understanding

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Abstract

Objective: Both nurses and certified care workers must acquire cultural competences to understand and respect the culture of the persons they are caring for. This study identifies differences in learning outcomes for Japanese nursing students and international students studying elderly care and welfare who were taught joint classes and also examines the educational methods for acquiring appropriate cultural competences by each group.

Methods: A qualitative factor exploration was conducted by analyzing the assignment reports submitted by students who consented to participate in the study.

Results: The joint classes were implemented in two stages. After the first group work session, 79 codes related to student learning were identified and organized into 14 subcategories and five categories. After the second presentation, 111 codes were identified and classified into 24 subcategories and nine categories. Each category included the learning characteristics of nursing students, the learning characteristics of international students, and the learning observed in both groups.

Conclusion: Through cross-cultural contact, nursing students' cultural competences gradually improved. Creating opportunities to interact with different cultures appears to be effective in enhancing cultural abilities. Furthermore, for international students, it is desirable for course content to be extended beyond cultural exchanges or cross-cultural understanding to include a strong career-oriented focus.

Keywords: cross-cultural understanding, joint classes, Japanese nursing students, international students, comparative learning

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Introduction and Background

Recently, more individuals of diverse nationalities have been living in and visiting Japan, further internationalizing the country. With the increase in the number of foreign residents and tourists, the opportunities to visit medical institutions in Japan have also increased^{1,2}. Accordingly, nurses must acquire cultural competences to understand and respond appropriately to patients from diverse cultural backgrounds.

Furthermore, Japan is facing a declining birth rate and a rapidly aging population. Although the demand for caregiving services continues to increase, securing sufficient personnel remains a challenge. As such, the Japanese government has expanded its legal framework to accept foreign-certified care workers. Many international students in Japan aim to become certified care workers. These workers must understand patients and collaborate with multiple professionals to ensure safe and efficient care. However, international students face challenges, such as understanding the Japanese culture, building relationships with Japanese people, and communicating with the patients they attend to. For this reason, it is important for international students who plan to work as certified care workers in Japan to acquire cultural competence that enables them to understand others' backgrounds and respond respectfully.

Cultural competence is the ability to understand subjects from different cultural backgrounds and provide culturally appropriate medical treatment and care, being a complex integration of cultural knowledge, attitudes, and skills³. According to Bacote⁴, cultural competence refers to the ability to be sensitive to a client's culture and to provide appropriate care. It comprises five elements, namely cultural awareness, cultural knowledge, cultural encounters, cultural skills, and cultural desire. By incorporating cultural humility into cultural encounters, the other four elements can also be acquired. However, this process is constantly changing.

Examining the literature on cultural competence in foreign countries with more ethnic and culturally

diverse populations than in Japan, there are several reports on the development and implementation of curricula to improve cultural competences in undergraduate education⁵⁻⁷. Although a few studies have focused on the cultural competence of clinical nurses in Japan^{8,9}, none have hitherto targeted nursing students. In addition, there have been few studies on this topic^{10,11} and almost no effort has been made in nursing education.

In Japan, it is necessary to develop educational methods that help nursing students understand different cultures.

For those who shape the future of nursing and caregiving in Japan to provide high-quality care, collaboration with other professionals, understanding different perspectives, and understanding diverse cultures are essential. Therefore, to promote cultural understanding, a joint class was conducted between a nursing department enrolling Japanese nursing students and a welfare vocational school enrolling international students aiming to become certified care workers. The purpose of this study was to determine whether there were differences in learning outcomes between the Japanese nursing students and international students who participated in the joint classes to gain insights into the educational methods suitable for both groups for the acquisition of cultural competence.

Material and Methods

1. Definition of terms

- 1) Cultural competence: the ability to be sensitive to a client's culture and provide care that is appropriate for that culture⁴.
- 2) Caregiving: providing assistance necessary for daily life, such as walking, toileting, eating, and bathing.
- 3) Certified care worker: a person who uses specialized knowledge and skills to provide care according to the physical and mental conditions of individuals who experience difficulties in daily living due to physical or mental disabilities.

2. Overview of joint classes

1) Class content (Table 1)

The joint class was conducted twice. In the first session, each group read the

cases assigned to them and discussed the assistance required (group work). In the second session, each group presented their planned assistance in the form of a role play (presentation).

Table 1. Overview of the joint classes

Stage	Purpose	Method		Course content	Assignment report theme
1	Experiencing a difference in thinking	joint class 1	practice 1	Icebreaker GW (necessary care and planning for the case patient) Assignment report	Learning from the experience of working in groups with people from different cultures.
2	People from different cultures and professions to work together to implement the planned care	joint class 2	practice 2	Role play Implementing planned care to a simulated patient Assignment report	Learning from role-playing with people from different cultures.

2) Students taking the course

The joint class was conducted using the university's "Advanced Fundamental Nursing" (elective) and the welfare vocational school's "Nursing Care Inclusion" (required) courses. The students taking the course comprised 13 Japanese students from the Nursing

Department and 31 international students from the Caregiving and Welfare Department.

3) Background of the international students

Table 2 presents the backgrounds of the 31 international students. Most participants were from Asian countries and had passed the Japanese Language Proficiency Test at the N2 level.

Table 2. Background of international students

Japanese language proficiency	Country of Origin	number
N2※ The ability to understand Japanese used in everyday situations, and in a variety of circumstances to a certain degree.	Indonesia	19
	Mongolia	5
	Philippines	4
	Nepal	1
	Vietnam	1
	India	1

※The Japanese language proficiency test (JLPT) has five levels: N1, N2, N3, N4 and N5. The easiest level is N5 and the most difficult level is N1.

3. Research subjects

As previously mentioned, the participants were 13 Japanese students from the nursing department and 31 international students from the Caregiving and Welfare Department. All participants consented to participate in the study. No one declined to participate in the research.

4. Research period

The study was conducted between December 2021 and October 2023. The joint classes were conducted on December 14 and 21, 2021.

5. Research design

To obtain a deeper understanding of the psychology and experiences of learners, we conducted qualitative factor analysis to identify the underlying factors.

6. Data collection method

Written assignments were assigned after the group work and presentations in the joint classes. The assignment reports were written in accordance with the designated themes (Table 1) and submitted during class. As the analysis was planned based on the report, no audio or video recordings or field notes were made. The exclusion criterion was that the report was not written in line with the theme; however, no such reports were found.

7. Data analysis

The data analysis team consisted of female researchers with instructional design and nursing education backgrounds (Professor, lecturer), all being experienced in internationalization within higher education and holding a PhD. The analysis focused on the assignment reports from students who provided their consent. Of the relevant responses, 185 were selected as codes. The selections were performed independently by two researchers. The codes were then classified and categorized based on their semantic similarities, followed by between-group analyses including all data to identify the

differences and similarities between the two groups. During the categorization process, the researchers engaged in repeated discussions to reach consensus. When categorizing the data, we determined that the categories were saturated because similar content was extracted from the reports of multiple participants. To strengthen study validity, the investigators typically contact the participants and present the results to achieve agreement; however, owing to the time lag between data collection and analysis, this approach was not feasible.

8. Ethical considerations

Before the joint class, the research content (which also included the protection of personal information, anonymity, and publication of research results) was explained verbally and in writing. The participants who provided informed consent to participate in the research completed a consent form. This study was approved by the ethics review committee of the researchers' affiliated institution (approval number: PAZ 21-29)).

Results

Consent was obtained from all participants, resulting in 44 reports for analysis. Tables 3 and 4 present the analysis results for each stage. Categories are indicated by 【】, subcategories by 《》, and codes by 『』.

1. Student learning at each stage

1) After group work (following the first joint lesson)

(1) Experiences of nursing and international students with different cultural and educational backgrounds through group work.

Regarding student learning after group work, 79 codes were extracted and organized into 14 subcategories and five categories.

Of the 14 subcategories, five consisted solely of learning. For example, in 《Awareness of the characteristics of Japanese expressions》,

students expressed learning such as 『I thought that guessing may be the beginning of a misunderstanding』.

Three subcategories were composed solely of learning experiences reported by the international students. In『Differences in specific methods of assistance』, the students described learning about concrete caregiving approaches, such as 『Using diapers and applying ointment to the painful area will

eventually relieve the pain, although it may take some time』.

Six subcategories included learning reported by both nursing and international students. In『A shared empathetic attitude toward the subject's feelings』, learning such as 『We were all the same in terms of empathizing with the patient's feelings』 was observed. In『How to discuss among people from different cultural backgrounds』,

Table 3. What nursing students and international students with different cultural and educational backgrounds felt through group work.

Categories	Subcategorie (Number of codes)	Representative Code
Recognition that other cultures exist	Awareness of the characteristics of Japanese expressions (3)	I thought that guessing may be the beginning of a misunderstanding.
	Realization of the existence of different cultures (2)	I felt that things that are commonplace for Japanese people might often feel strange or unusual to foreigners.
		I realized that people think differently based on the country's culture, living background, social situation.
	The awareness that each individual is a different person[1]	<i>Everyone has their own individual thoughts.</i>
Cross-cultural differences and similarities	A shared empathetic attitude toward the subject's feelings (9) [13]	We were all the same in terms of empathizing with the patient's feelings.
		I had the same thoughts as the Japanese nursing students.
	Differences in medical and nursing care situations (6)	I heard that physical restraint is not commonly used in the Philippines.
	Differences in family involvement in caregiving (4)[1]	The international student seemed unable to understand why the patient was on bad terms with their family.
		There are not many nursing care facilities in Mongolia.
		I thought it was terrible to lie to the patient and tell them that their family wanted to see them.

Continue....

How to discuss among people from different cultural backgrounds	How to discuss among people from different cultural backgrounds (2)[7]	Do not try to advance the conversation based on your own interpretation.
		It is necessary to listen carefully to the other person's opinion.
Interest in experiencing different cultures	Interest in thinking different from one's own (1)[2]	I thought the international students' opinions were interesting.
		I felt that I didn't have enough time to talk with the nursing students.
Professional recognition	Perspectives on assistance held by other professions (6)[1]	I was thinking of completely releasing the patient from physical restraints, but the international student believed that partial and time-limited release was better in terms of ensuring safety.
		Nursing and caregiving have different perspectives on providing assistance.
	Differences in specific methods of assistance [7]	<i>I need to take my time to persuade my family.</i>
		Using diapers and applying ointment to the painful area will eventually relieve the pain, although it may take some time.
	Awareness of the differences in job responsibilities compared to other professions (6)	We believe that nurses need to know the scope of tasks that can be performed by care workers.
	The importance of eliciting patients' true feelings (3)[1]	The suggestion that it's necessary to ask the patient for clarification when you don't understand what they're saying is something I believe is also essential in nursing.
		The most important thing is communication that supports the patient's feelings.
	The role of nurses in interprofessional collaboration (3)	Collaboration between nurses and caregivers is crucial.
	Implementation of highly satisfactory assistance [1]	By having discussions, we can ensure that the team provides the kind of care they want to provide.

※() indicates the number of codes for nursing students, and[] indicates the number of codes for international students.

students reported learning such as 『It is necessary to listen carefully to the other person's opinion』, and in 《Interest in thinking different from one's own》, learning such as 『I thought the international students' opinions were interesting』 was noted.

The five categories derived from these subcategories included 【Cross-cultural differences and similarities】, 【How to discuss among people from different cultural backgrounds】, 【Professional recognition】, among others. Among

these, 【Cross-cultural differences and similarities】 had the largest number of learning codes.

- 2) After the presentation (following the second joint class)
- (1) Experiences of nursing and international students from different cultural and educational backgrounds through collaborative assistance

Regarding student learning after the presentations, 111 codes were extracted and organized into 24 subcategories and nine categories.

Of the 24 subcategories, 13 consisted solely of learning by nursing students. In 《Dominant views of the Japanese language and culture》, the students reported learning such as 『I unconsciously focused on Japanese nurses because I was at a loss for words when international students spoke』. In 《Attitudes of international students toward patients that differed from my own》, learning such as 『I was impressed that the international students cared deeply for the patients and their families as if they were their own』 was observed, along with related topics.

Eight subcategories were derived solely from international students' learning experiences. For example, in 《Recognition of the importance of feeling connected》, the students reported learning such as 『I realized that it is important to talk to others about problems and anxieties rather than keeping them to yourself』.

Three subcategories reflected learning shared by nursing students and international students. In 《Difficulty in sharing professional information due to language differences》, nursing students expressed learning such as 『I did not know how to communicate technical content in a way that would be easy to understand』, while international students reported learning such as 『Because I was not fluent in Japanese, it was not easy to provide care together』.

The nine categories derived from these subcategories included 【The value of having different cultures】, 【Language barriers】, 【Interest in experiencing different cultures】, 【Connections with people】, 【Professional Recognition】, among others.

Table 4. What nursing students and international students with different cultural and educational backgrounds felt through collaborative assistance.

Categories	Subcategories (Number of codes)	Representative Code
Awareness of ethnocentrism	Predicting patient's feelings towards international students who do not speak Japanese well (4)	From a patient's perspective, I thought it would be easier to understand if they were fluent in Japanese.
	Dominant views of the Japanese language and culture (3)	I unconsciously focused on Japanese nurses because I was at a loss for words when international students spoke.
	Perception that Japanese language and culture are not dominant (2)	There was certainly a language barrier between us and international students. But I thought that they did not say that they could not do it.

Continue....

The value of having different cultures	Attitudes of international students toward patients that were differed from my own (5)	I was impressed that the international students cared deeply for the patients and their families as if they were their own.
	The importance of interacting with different cultures regularly (3)	People who are in touch with a lot of international students know how to convey their message.
	Realizing diverse ways of interacting according to the situation (1)	Leveraging the strengths of being involved in multiple professions.
	The value of diverse ideas [5]	<i>It is important to have a variety of opinions.</i>
Language barriers	Difficulty in sharing professional information due to language differences (7)[9]	I did not know how to communicate technical content in a way that would be easy to understand.
		<i>Because I was not fluent in Japanese, it was not easy to provide care together.</i>
	Non-problem everyday conversation (2) [1]	When we talked, we were able to understand each other quite well. <i>I was able to convey what I wanted to say.</i>
Differences and similarities in perceptions of care	A common opinion to providing care to patients (8)	Although our backgrounds and occupations were different, I felt that we shared a common sense of compassion for the patient audience.
	Differences in attitudes and ways of dealing with parents (6)	I felt that the idea that parents should be cherished no matter how bad they are is different from the idea prevailing in Japan.
	Differences in perception of care (1)	The same care will result in different perceptions if people come from different cultural or educational backgrounds.
Ingenuity in modes of expression	How to discussion among people from different cultural background (5) [4]	Understanding together even if it takes time.
		<i>It is important to use easy-to-understand language.</i>
	The need to use gestures, words, and ruby (7)	Even if I couldn't get my point across through discussion, I felt like I was able to get it across a little by using movements.
Interest in experiencing different cultures	<i>Interest in different cultures [3]</i>	<i>It was a lot of fun collaborating together.</i>

Continue....

Providing safe and comfortable care	The ingenuity required to provide assistance together with other professions (8)	By calling out to each other together, we were able to complement each other and respond accordingly.
	The importance of caring for the patient's psychological well-being (3)	I think it's a comfortable experience for patients, so I want to follow their example.
	Understanding that one care can mean many things (2)	Physical restraints protect the safety of the subject, prevent complications, and maintain comfort, so I think there is a view that they should be implemented with some ingenuity.
Connections with people	Recognition of the importance of feeling connected [4]	<i>I realized that it is important to talk to others about problems and anxieties rather than keeping them to yourself.</i>
Professional recognition	Evaluation of collaborative results [8]	<i>Cooperation can help provide smooth assistance.</i>
	Fear of working together [4]	<i>I was nervous to present together.</i>
	Multidisciplinary professionals provide assistance by complementing each other's expertise [4]	<i>Through discussion, I learned about various ways to help.</i>
	Expectations for professional growth [1]	<i>This kind of lesson will be good practice for the future.</i>
	Attitudes required when interacting with patients [1]	<i>Always keep the patient comfortable</i>
※() indicates the number of codes for nursing students, and [] indicates the number of codes for international students.		

Discussion

This study examined the characteristics of learning among nursing and international students at each stage of joint classes, as well as the educational methods appropriate for fostering cultural competence in each group.

1. Characteristic learning among nursing students

During the group work, contact with international students elicited learning related to 【Cross-cultural differences and similarities】. Typically, nursing students have

limited opportunities to interact with people from other countries. Therefore, the information shared by international students about their home countries was perceived as novel. The strong awareness of differences and similarities may be attributed to the familiarity of the themes addressed, such as “family,” “medical care,” and “ways of supporting patients.”

After the presentations, the students cited learning on 【The value of having different cultures】. They perceived and evaluated positive attitudes toward others who differed from their own. The nursing students initially thought there was no significant difference in

the assistance they could provide to patients; in fact, they believed they had an advantage because they were fluent in Japanese. However, by working with international students, the nursing students perceived that they treated patients with greater warmth than they did themselves. Nursing students are often instructed to “be close to the patient,” and this realization may have emerged because they observed expressions of empathy that exceeded their own expectations of their practice.

2. Characteristic learning among international students

When asked about learning after group work, many students cited items related to **【Professional recognition】**. As international students are accustomed to living in a different cultural context in Japan, they tend to focus less on differences between Japan and their home countries and more on concrete differences in caregiving practices across professions.

Even after the role-play, learning related to **【Professional recognition】**, such as *«Evaluation of collaborative results»*, was frequently mentioned. By contrast, **【Connections with people】**, composed of *«Recognition of the importance of feeling connected»*, did not surface after the group work stage. Given the relatively high frequency of statements such as *「I realized that it is important to talk to others about problems and anxieties rather than keeping them to yourself」*, it can be inferred that international students may be in environments where it is difficult to consult regularly with Japanese colleagues. Previous studies have reported the challenges faced by certified care workers, including language barriers and limited access to counseling resources^{12,13}. Although many international students work part-time at nursing care facilities, it is likely that they often deal with various difficulties. However, the joint classes seem to have enabled them to recognize the importance of **【Connections**

with people】by providing sufficient time for discussion and opportunities to experience team-based caregiving. This experience seems to have fostered **【Interest in experiencing different cultures】** and openness toward Japanese people.

3. Common learning among nursing students and international students

Through group work, all students recognized the existence of diverse viewpoints. Discussing issues with individuals who hold different opinions appears to have provided an opportunity to consider **【How to discuss among people from different cultural backgrounds】**. The students focused on mutual understanding as a means of achieving the shared goal of planning and implementing care collaboratively. During group work, learning tended to be expressed in abstract terms, such as *「It is necessary to listen carefully to the other person's opinion」*. After the role-play, learning became more concrete, as reflected in statements such as *「It is important to use easy-to-understand language」*. This shift may be related to students' direct experience of **【Language barriers】**. In the practical stage of providing care together, detailed explanations and confirmation among staff are essential, as ambiguous communication can hinder appropriate action. This experience appears to have encouraged students to consider more specific ways of conveying their intentions to others.

4. Consideration of educational methods to improve cultural competences

An educational approach suited to improve the cultural competences of Japanese nursing students is providing opportunities for contact with different cultures. Although the number of foreign residents in Japan is increasing and encounters have become more common in daily life, the opportunities for interaction with peers or colleagues remain limited. By facilitating such contacts, nursing students can become aware

of cultural differences and learn strategies to address them. At the same time, instances of ethnocentric views toward Japanese language and culture suggest that instructors must be prepared to provide appropriate guidance and adjustments during instruction.

For international students, educational methods that emphasize rich discussions and collaborative experiences are particularly beneficial. Due to language barriers, international students often have limited opportunities to express or acknowledge their opinions. Providing extended opportunities for discussion allows them to experience their views, which may contribute to increased self-esteem. Greater self-esteem, in turn, may facilitate acceptance of others' perspectives and foster more flexible engagement with Japanese culture. Additionally, many students cited **【Professional recognition】** as a central aspect of their learning. Given their clear goal of becoming certified care workers, they appear to approach Japan primarily from a professional rather than cultural standpoint. Their interest lies less in "Japan" per se and more in "the Japanese profession of certified care worker." Accordingly, course content should prioritize professional relevance rather than focus solely on cultural exchanges or general cross-cultural understanding. The finding that collaborative work toward a common goal improves cultural abilities may be applicable to other educational programs for training professionals in care professions, as well as to collaborative classes with different educational institutions.

5. Limitations of the study

This study identified how "cultural encounters" – one of the components of cultural competence – provide Japanese nursing and international students with distinctive learning experiences. To establish educational methods to enhance cultural competences, it is necessary to clarify how the other four components can be incorporated into teaching practices.

6. Researcher's reflection

In this study, the preconception that "international students will primarily encounter difficulties due to cultural differences between their home country and Japan, and their learning will focus more on cultural exchange than on professional aspects" may have influenced the interpretation of the results. To address this issue, we attempted to ensure validity by continuing the analysis until similar content was extracted from multiple participants, thereby confirming that the data were saturated.

Conclusion

It is necessary to provide opportunities for cross-cultural contact to improve nursing students' cultural competences. For international students, it is desirable for course content to extend beyond cultural exchanges or cross-cultural understanding to include a strong career-oriented focus. When international students express and acknowledge their opinions, their self-esteem increases, which may lead to greater interest in and engagement with different cultures.

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Primary Caregiver Competency in Nasogastric Tube Feeding: Effectiveness of A Video-Assisted Teaching Approach

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Abstract

Background: Nasogastric (NG) tube feeding is a critical skill for the competency development of primary caregivers (PCGs) of neurology and neurosurgery patients, as it helps prevent feeding-related complications. Discharge data from our institution indicate that nearly 40% of patients with neurological disorders are sent home with a feeding tube. This study aimed to evaluate the effectiveness of a video-assisted teaching (VAT) program on the competency development of PCGs regarding NG tube feeding.

Methods: A quasi-experimental research design was employed. A total of 50 PCGs from neurology and neurosurgery wards were recruited using purposive sampling. Baseline (pre-test) assessment was conducted on day zero using a structured knowledge questionnaire (five domains) and an observation checklist (eight items) to assess competency in terms of knowledge and practice. The VAT intervention was delivered on a one-to-one basis. Immediate post-test I was conducted following the intervention, and post-test II was conducted two weeks later. Satisfaction with the VAT program was also assessed.

Results: There was a statistically significant improvement in mean knowledge and practice scores across pre-test, immediate post-test I, and post-test II ($p = 0.001$), indicating enhanced competency. A moderate positive correlation between knowledge and practice was observed at all three time points ($r = 0.473, 0.455, \text{ and } 0.477$; $p < 0.05$). All the participants were highly satisfied with the VAT program and its content.

Conclusion: The VAT program was effective in promoting the competency of primary caregivers in NG tube feeding, improving both knowledge and skills.

Keywords: Nasogastric tube feeding, Video-assisted teaching, Competency development, Primary caregivers, Knowledge, Practice, Satisfaction.

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Introduction

A Nasogastric (NG) tube is a medical device inserted through the nose into the stomach to provide enteral nutrition to patients who are unable to consume food orally.¹ NG tube feeding is essential in the management of patients with reduced oral intake, neurological disorders, mechanical dysphagia, gastrointestinal dysfunction, and critical illness.² There is a high global prevalence of NG tube feeding with over 790,000 tubes inserted annually in the year 2016.³ and according to the American Society of Parenteral and Enteral Nutrition (ASPEN), in year 2009 over 245,000 patients annually require at least a temporary feeding tube during a hospital stay, with nearly 31,000 patients receiving enteral nutrition at home.⁴ Unpublished discharge data from our hospital indicate that nearly 40% of patients in neurology settings are discharged with an NG tube, requiring ongoing care at home. Inadequate knowledge and improper techniques may lead to serious complications such as aspiration pneumonia.⁵ A study conducted in India found that nearly half (46%) of the caregivers demonstrated suboptimal satisfactory practices in NG tube care.⁶ Another study among caregivers of older adults receiving NG tube feeding reported a pre-test mean knowledge score of 42%, indicating suboptimal knowledge levels.⁷ Likewise practice scores were unsatisfactory among caregivers (55%) in a study involving 233 caregivers.⁸ In this context, primary caregivers (PCGs) play a vital role in ensuring safe and effective feeding practices. They are expected to understand the nutritional needs of the patient, provide emotional support, communicate effectively with healthcare providers, and report any complications promptly.⁹ In addition, caregivers must possess basic nursing knowledge and practical skills to ensure safe and effective care at home. Therefore, the competency development of primary caregivers, including both knowledge and practical skills related to NG tube feeding, is essential to prevent complications and improve patient

outcomes.^{10,11} Structured education and nursing guidance have been shown to enhance caregiver performance, ensure adherence to care protocols, and reduce healthcare costs associated with preventable complications.^{12,13}

Video-assisted teaching (VAT) is an effective educational strategy that facilitates learning through visual demonstration and repetition. It enables caregivers to better understand procedures and retain information, thereby improving their confidence and performance.¹⁴

This study aimed to assess effectiveness of VAT programs on PCGs' knowledge and practices regarding NG tube feeding. Additionally, satisfaction of the PCGs with the intervention was also assessed.

Methodology

Study Approach and Design

The study adopted a quantitative research approach using a quasi-experimental one-group pre-test-post-test design. It was conducted in the neurology and neurosurgery wards of a tertiary hospital of Delhi, India. The rationale for selecting the setting is feasibility and availability of subjects. The study population comprised PCGs of patients receiving NG tube feeding. Fifty PCGs were selected using purposive sampling. The inclusion criteria were caregivers aged ≥ 18 years, providing care for at least 8 hours per day, and caring for a patient with an NG tube for more than two weeks. Caregivers without access to a smartphone or those unable to communicate effectively were excluded from the study.

Development and validation of the Video on NG tube feeding

A 19-minute instructional video on NG tube feeding was developed as part of the intervention. The content was developed through a review of current literature and underwent content validation by experts, including two physicians, three nursing faculty, and two clinical nurses, each with at least five

years of experience in their field. The initial version of the video script was evaluated by these experts for relevance and appropriateness, followed by a second round of validation. Their suggestions, such as using household cups to measure feed, were incorporated to improve clarity and comprehensiveness, resulting in the final version of the video. The video covered five key areas: general information on NG tube feeding, pre-procedure preparation, procedural care, post-procedure care, and troubleshooting of common problems. To improve accessibility, the video was made available in both Hindi and English.

Data Collection

Participants' socio-demographic characteristics were recorded. Knowledge was evaluated using a structured questionnaire comprising 25 items across five domains, while practice was assessed using an 8-item observational checklist. Knowledge scores were categorized as adequate (19–25), moderately adequate (13–18), and inadequate (0–12). Practice scores were interpreted as adequate (>6), moderately adequate (4–6), and inadequate (<4).

The VAT session, lasting approximately 45 minutes, was delivered individually to each participant. This was followed by a return demonstration session where the researcher guided the participant through the steps of the procedure and provided immediate feedback. Participants were then provided with the video and instructed to review it at least twice daily or as needed. A pre-test was conducted prior to the intervention. Immediate post-test I was administered following the intervention to assess changes in knowledge and practice. A follow-up post-test II was conducted after 14 days to assess retention of knowledge and practice.

Caregiver satisfaction with the VAT program was assessed at post-test II using a structured satisfaction questionnaire with five questions on a three-point Likert scale (1 = not satisfied to 3 = highly satisfied). The score ranged from 5 to 25. A score below 15 was deemed not satisfied and more than 20 as highly satisfied.

Content validity of the tools was established by a panel of seven experts. Reliability was assessed using the split-half method for the knowledge questionnaire and inter-rater reliability for the practice checklist, evaluated by three clinical nurses with more than five years of experience.

Ethical approval was obtained from the Institutional Ethics Committee (IEC Ref No.: IECPG-182/23.03.2023). Written informed consent was obtained from all participants, and confidentiality was maintained throughout the study. The study was registered with the Clinical Trial Registry of India (CTRI/2023/06/054018). Data collection was carried out from 01 September 2023 to 28 November 2023.

Data Analysis

Data were analysed using IBM SPSS Version 26. Normality of data was checked by Shapiro-Wilk test and found normally distributed. Descriptive statistics like frequency, percentage, mean, Standard Deviation (SD) was used and inferential statistics like Chi Square/Fisher exact test for categorical data, Karl Pearson's correlation coefficient for correlation was used. Repeated Measure Analysis of Variance (RM-ANOVA) for more than 2-point comparison to evaluate changes in knowledge and practice, checked with a significance level set at $p < 0.05$.

Results

A total of 72 participants were screened for eligibility, and 50 participants met the inclusion criteria. Pre-test was conducted for 50 PCGs then intervention was given and immediate post-test-I was conducted on day zero to assess knowledge and practice. After 14 days post-test II was conducted for 38 PCGs.

Majority of PCGs were in the age group of 26 to 35 years, and around half of them (42%) were either son or daughter of the patient. Majority of them were males (74%), equal number of PCGs (62%) were married and residing in urban areas and more than half PCGs (62%) belong to the lower socioeconomic class. None of them had prior knowledge nor training regarding NG tube feeding before hospitalization (Table 1).

Description of Flow of Study

Figure 1

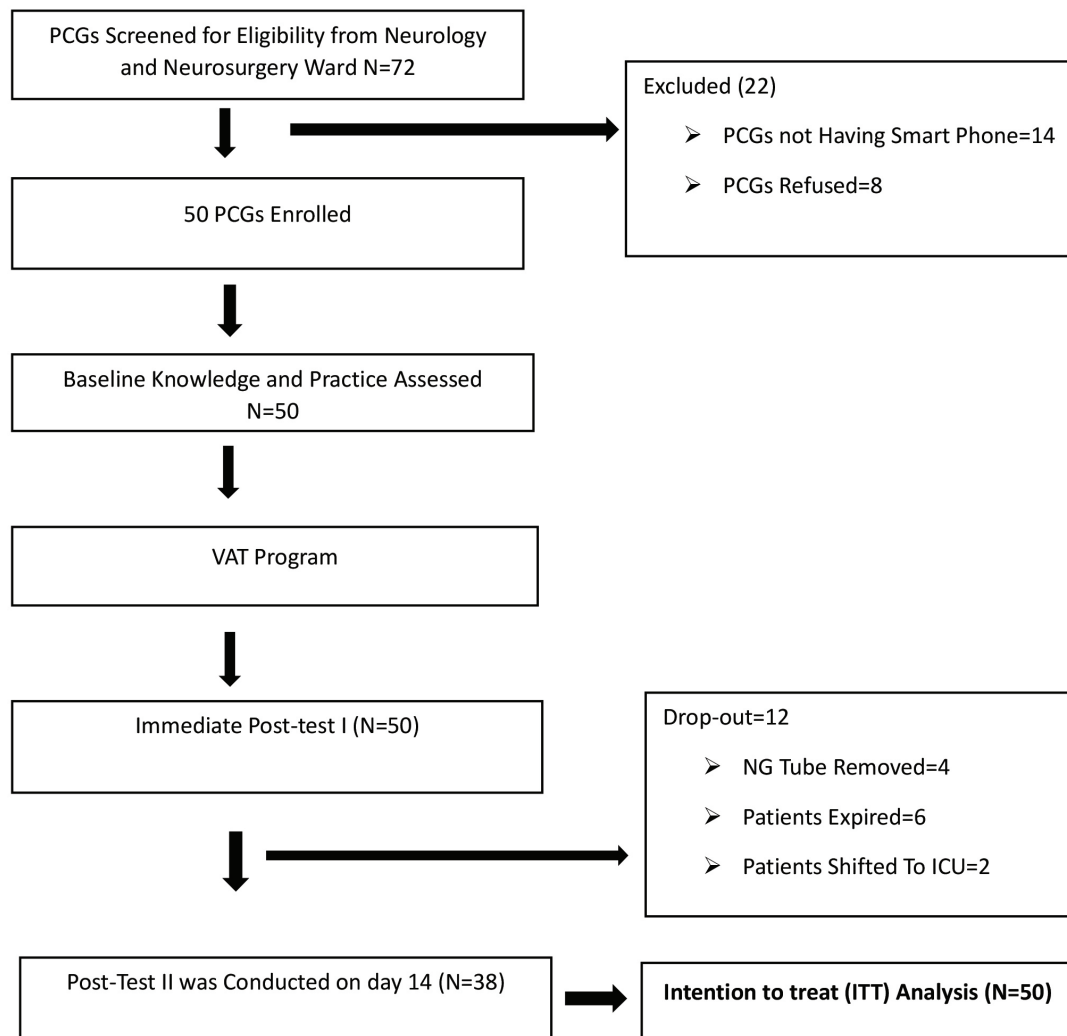


Figure 1: Diagrammatic presentation of data collection and data analysis.

Table No 1. Frequency & Percentage Distribution of Socio-Demographic Variables of the Primary Caregivers N=50

Demographic variables	Frequency (n)	Percentage (%)
1.Age (In years)		
18 yrs-25 yrs.	16	32.00
26 yrs-35 yrs.	21	42.00
36 yrs-45 yrs.	10	20.00

Continue....

2. Sex		
Male	37	74.00
Female	13	26.00
3. Relationship with patient		
Spouse	7	14.00
Sibling	13	26.00
Parents	6	12.00
Son/daughter	24	48.00
4. Caregiver's marital status		
Married	31	62.00
Unmarried	19	38.00
5. Habitat		
Rural	19	38.00
Urban	31	62.00
6. Socioeconomic class		
Upper (I)	1	2.00
Upper middle (II)	2	4.00
Lower middle (III)	9	18.00
Upper lower (IV)	31	62.00
Lower (V)	7	14.00
7. Self-health status		
Healthy	48	96.00
Any chronic illness	2	4.00
8. Prior training on NG Tube feeding (Before hospitalization)		
Yes	0	00.00
No	50	100
9. Prior knowledge on NG Tube feeding (Before hospitalization)		
Yes	0	00.00
No	50	100

The comparison of caregiver knowledge on NG Tube feeding across five domains revealed that there was a significant increase in knowledge in

all domains from pre-test to both immediate post-tests I and post-test II. The $p < 0.001$ indicates this improvement is statistically significant. (Table No 2)

Table No 2. Domain Wise Comparison of Knowledge of Primary Caregivers regarding Nasogastric Tube Feeding. N=50

Domains		Pre-test (Mean $\pm$ SD)	Immediate Post-test I (Mean $\pm$ SD)	post-test-II (Mean $\pm$ SD)	F value	p value
1	General knowledge of NG Tube feeding	1.86 $\pm$ 1.21	4.62 $\pm$.69	4.86 $\pm$.40	201.80	>0.001
2	Pre-procedure knowledge assessment	2.30 $\pm$.81	4.88 $\pm$.38	4.92 $\pm$.34	361.19	>0.001
3	Procedural care Knowledge assessment	1.68 $\pm$.99	4.56 $\pm$.76	4.54 $\pm$.83	229.29	>0.001
4	Post-procedure Knowledge assessment	2.14 $\pm$.75	3.84 $\pm$.71	3.82 $\pm$.82	62.51	>0.001
5	Knowledge assessment to troubleshooting common problems	1.18 $\pm$ 1.15	4.30 $\pm$.99	4.26 $\pm$.96	173.44	>0.001
^d Repeated Measures ANOVA with Bonferroni correction, *- Significance at $p < 0.05$						

The mean pre-test Knowledge score of PCGs. In the pre-test, it was moderately adequate with a mean score of 9.16 ± 3.00 in PCGs. While in the post-test I and II mean practice score was significantly increased to adequate in almost in all PCGs with the mean score 22.20 ± 1.99 and 22.44 ± 2.05 respectively.

The differences in mean score of Knowledge at the three time points were compared using RM-ANOVA with Bonferroni correction. The difference in mean practice score at was found to be statistically significant ($p=.001$) at <0.05 level of significance. (Table- 3)

Table No. 3. Comparison of Mean Knowledge Scores at Pre-test, Immediate Post-test I, and Post-test II N=50

Variable	Pre-test (Mean $\pm$ SD)	Immediate Post-test I (Mean $\pm$ SD)	post-test-II (Mean $\pm$ SD)	F value	p value
Knowledge score Min-max=0-25	9.16 $\pm$ 3.00	22.20 $\pm$ 1.99	22.44 $\pm$ 2.05	450.43	.001 ^{d*}
	Pre-test Vs Imme. Post-test-1		Pre-test Vs post-test-2	Imme. Post-test-1 Vs post-test-2	
Mean difference	-13.04{(-14.14) - (-11.93)}		-13.28 {(-14.37) - (12.18)}	-.24 {(-.21) - (.69)}	
SE	.44		.44	.18	
<i>p</i> value	.001 ^{d*}		.001 ^{d*}	.59 ^d	
^d Repeated Measures ANOVA with Bonferroni correction, *- Significance at <i>p</i> <0.05					

Table 4 shows the frequency and percentage distribution of practice of PCGs in 8 stepwise items. During the pre-test, most of the PCGs (94%) were able to prepare the patient for feeding while most of them failed to check the NG tube placement

prior to feeding. In the Immediate post-test I and post-test II after the percentage increased significantly in all items except for item no.6, which already had satisfactory practice during the pretest. It shows that practice was sustained in post-test II as well. (Table. 4)

Table No. 4. Frequency & Percentage Distribution Stepwise Practice Score of Primary Caregivers on Nasogastric Tube Feeding Patient. N=50

Stepwise Practice Items	Pre test		Immediate Post-test I		Post-test II	
	Correct Practice f (%)	Incorrect Practice f (%)	Correct Practice f (%)	Incorrect Practice f (%)	Correct Practice f (%)	Incorrect Practice f (%)
1. Performs hand hygiene	27 (54.00)	23(46.00)	49 (98.00)	1 (2.00)	50 (100)	0 (00.00)
2. Gets ready articles for NG Tube feeding	33 (66.00)	17(34.00)	49 (98.00)	1 (2.00)	50 (100)	0 (00.00)
3.Prepare the patient	41(82.00)	09 (18)	49 (98.00)	1 (2.00)	49 (98.00)	1 (02.00)
4. Checks the tube position	0 (00.00)	50 (100)	49 (98.00)	1 (2.00)	49 (100)	1 (02.00)
5.Aspirates the gastric content	04 (8.00)	46(92.00)	43 (86.00)	7 (14.00)	48 (96.00)	2 (04.00)
6. Prepares the patient to feed	04 (94.00)	03 (6.00)	48 (96.00)	2 (4.00)	45 (90.00)	5 (10.00)
7. Gives the feed	33 (66.00)	17 (34)	43 (86.00)	7(14.00)	46 (92.00)	4 (08.00)
8.Gives medication (If applicable)	30 (60.00)	20 (40)	45 (90.00)	5 (10.00)	47 (94.00)	3 (06.00)

The mean pre-test practice score of knowledge of PCGs in the pre-test was moderately adequate with a mean score of 4.33 in PCGs. In the post-test I and II mean practice score was significantly increased to

“adequate” in almost all PCGs with the mean score 7.18 and 7.87 respectively. The difference in mean practice score at the three time points was found to be statistically significant ($p=.001$) at <0.05 level of significance. (Table. 5)

Table 5. Comparison of Mean Practice Scores at Pre-test, Immediate Post-test I, and Post-test II N=50

Variable	Pre-test (Mean $\pm$ SD)	Immediate Post-test I (Mean $\pm$ SD)	post -test-II (Mean $\pm$ SD)	F value	p value
Practice Scoring range possible Min-Max (0-8)	4.33 $\pm$ 1.30	7.18 $\pm$ 0.87	7.87 $\pm$.34	175.02	.001 ^{d*}

Continue....

Mean difference	-2.80 {(-3.28) (-2.31)}	-3.26 {(-3.79) (-2.72)}	-.46 {(.15) (.76)}
SE	.19	.21	.12
<i>p</i> value	.001 ^{d*}	.001 ^{d*}	.001 ^{d*}
Mean difference	-2.80 {(-3.28) (-2.31)}	-3.26 {(-3.79) (-2.72)}	-.46 {(.15) (.76)}

^d-Repeated Measures ANOVA with Bonferroni correction, *- Significance at $p < 0.05$

The correlation was assessed between knowledge and practice scores at pre-test, immediate post-test I and post-test II respectively in all PCGs. The

result showed a moderate positive relationship in knowledge and practice with the r values 0.473, 0.455, 0.477 respectively at p -value < 0.05 . (Figure: 2)

Figure-2

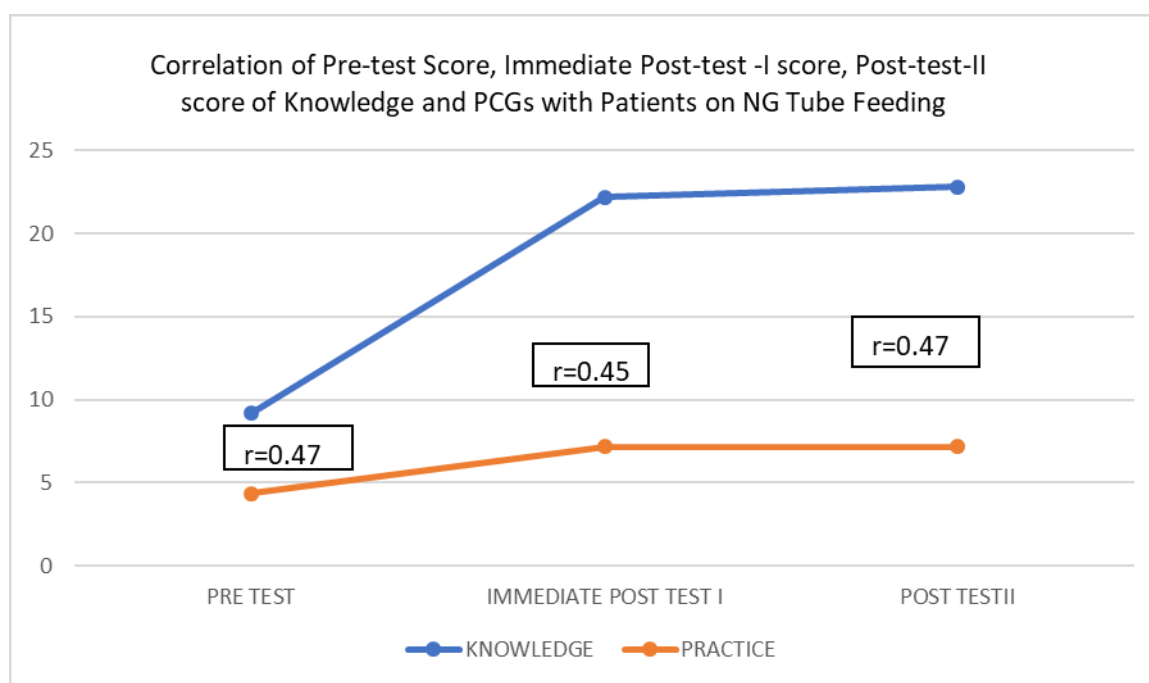


Figure-2: Correlation of Pre-test Score, Immediate Post-test -I score, Post-test-II score of Knowledge and PCGs with Patients on NG Tube Feeding

Satisfaction-Most of the participants were highly satisfied with the intervention with a mean score of 23.55 ± 0.68 out of 25 with all PCGs (100%) reported highly satisfied.

Discussion

Competency building of caregivers of patients admitted in hospitals is essential to reduce risk of readmissions and emergency hospital

visits. Hospitalization provides that window of opportunity for skill and confidence building under the supervision of health care providers. Various education modalities have been used to build competency of caregivers with variable effectiveness.¹² In this study, around half of the PCGs (42%) were aged 26-35 years, with 48% being the son or daughter of the patient. The majority (74%) were male and belonged to the lower-middle

socioeconomic class.¹⁵ These findings are consistent with study done by StephenDet al. (2026)³, Kun SS et al. (2010)¹⁶ and Chao YC et al. (2021)¹⁷, which highlighted similar age distributions and male predominance among PCGs. However, the findings contrast with Ismailoglu E et al. (2021)¹⁸, who reported that most caregivers were spouses or children. As most of the patients were males (74%), it is expected that the female spouse would be the primary caregiver. However, our hospital being a tertiary referral, patients need to travel from far off places seeking specialized healthcare such as neurology or neurosurgery and this may have influenced the decision to have a male attendant to travel with and attend to the patient's needs which may involve lifting and mobilizing etc. The present study also found that socio-economic class was the only demographic variable significantly associated with the baseline knowledge score, echoing findings from previous research.³

The effectiveness of the VAT program was evident in the significant improvements in knowledge and practice scores. The highest percentage gain in knowledge was observed in troubleshooting common NG tube problems. These improvements align with findings from Subhashini L et al. (2018)¹⁹ and Kwok MWS et al. (2015)¹², who reported significant increases in knowledge and practice after video-based education. The retention of knowledge in the second post-test done after 14 days further supports the VAT program's effectiveness. Similar result was reported by Mei-Ju Chen et al. (2022)²⁰, among caregivers of elderly who received multimedia instruction including video for NG tube feeding. In contrast, Carpenter et al. (2015)²¹ who evaluated the effect of video-based teaching for inhaler use among children did not find any significant difference one month later. In our study the video was made available to the PCGs for repeated viewing; the cohort were adults; and the timing of post-test II was shorter, and all these factors may explain the contrasting result.

The study also explored the correlation between knowledge and practice regarding NG tube feeding. A significant medium positive correlation

was found between knowledge and practice, with *r-values* of 0.473, 0.455, and 0.477, respectively. This correlation is consistent with findings by ZhengS et al. (2021)²² but contrasts with AM Sheela S et al. (2010),²³ who reported a stronger correlation between knowledge and practice. The PCGs who received the intervention may have been influenced by existing practices of other caregivers at the hospital. Also, the short duration of 14 days may not be sufficient to translate gained knowledge into proficient practice.

Regarding the level of satisfaction with the VAT program, all the PCGs reported highly satisfied. This high level of satisfaction aligns with the study by YC Chao et al. (2021)¹⁷ where nursing students were highly satisfied with innovative learning methods, including immersive and interactive videos. Similarly, Çevik L et al. (2024)²⁴ found that VAT increased satisfaction and decreased anxiety, further validating the effectiveness of such educational interventions.

The study assessed PCGs knowledge and practice through self-reporting, and practice was objectively verified in a face-to-face setting with patients. Enhanced VAT program was particularly effective in retaining knowledge and skills.

The study had few limitations: it was conducted at a single centre which limits the generalizability of the study. As it was a one-group study, the causality of the outcome is weak and cannot be entirely attributed to the intervention. The study can be replicated with a larger sample size, with a control group, with longer and more extensive follow-up periods to understand the long-term effects of VAT program.

Implications of the Study

Nursing Practice-Educating PCGs on NG tube feeding, including knowledge, practice, and preventive strategies, is essential to prevent serious complications like aspiration pneumonia. Institutional awareness programs using VAT program can be implemented to educate PCGs.

Nursing Education-Nursing educators should use VAT for PCGs to raise awareness about neurological deficits and the importance of proper care. In-service education programs for nurses can help update their knowledge and practices regarding NG tube feeding. Nursing students should be trained in best practices for NG tube feeding and assessing vulnerable groups. Nurse informatics services should be included in the curriculum to promote a high-tech, high-touch approach.

Conclusion

Patients with neurological deficits and swallowing difficulties are at high risk of developing aspiration pneumonia, a potentially fatal complication. PCGs play a crucial role in preventing these complications by gaining adequate knowledge and practice in NG tube feeding, which can be effectively imparted through VAT programs. The study demonstrated that regular use of VAT program significantly improved PCGs knowledge and practices related to NG tube feeding, and these improvements were sustained over two weeks. Utilizing VAT program via mobile devices and other platforms offers an accessible way for vulnerable populations to adopt best practices, regardless of their geographic location or socioeconomic status.

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Knowledge, Application and Challenges of Vocational Nursing Educators in Disaster Nursing Education in China: An Explanatory Sequential Mixed Methods Study

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Abstract

Objective: To explore the knowledge level, teaching application status, influencing factors and challenges of vocational nursing educators in disaster nursing education (DNE), and propose targeted improvement strategies.

Methods: An explanatory sequential mixed methods design was adopted. A total of 77 eligible nursing teachers from ademonstrativevocational collegein eastern China were surveyed using the Disaster Nursing Knowledge Test (DNKT) and Objective Structured Clinical Examination (OSCE). Fourteen teachers were selected via quartile-stratified sampling for semi-structured interviews.

Results: Participants had a moderate overall DNE knowledge score of 3.61 ± 0.57 (out of 5), and a low average OSCE score of 67.9 ± 12.8 (out of 100). Knowledge level was significantly positively correlated with teaching application ($r=0.672$, $p<0.001$). Teaching age, professional title, DNE training experience and disaster emergency experience were significant influencing factors (all $p<0.05$). Post-hoc comparisons showed that teachers with ≥ 9 years of teaching experience scored 22.7% higher than those with ≤ 3 years ($MD=0.73$, 95% CI: 0.41-1.05, $p<0.001$). The main challenges included shortage of teaching resources, class hour and system constraints, insufficient personal capacity, and disconnection between teaching and clinical practice.

Conclusions: Vocational nursing educators have an unbalanced knowledge structure regarding DNE and only limited ability to apply that knowledge. To improve DNE quality in vocational colleges, targeted interventions are needed in the areas of resource support, system optimization, and capacity building.

Key Words: Vocational nursing teachers, Disaster nursing education, Knowledge level, Teaching application, Mixed methods research

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Introduction

Each year, natural disasters and man-made crises impact more than 2 billion people worldwide¹. In disaster settings, nurses make up 80% of frontline healthcare responders. Globally, about 60% of the total nursing workforce comes from vocational nursing institutions, which are especially important for primary healthcare and disaster response in resource-poor regions². However, a 2023 report from the International Council of Nurses (ICN) shows that only 38% of vocational nursing institutions globally offer systematic DNE programs, and in low- and middle-income countries (LMICs) this figure drops to 22%. This global deficiency in DNE is recognized as a major barrier to effective disaster response, because nurses who are not adequately trained cannot deliver safe and competent care during emergencies.

China is one of the countries most prone to disasters, experiencing on average 1,300 natural events each year that affect more than 200 million people. After the 2008 Wenchuan earthquake, China accelerated its development of DNE policies. The National Health Commission now explicitly requires DNE to be integrated into core nursing competency training at all educational levels³. Nevertheless, implementation is inconsistent: only 102 Chinese colleges and universities offer DNE-related courses, and vocational colleges account for less than 30% of these⁴. DNE in Chinese vocational colleges is marked by fragmented curricula, insufficient teaching materials, and a serious disconnection between what is taught and clinical reality.

While vocational nursing educators play a vital role in shaping the disaster response skills of frontline nurses, most existing DNE research focuses on undergraduate nursing students or clinical nurses. A 2024 bibliometric analysis found that only 7% of DNE studies target vocational nursing educators, with most being descriptive cross-sectional surveys^{5,6}. Critical knowledge gaps persist: there is limited understanding of the specific knowledge structure required for vocational DNE teaching, the mechanisms underlying the transformation from knowledge mastery to teaching application, and the multi-dimensional barriers faced by educators

in resource-constrained vocational settings. No mixed-methods studies have systematically explored these issues using a theoretical framework to guide analysis. This study constructs an analytical system of “core framework and multi-theoretical supplementation”, taking Benner’s Novice-Expert Theory⁷ and Bandura’s Social Cognitive Theory⁸ as the core guiding frameworks, while integrating multidisciplinary perspectives including Institutional Theory, Human Capital Theory, Resource Dependence Theory, Organizational Inertia Theory and Humanistic Care Education Theory. It adopts an explanatory sequential mixed methods design to quantify the disaster nursing education (DNE) knowledge level and teaching application ability of vocational nursing educators in China, systematically explore the causes of gaps at the individual, organizational and institutional levels, and provide evidence-based recommendations for improving the quality of DNE in vocational colleges.

Method

Study Design

An explanatory sequential mixed methods design was employed, consisting of three distinct, sequential phases (Figure 1): (1) Quantitative phase: A census was conducted to assess DNE knowledge levels and teaching application abilities using standardized instruments; (2) Qualitative phase: Semi-structured interviews were conducted with a stratified purposive sample to explore the contextual factors and underlying causes of the quantitative findings; (3) Integration phase: Quantitative and qualitative data were synthesized using a joint display matrix to generate comprehensive meta-inferences.

This study employed a multi-theoretical analytical approach. Benner’s Novice-Expert Theory⁷ and Bandura’s Social Cognitive Theory⁸ served as the core frameworks guiding instrument development and sampling. Additional theories including Institutional Theory, Human Capital Theory, Resource Dependence Theory, Organizational Inertia Theory and Humanistic Care Education Theory were used to interpret findings at organizational and institutional levels during the discussion phase.

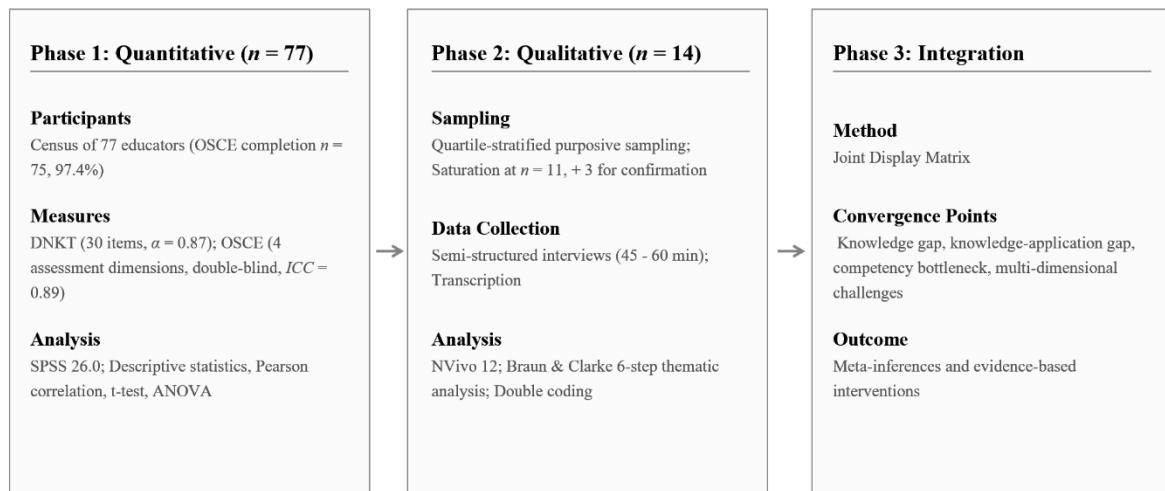


Figure 1: Explanatory Sequential Mixed Methods Design for Disaster Nursing Education (DNE) Research

Study Setting and Time Period

The study was conducted at a provincial demonstrative vocational nursing college in eastern China, which has been offering nursing education for over 100 years. It runs a three-year diploma program in nursing; within the first-aid nursing course, there is a four-hour module on disaster nursing. The college was selected as it represents typical vocational nursing education conditions in eastern China, with moderate levels of teaching resources and DNE development, making its findings generalizable to similar institutions nationwide. Data collection occurred from January 2026 to April 2026.

Tools Utilized and Sampling

Quantitative sampling

A census method was used, including all 77 eligible nursing teachers from the college. Inclusion criteria: (1) Hold a valid Chinese nurse practicing certificate; (2) Formally employed by the college for ≥ 1 year; (3) Undertake core nursing teaching tasks; (4) Have taught DNE-related content in the past 3 years; (5) Voluntarily participate in the study and sign written informed consent. Exclusion criteria: (1) Non-nursing professional teachers; (2) Personnel engaged solely in administrative work; (3) Short-term seconded or temporary staff; (4) Teachers on leave during the study period.

Qualitative sampling

Fourteen teachers were selected via quartile-stratified purposive sampling based on their DNKT and OSCE scores. Participants were divided into four mutually exclusive groups: high knowledge-high application ($n=3$), high knowledge-low application ($n=4$), low knowledge-high application ($n=3$), and low knowledge-low application ($n=4$). This sampling strategy ensured maximum variation in participant characteristics, allowing for exploration of differences between groups. Information saturation was achieved at the 11th interview, with 3 additional interviews conducted to confirm saturation and ensure no new themes emerged.

Research Tools

Revised Disaster Nursing Knowledge Test (DNKT)

Originally developed by Li (2013)⁹, the scale was revised for vocational nursing educators following standard procedures. A panel of 5 experts (3 nursing education professors, 2 disaster nursing clinical specialists) reviewed and revised items to align with the 2022 ICN Disaster Nursing Core Competency Framework¹⁰ and the National Nursing Career Development Plan (2021-2025). It comprises three dimensions: contextual knowledge (10 items, e.g., disaster management

policies, disaster epidemiology), technical knowledge (10 items, e.g., triage, trauma care), and integrated knowledge (10 items, e.g., curriculum design, interdisciplinary collaboration). Items are rated on a five-point Likert scale (1 = completely not mastered, 5 = completely mastered). Pre-testing with 20 nursing teachers showed good psychometric properties: overall *Cronbach's a* = 0.87, *KMO* = 0.84, and *S-CVI/Ave* = 0.95. Scoring benchmarks: 1.0–2.5 = Low (insufficient knowledge to teach basic DNE content); 2.6–3.5 = Moderate-low (can teach basic technical skills but lacks contextual/integrated knowledge); 3.6–4.5 = Moderate (can teach most DNE content but has gaps in advanced competencies); 4.6–5.0 = High (comprehensive knowledge to design advanced DNE programs).

Objective Structured Clinical Examination (OSCE)

We designed a single-station OSCE specifically to assess DNE teaching application ability. Teachers had to deliver a ten-minute teaching demonstration on “haemostasis and bandaging techniques at disaster sites” to three standardized nursing students, followed by answering three pre-set questions about teaching design and clinical relevance. The assessment covered four dimensions: clarity of teaching objectives (25 points), accuracy of operation demonstration (30 points), effectiveness of interactive guidance (25 points), and integration of humanistic care (20 points). Two trained experts scored the demonstrations independently and in a double-blind manner; the intraclass correlation coefficient (ICC) for the formal assessment was 0.89. Scoring benchmarks: <60 = Fail (cannot teach DNE effectively); 60–70 = Borderline Pass (meets minimum requirements but has major weaknesses in teaching design); 71–85 = Good (can teach DNE effectively using appropriate methods); 86–100 = Excellent (exemplary teaching that integrates technical skills and humanistic care).

Semi-structured Interview Outline

The interview guide was developed based on the research aims and pre-interviews with three nursing teachers. It contained five core questions: (1) What core content do you mainly teach in your DNE-related classes? (2) Which aspect of DNE knowledge do you master best, and which do you find most challenging? (3) How do you apply your DNE knowledge in your teaching practice? (4) What are the biggest challenges you face when teaching DNE? (5) What kind of support would you like to receive from the college or the government to improve your DNE teaching?

Data Collection Process

Quantitative data were collected in two stages. First, the DNKT questionnaire was administered online via a dedicated platform during a faculty meeting. Second, OSCE assessments were conducted over a 3-day period in the college's simulation lab. Two invalid OSCE forms were excluded due to incomplete scoring, resulting in 75 valid cases for the OSCE analysis.

Qualitative interviews were conducted within 2 weeks of the quantitative assessments. Interviews were held in a private office at the college to ensure confidentiality. Each interview lasted 45–60 minutes and was audio-recorded with the participant's written consent. Interviews were transcribed verbatim within 24 hours, and all identifying information was removed to ensure anonymity.

The study was approved by the Ethics Committee of the participating vocational college (Approval No.: WFNVC-IRB-2026001) and strictly followed the principles of the Declaration of Helsinki. All participants provided written informed consent, and were informed of their right to withdraw from the study at any time without penalty. Data were stored on password-protected servers accessible only to the research team, and will be destroyed after 5 years.

Data Analysis

Quantitative data were analyzed using SPSS26.0. Shapiro-Wilk and Levene tests confirmed normality

and homogeneity of variances for all variables (all $p > 0.05$). Descriptive statistics (mean, SD, frequency, percentage) summarized participant characteristics and scores. Pearson correlation, independent samples t-test, and one-way ANOVA were used for inferential analysis ($\alpha = 0.05$). Tukey's HSD test was applied for post-hoc comparisons.

Qualitative data were analyzed using NVivo12 following Braun & Clarke's thematic analysis¹¹. Two researchers coded transcripts independently, with discrepancies resolved via consensus. The inter-coder reliability Kappa coefficient was 0.85 (substantial agreement).

Mixed Methods Integration Analysis: A joint display matrix was constructed in three steps to integrate findings: (1) Extract key quantitative results and core qualitative themes; (2) Map each

theme to corresponding quantitative findings; (3) Generate meta-inferences by identifying convergence and divergence between datasets. Discrepancies were resolved through raw data review and team discussion until consensus was reached.

Results

Quantitative Research Results

Differences in DNE Knowledge Scores by Demographic Characteristics

Teaching age, professional title, DNE training experience and disaster emergency experience had significant positive effects on overall DNE knowledge scores (all $p < 0.05$), while age and educational background showed no significant effects (Table 1). Detailed post-hoc comparisons are presented in Table 2.

Table 1. Demographic Characteristics of Nursing Educators and DNE Knowledge Scores by Different Characteristics ($n=77$)

Characteristics	Categories	Number (n)	Percentage (%)	Knowledge Score (Mean $\pm$ SD)	Test Value (t/F)	p
Gender	Female	68	88.3	3.59 ± 0.58	-0.872 (t)	0.354
	Male	9	11.7	3.78 ± 0.49		
Age	≤ 35 years old	38	49.4	3.52 ± 0.61	1.874 (F)	0.161
	36-45 years old	25	32.4	3.65 ± 0.52		
	≥ 46 years old	14	18.2	3.79 ± 0.54		
Teaching Experience	≤ 3 years	18	23.4	3.22 ± 0.60	21.357 (F)	< 0.001
	4-8 years	33	42.9	3.58 ± 0.53		
	≥ 9 years	26	33.7	3.95 ± 0.45		
Educational Background	Bachelor's Degree	45	58.4	3.57 ± 0.59	1.026 (F)	0.364
	Master's Degree	30	39.0	3.66 ± 0.54		
	Doctoral Degree	2	2.6	3.85 ± 0.32		

Continue....

Professional Title	Assistant Lecturer/ Lecturer	53	68.8	3.42 ± 0.54	-4.493 (<i>t</i>)	< 0.001
	Associate Professor/ Professor	24	31.2	3.98 ± 0.47		
DNE Training Experience	Yes	28	36.4	3.92 ± 0.50	3.970 (<i>t</i>)	< 0.001
	No	49	63.6	3.43 ± 0.56		
Disaster Emergency Experience	Yes	22	28.6	4.01 ± 0.43	4.959 (<i>t</i>)	< 0.001
	No	55	71.4	3.45 ± 0.54		

Note: Independent sample *t*-test was used for binary data, and one-way analysis of variance (ANOVA) was used for multi-class ordered data. The significance level was set at $\alpha = 0.05$.

Table 2. Post-hoc Comparisons of DNE Knowledge Scores by Significant Demographic Characteristics (Tukey's HSD Test)

Characteristic	Comparison Groups	Mean Difference	95% CI	p
Teaching Experience	≥ 9 years vs 4-8 years	0.37	0.05-0.69	0.012
	≥ 9 years vs ≤ 3 years	0.73	0.41-1.05	< 0.001
	4-8 years vs ≤ 3 years	0.36	0.04-0.68	0.018
Professional Title	Associate Professor/Professor vs Assistant Lecturer/Lecturer	0.56	0.31-0.81	< 0.001
DNE Training Experience	Yes vs No	0.49	0.24-0.74	< 0.001
Disaster Emergency Experience	Yes vs No	0.56	0.31-0.81	< 0.001

DNE Knowledge Level Status

Presented in table 3, the overall DNE knowledge score was 3.61 ± 0.57 , at a moderate level. Dimension scores from high to low were: technical

knowledge (4.08 ± 0.61), contextual knowledge (3.54 ± 0.63), and integrated knowledge (3.17 ± 0.73). The full-score rate of integrated knowledge was only 11.7%, indicating severe deficiency in expert-level competencies.

Table 3. Scores of Each Dimension of DNE Knowledge Level of Nursing Educators

Knowledge Dimensions	Mean $\pm$ Standard Deviation	Score Range	Full Score Rate (%)	Dimension Ranking
Technical Knowledge	4.08 ± 0.61	1.9-5.0	34.9	1
Contextual knowledge	3.54 ± 0.63	1.6-4.7	17.8	2
Integrated Knowledge	3.17 ± 0.73	1.3-4.5	11.7	3
Total Knowledge	3.61 ± 0.57	1.7-4.6	20.8	-

Note: Full score rate = (Number of teachers who scored 5 points under the 5-point system / Total number of people) $\times$ 100%

DNE Teaching Application Status

As shown in table 4, the average OSCE score was 67.9 ± 12.8 , indicating low teaching application ability. Dimension scores from high to low were: operation demonstration accuracy (74.8 ± 11.0), teaching objective clarity (68.7 ± 11.5), interactive

guidance effectiveness (64.9 ± 13.5), and humanistic care integration (60.3 ± 14.8). Of the 75 valid participants, only 26.7% ($n = 20$) could systematically integrate psychological support for disaster victims into teaching, and 31.3% ($n = 23$) could not effectively answer students' questions about the connection between teaching content and future employment.

Table 4. DNE Teaching Application Status of Nursing Educators (OSCE Results)

OSCE Assessment Dimensions	Mean $\pm$ Standard Deviation	Score Range
Clarity of Teaching Objectives	68.7 ± 11.5	42.0–90.0
Accuracy of Operational Demonstration	74.8 ± 11.0	48.0–95.0
Effectiveness of Interactive Guidance	64.9 ± 13.5	35.0–88.0
Integration of Humanistic Care	60.3 ± 14.8	30.0–85.0
Overall Application Score	67.9 ± 12.8	40.0–92.0

Note: 2 invalid data were excluded from the OSCE test, and 75 cases were finally included in the statistics.

Correlation Between Knowledge Level and Teaching Application

DNE knowledge total score was significantly positively correlated with OSCE score ($r = 0.672$, $p < 0.001$), indicating that higher knowledge levels were associated with better teaching application abilities. All three knowledge dimensions were also significantly positively correlated with OSCE score: technical knowledge had the highest correlation ($r = 0.713$, $p < 0.001$), followed by integrated knowledge ($r = 0.648$, $p < 0.001$), and contextual knowledge had the lowest correlation ($r = 0.589$, $p < 0.001$), with detailed results presented in Table 5.

Table 5. Correlation Analysis Between Knowledge Level and Teaching Application ($n=75$)

Variables	Teaching Application Score (OSCE)
Total Knowledge Level	$r = 0.672$, $p < 0.001$
Contextual knowledge	$r = 0.589$, $p < 0.001$
Technical Knowledge	$r = 0.713$, $p < 0.001$
Integrated Knowledge	$r = 0.648$, $p < 0.001$

Qualitative Research Results

Thematic Coding Process

We followed a four-level hierarchical coding process: Significant Statements (raw data) $\rightarrow$ Formulated Meaning (initial coding) $\rightarrow$ Theme Clusters (axial coding) $\rightarrow$ Emergent Themes (selective coding).

The final thematic structure is presented in Table 6. We identified four core challenge themes through thematic analysis, with representative quotes from participants across different groups:

Table 6. The Final Thematic Map

Main Themes	Sub-themes
Theme 1: Drivers of DNE Knowledge Structural Imbalance	Continuous Reinforcement Effect of Daily Teaching Structural Deficit in the Training System Incentive Orientation Deviation in Career Development

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Theme2: Barriers to Knowledge-Application Translation	Employment-oriented Assessment System Reduces Motivation Insufficient Teaching Resources Limit Diversified Teaching
Theme 3: Influence Path of Demographic Characteristics	Practical Accumulation Effect of Teaching Experience Knowledge Completion Effect of Specialized Training Missing Effect of Education and Age Caused by Homogenized Training
Theme 4: Four-Dimensional Interactive Challenge Framework	Insufficient Teaching Resources Institutional System Constraints Personal Competency Deficits Clinical-Education Disconnection

Detailed Theme Analysis

Theme 1: Drivers of DNE Knowledge Structural Imbalance

This theme explains why we saw a pattern of “strongest technical knowledge but weakest integrative knowledge” in the quantitative data.

“First-aid skills like hemostasis and bandaging are central to the Emergency Nursing course. We teach them every semester, practice them in skill competitions, and students are tested on them in clinical placements. I can teach these with my eyes closed now.” (P-03)

“All the DNE training I’ve attended in the past 5 years focused on first-aid operations. No one has ever taught me

how to design a systematic DNE curriculum or integrate disaster policies into teaching.” (P-09)

“Our college’s performance appraisal and title evaluation only count skill competition awards and clinical research papers. DNE curriculum design and teaching reform projects carry no weight at all. There is no motivation to spend time on them.” (P-05)

These responses show that the knowledge imbalance is not a matter of personal willingness but a structural outcome shaped by daily teaching practice, a training system that ignores integrative knowledge, and incentive mechanisms that do not reward it. This supports Benner’s Novice-Expert Theory, which argues that integrative competence develops only through cumulative practical experience in curriculum design and teaching reform.

Theme 2: Barriers to Knowledge-Application Translation

This theme explains the “high knowledge but low application” paradox seen in 15.6% of participants, as well as the complementary “low knowledge but high application” phenomenon.

“DNE is not in the nurse licensing exam syllabus, nor is it a core assessment point for student employment. The college does not care, and students are not interested. Even if I spend weeks designing a scenario-based course, it will not help my teaching evaluation or student employment” (P-07)

“I know all about mass casualty triage, but our college has no disaster simulation scenarios or equipment. I can only talk about it using PowerPoint. Students have no sensory experience, so I have to simplify it to basic theory lectures.” (P-11)

Two core barriers emerged: institutional assessment constraints and resource limitations. These act as critical boundary conditions that determine whether mastered knowledge can be turned into high-quality teaching.

Despite these barriers, educators in both high-high and low-high groups showed adaptive strategies. “I use cardboard boxes and medical models to build simple disaster scenarios in class. I also integrate DNE content into the first-aid knowledge points that appear in the nurse

licensing exam. This improves student acceptance and lowers the difficulty of implementation." (P-02)

"I do not have much systematic theoretical knowledge about DNE, but I focus on teaching the most practical skills that students will actually use in clinical practice. I collect real disaster cases from the news and use them in my classes." (P-14)

These adaptive approaches offer low-cost, practical solutions for improving DNE teaching under resource constraints.

Theme 3: Influence Path of Demographic Characteristics

This theme explains why certain demographic factors significantly affected DNE knowledge scores.

"I have participated three times in revising the college's Emergency Nursing syllabus and compiling textbooks. Through these practices, I gradually learned how to design DNE courses that fit vocational students' cognitive characteristics." (P-13)

"After taking part in provincial DNE training and the COVID-19 emergency response, I really understood the national disaster response system and the actual nursing needs during disasters. This is something you can never learn from textbooks." (P-04)

"All DNE training is the same basic technical training for everyone. My research background and experience give me no advantage. There is no advanced training for senior educators." (P-06)

Thus, teaching experience and professional title were the strongest predictors, with their influence coming mainly from practical engagement in curriculum design and teaching reform. Specialized DNE training and disaster emergency experience served as important accelerators. Education and age had no significant effect, which can be attributed to the homogenized, non-stratified training system that is common in the field.

Theme 4: Four-Dimensional Interactive Challenge Framework

This theme presents a systematic picture of the core challenges. All 14 participants reported insufficient teaching resources. Institutional system constraints

were mentioned by 12, personal competency deficits by 11, and clinical-education disconnection by 10.

"Our college has no disaster simulation lab, no specialized DNE textbooks, and no digital teaching resources. I can only use ten-year-old videos from the internet." (P-01)

"We only have four class hours allocated to DNE content in the entire Emergency Nursing course. I can barely finish the basic theory, let alone simulation training." (P-08)

"I know the basic first-aid skills, but I do not know how to design interdisciplinary DNE courses or integrate humanistic care into technical training." (P-10)

"I have never taken part in any actual disaster rescue. The clinical teachers in the hospital also lack disaster experience. There is no effective college-hospital cooperation mechanism for DNE." (P-12)

Participants stressed that these four challenges are not isolated; they form a closed-loop vicious cycle:

Institutional constraints → Marginalization of DNE in the curriculum → Insufficient resource investment → Difficulty in teaching implementation → low motivation to improve competence → Poor teaching outcomes → Further reduction in institutional support

This cycle explains the widespread "policy-practice disconnection" in DNE implementation across the country and highlights the need for interventions that address all four dimensions together.

Integrated Analysis

Using a joint display matrix, we integrated the quantitative and qualitative findings. The quantitative data showed an imbalanced DNE knowledge structure, low overall teaching application ability, a significant positive correlation between knowledge and application, and key influencing factors such as teaching experience and professional title. The qualitative data added explanations for the systemic causes of the knowledge imbalance, the barriers to translating knowledge into application, the mechanisms behind demographic differences, and the four-dimensional vicious cycle. Together, the integrated results confirm that DNE competency

development follows Benner's Novice-Expert Theory and that the observed gaps are structural outcomes shaped by institutional, resource, and training factors rather than individual deficits. This provides a clear evidence base for targeted improvement strategies (Table 7).

Table 7. Joint Display Matrix: Integration of Quantitative and Qualitative Findings for DNE Research

Qualitative Themes	Quantitative Results	Meta-Inferences & Theoretical Support
Theme 1: Drivers of DNE Knowledge Structural Imbalance	Overall DNE knowledge score: 3.61 ± 0.57 (moderate) Technical knowledge: 4.08 ± 0.61 (highest) Integrated knowledge: 3.17 ± 0.73 (lowest) Integrated knowledge full-score rate: 11.7%	Knowledge imbalance is a structural outcome shaped by daily teaching reinforcement, training system deficits and incentive misalignment, not personal willingness. This aligns with Benner's Novice-Expert Theory, which states that integrative competence requires long-term practical experience.
Theme 2: Barriers to Knowledge-Application Translation	DNE knowledge-application correlation: $r = 0.672, p < 0.001$ "High knowledge-low application" group: 15.6% Only 31.3% of teachers could link teaching to employment OSCE overall score: 67.9 ± 12.8 (low)	Knowledge is a necessary but not sufficient condition for effective teaching. Institutional assessment constraints and resource limitations act as critical boundary conditions that moderate the knowledge-application translation process. Adaptive teaching strategies can partially compensate for these barriers.
Theme 3: Influence Path of Demographic Characteristics	Teaching experience: ≥ 9 years vs ≤ 3 years, $MD = 0.73, p < 0.001$ Professional title: Associate Professor/Professor vs Lecturer, $MD = 0.56, p < 0.001$ DNE training experience: Yes vs No, $MD = 0.49, p < 0.001$ Disaster experience: Yes vs No, $MD = 0.56, p < 0.001$ Age and education: No significant effect (all $p > 0.05$)	DNE knowledge improvement relies primarily on practical accumulation in curriculum design and teaching reform, not age or educational background. The homogenized training system fails to leverage the advantages of highly educated educators.
Theme 4: Four-Dimensional Interactive Challenge Framework	Humanistic care integration score: 60.3 ± 14.8 (lowest OSCE dimension) Interactive guidance effectiveness score: 64.9 ± 13.5 (third OSCE dimension) Only 26.7% of teachers could systematically integrate psychological support into teaching	The four challenges form a closed-loop vicious cycle rooted in institutional assessment deviation. This cycle explains the widespread "policy-practice disconnection" in DNE implementation and hinders educators' progression along Benner's Novice-Expert path.

Discussion

This study used an explanatory sequential mixed methods design to systematically explore the knowledge level, teaching application status, and practical challenges of DNE among vocational nursing educators in China. The findings reveal a moderate overall DNE knowledge level but a significant structural imbalance, low teaching application ability, and a four-dimensional interactive challenge framework. We interpret these results through a multi-theoretical lens that combines Benner's Novice-Expert Theory, Bandura's Social Cognitive Theory (SCT), Institutional Theory, and Resource Dependence Theory.

1. Knowledge Structural Imbalance: Dual Explanation of Individual Development and Institutional Constraints

Quantitatively, technical knowledge was the strongest dimension ($M = 4.08 \pm 0.61$), while integrated knowledge (curriculum design, interdisciplinary collaboration) was the weakest ($M = 3.17 \pm 0.73$; full-score rate = 11.7%). This is consistent with Benner's Novice-Expert Theory, which proposes that professional competence develops sequentially from discrete technical skills to holistic integrative abilities. Technical knowledge corresponds to the novice and advanced beginner stages, which can be mastered through standardized training and repeated practice. Integrated knowledge, in contrast, is an expert-level ability that requires long-term accumulated experience in curriculum design and teaching reform – something most vocational educators have not yet acquired¹².

From the perspective of Institutional Theory¹³, this imbalance is not merely an individual deficit but a structural outcome shaped by organizational institutions. Three institutional factors reinforce it: (1) daily teaching practice continuously reinforces technical skills through repeated instruction, skill competitions, and clinical placement assessments; (2) the

industry training system focuses exclusively on technical operations, with no content on curriculum design or policy interpretation; and (3) career incentive mechanisms prioritize skill competition awards and clinical research papers, giving no weight to DNE teaching reform. These norms and reward systems guide educators' knowledge acquisition behaviours, producing the observed structural imbalance.

2. Demographic Differences: Human Capital Accumulation and Homogenized Training Limitations

Teaching experience, professional title, DNE training, and disaster emergency experience were significant predictors of knowledge levels (all $p < 0.001$), whereas age and educational background were not. Human Capital Theory offers a fundamental explanation¹⁴: DNE knowledge is a specific type of professional human capital that accumulates mainly through "learning by doing" rather than formal education. Curriculum design practice, textbook compilation, and disaster emergency experience are the most effective channels for this accumulation, which explains why teaching experience and professional title are the strongest predictors.

Bandura's SCT further explains why educational background did not matter. The homogenized, one-size-fits-all training system fails to provide differentiated self-efficacy enhancement paths for educators with different educational backgrounds¹⁵. As Participant P-06 noted, "All DNE training is the same basic technical training for everyone. My research background and experience give me no advantage." This homogenized approach cannot convert the analytical and research advantages of highly educated educators into DNE knowledge advantages, resulting in no significant correlation between educational background and knowledge level.

3. Knowledge-Application Translation: Environmental Constraints and Self-Efficacy Mechanisms

Although DNE knowledge was significantly positively correlated with teaching application ($r = 0.672$, $p < 0.001$), a “high knowledge but low application” paradox affected 15.6% of participants¹⁶. Bandura’s SCT explains this phenomenon well, emphasising that behaviour is determined by the interaction between personal factors and environmental contexts. Two core SCT constructs explain the translation barrier¹⁷: first, low teaching self-efficacy resulting from DNE’s exclusion from nurse licensing exams and employment assessments. Educators perceive that time spent on DNE teaching will not improve student employment outcomes or their own teaching evaluations, which strongly reduces their motivation to apply knowledge. Second, severe environmental constraints – particularly the lack of disaster simulation equipment and standardized teaching materials – create structural barriers that even knowledgeable teachers cannot overcome.

Benner’s Novice-Expert Theory complements this explanation at the individual competency level. Some teachers who have mastered theoretical knowledge remain in the competent stage: they can recite DNE concepts and procedures but lack the situational experience required to flexibly adjust teaching methods according to students’ cognitive characteristics and disaster scenario characteristics. This dual theoretical framework explains both the environmental and individual dimensions of the knowledge-application gap.

4. Technology-Care Separation: Stage Limitations and Paradigm Deficits

The lowest OSCE score was in humanistic care integration ($M = 60.3 \pm 14.8$), with only 26.7% of teachers able to systematically integrate psychological support into teaching¹⁸. Benner’s Novice-Expert Theory explains this as a stage-specific limitation: most educators are in the

competent stage, where their teaching focus is on standardized technical operations that can be clearly evaluated. The organic integration of technical skills and humanistic care is an expert-level ability that requires extensive experience providing care in real disaster scenarios, which most educators lack.

From the perspective of Humanistic Care Education Theory¹⁹, this separation also reflects a paradigm deficit in current DNE. The dominant “technology-first” teaching paradigm reduces DNE to a set of technical operations, ignoring the essential humanistic attributes of disaster nursing. Without authentic disaster care experiences and targeted humanistic care training, teachers cannot naturally embed psychological support and ethical considerations into technical teaching, leading to the observed “technology-care separation”.

5. Four-Dimensional Challenge Cycle: Resource Dependence and Organizational Inertia

Qualitative findings identified a four-dimensional interactive challenge framework (insufficient resources, institutional constraints, personal deficits, clinical-education disconnection) forming a closed-loop vicious cycle. Resource Dependence Theory explains the root cause of this cycle²⁰: vocational colleges are highly dependent on two core resources—nurse licensing exam pass rates and graduate employment rates—for survival and development. This resource dependence leads to an institutional assessment orientation that prioritizes these two indicators, marginalizing DNE which is not directly related to them.

Organizational Inertia Theory further explains why this cycle is difficult to break²¹. Long-term adherence to the “exam-centred” teaching model has created strong organizational inertia, making it difficult to adjust resource allocation and teaching priorities even when national policies require DNE integration. The cycle of “institutional constraints → marginalization → insufficient resources → poor teaching

effect → further marginalization” becomes self-reinforcing, leading to the widespread “policy-practice disconnection” in DNE implementation nationwide.

6. Limitations

This study was conducted at a single vocational college in eastern China, and findings may not be generalizable to colleges in western rural areas with more limited resources. Future research should conduct multi-center surveys and randomized controlled trials to verify the effectiveness of the proposed intervention strategies.

Conclusions

This study provides comprehensive empirical evidence on DNE among vocational nursing educators in China. The main conclusions are as follows:

Vocational nursing educators have a moderate overall DNE knowledge level but a significant structural imbalance: strong on technical knowledge and weak on integrated knowledge. This imbalance is shaped jointly by individual competency development stages and institutional constraints, confirming the applicability of both Benner’s Novice-Expert Theory and Institutional Theory in the DNE context.

Teaching application ability is generally low, with a prominent “technology-care separation”. While knowledge is a necessary foundation for effective teaching, institutional assessment constraints and resource limitations act as critical boundary conditions that moderate the knowledge-application translation process, as explained by Bandura’s Social Cognitive Theory.

Improvement in DNE knowledge depends mainly on practical accumulation rather than formal education. The homogenized training system fails to exploit the advantages of highly educated educators, highlighting the need for hierarchical and classified training approaches²².

Educators face a four-dimensional interactive challenge framework that forms a vicious cycle rooted in institutional assessment deviation. Breaking this cycle requires systemic interventions targeting institutional, resource, competency, and clinical dimensions simultaneously.

Suggestions

Based on the integrated findings, we propose the following evidence-based recommendations for improving DNE quality in vocational colleges, tailored to the Chinese vocational nursing education context.

1. College Level

These recommendations apply to any vocational nursing college that has basic teaching infrastructure, a stable full-time nursing faculty, and established relationships with local tertiary hospitals.

Develop modular DNE teaching packages in collaboration with tertiary hospital emergency departments, including standardized courseware, typical disaster case sets, and low-cost simulation training guidelines. This addresses resource shortages while keeping teaching content clinically relevant.

Optimize curriculum arrangements so that DNE modules account for no less than eight hours within the first-aid nursing course, with progressive integration of disaster-related content throughout the three-year nursing program.

Reform the faculty performance evaluation system to give more weight to DNE teaching reform and curriculum design in performance appraisal and professional title review, and set up special incentive funds for outstanding DNE teachers.

2. Teacher Level

These recommendations apply to in-service nursing educators with at least one year of teaching experience and basic clinical nursing skills.

Implement hierarchical and classified DNE training programs: focus on basic teaching skills and technical knowledge for novice teachers (≤ 3 years of experience); curriculum design ability for competent teachers (4–8 years); and interdisciplinary and situational teaching skills for expert teachers (≥ 9 years).

Establish a clinical practice rotation system, organizing teachers to take part in one or two disaster emergency drills or emergency department rotations each year to gain real-world scenario experience.

Promote peer learning and teaching observation, and disseminate the effective adaptive teaching strategies identified in this study (e.g., low-cost scenario construction, integrating DNE content into licensing exam knowledge points) among educators.

3. Industry Level

These recommendations are directed at national and provincial nursing education authorities.

Formulate unified DNE teaching competency standards for vocational nursing teachers, clearly defining the knowledge, skills, and attitude requirements at different career stages.

Introduce incentive policies to encourage tertiary hospitals to open their emergency department resources to colleges, and establish formal college-hospital DNE collaboration bases.

Establish a special DNE fund to support resource construction in vocational colleges, with priority given to central and western regions with limited educational resources.

Appropriately integrate DNE content into the national nursing licensing exam syllabus to reverse the long-term marginalization of DNE in vocational nursing education.

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Redesigning with Intelligence: Faculty Led Innovation in Nursing Curriculum Using Artificial Intelligence

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Abstract

Background/Objectives: Updating curricula to meet accreditation standards and to adapt to the evolving healthcare environment is a complex challenge for nursing programs. As with time intensive curriculum redesign tasks, the emergence of artificial intelligence (AI) offers new opportunities to assist faculty and can help streamline processes and alleviate workloads. This study explores the use of a customized Large Language Model, ChatGPT-4, to complete essential nursing curriculum redesign tasks compared to manual methods.

Methods: A sequential explanatory mixed-methods approach was utilized. Twenty-five faculty completed a retrospective survey to estimate the time required for manual redesign tasks and to collect qualitative data on the redesign process. Furthermore, this version of ChatGPT was tailored to align with the American Association of Colleges of Nursing's 2021 Essentials to support accreditation compliance. Manual estimates were compared with the recorded time using AI assistance. Results: Manual redesign took approximately 41.6 hours, whereas AI-supported workflow took 2.9 hours, saving nearly 39 hours and demonstrating a 93% time-savings. Qualitative responses revealed themes including cognitive workload, structural barriers, and faculty interest in AI-support related to curriculum redesign processes. These findings provide preliminary insight but may be influenced by self-report and recall bias.

Conclusions: AI- tools like ChatGPT can serve as a personalized "assistant" to support the development and revision of educational curriculums. This time savings allows faculty to redirect effort toward other critical responsibilities in higher education.

Keywords: Artificial Intelligence, ChatGPT, Curriculum Redesign, American Association of Colleges of Nursing Essentials

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Introduction

Artificial intelligence (AI) has emerged as a transformative force in higher education, particularly through the integration of natural language processing (NLP) systems such as transformer-based Large Language Models (LLMs)¹. Tools such as ChatGPT-4, enable non-technical users, including educators, to automate labor-intensive instructional design tasks¹.

Simultaneously, nursing education is undergoing a transformation driven by evolving workforce expectations, regulatory frameworks and advances in educational technologies. Faculty are often tasked with complex curriculum redesign projects that require cross-functional collaboration, including outcome mapping, competency alignment, and integration of clinical expectations. While essential, they frequently divert faculty from instructional innovation, student mentorship, and community-engaged learning. The availability of AI tools, offers new possibilities to support faculty with curriculum redesign², though their use necessitates deliberate customization, ethical oversight, and alignment with pedagogical standards to preserve academic integrity and rigor.

While public discourse has largely focused on student facing AI applications such as tutoring, writing assistance, and integrative learning platforms³, there remains a critical need to explore how these technologies can assist faculty with the structural and regulatory complexities of program development. Ensuring alignment with accreditation standards, comprehensive curricular redesigns often span 12–24 months, and require careful coordination among faculty, administration, and clinical partners^{4,5}.

LLMs like ChatGPT-4 are built on transformer architectures trained on vast datasets, can generate language that mimics human reasoning and structure^{6,7}. However, their value in specialized fields—like nursing—depends on how effectively they are tailored to context-specific needs.

Purpose

This paper aims to demonstrate how AI can augment faculty efforts by automating repetitive and foundational curriculum design tasks and propose a replicable framework for customizing, validating, and integrating AI into competency-based education workflows using a tailored ChatGPT-4 tool.

The objectives of this study are multifaceted. One, to quantify the average amount of time faculty spend on each phase of a traditional, manual redesign process. Two, to examine how faculty experience levels impact the time demands and complexity of curriculum development tasks. Three, to identify which aspects of curriculum design are most amenable to AI support. Fourth, to measure time spent on AI-assisted curriculum redesign tasks.

Materials and Methods

Design

This study employed a sequential explanatory mixed-methods design that encompassed two components: (1) development and validation of a custom generative AI tool, based on ChatGPT-4, to support alignment with the 2021 American Association of Colleges of Nursing (AACN) Essentials; and (2) application of the tool in a live nursing curriculum redesign. In the first (quantitative) phase, data were collected and analyzed to estimate time requirements for key curriculum redesign tasks using traditional manual processes and to compare these estimates with time recorded during AI-assisted task completion. In the second (qualitative) phase, open-ended faculty responses were analyzed to better understand perceived workload, barriers to curriculum redesign, and opportunities for improvement. Integration of quantitative and qualitative findings occurred during interpretation, with quantitative results informing efficiency outcomes and qualitative findings providing contextual insight into faculty experiences.

Participants

Two faculty groups from the same institution participated. Group one, the curriculum modification

team, was comprised of experienced faculty redesigning a pre-licensure nursing curriculum using the customized ChatGPT-4 tool. Group two included faculty with recent redesign experience who had not used AI tools. This group completed a structured survey estimating time required for manual redesign tasks.

AI Tool Development

The diagram in Figure 1, illustrates the multi-phase approach used to create a customized ChatGPT-4 tool, referred to as the “AACN Assistant.” In phase 1, the AACN 2021 Essentials were embedded using structured prompt chains and domain-specific seeding. AI’s comprehension was tested through queries assessing the model’s interpretation of domain competencies, sub-competencies, and regulatory standards.

Phase 2 incorporated institutional context-program structures, course descriptions, and Bloom’s Taxonomy to generate tailored outputs. In Phase 3, structured prompts were used to generate program-level outcomes, curriculum summaries, and mapped competencies. Faculty reviewed outputs for clarity, alignment, and usability with iterative prompt refinement throughout.

AI Tool Application

Following validation, the curriculum modification team used the “AACN Assistant” to complete five redesign tasks: (1) develop leveled outcomes, (2) map competencies, (3) build a program plan, (4) revise based on feedback, and (5) finalize documentation. Each output was reviewed by faculty experts.

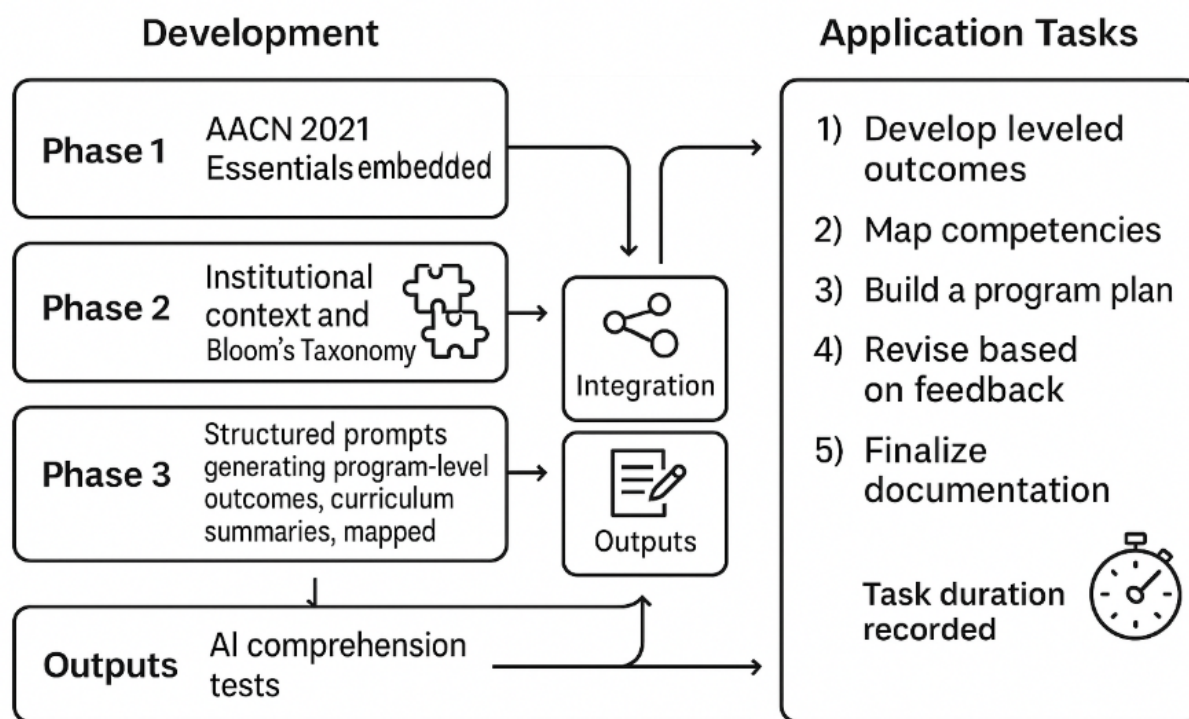


Figure 1. Multi-phase workflow diagram for the “AACN Assistant”

Data Collection

To establish baseline time estimates for manual redesign, researchers created and distributed a 14-item survey in-person via QR code at a faculty

meeting and subsequently emailed to allow additional opportunities for faculty participation. Five items collected demographic and professional role data. Six used ordinal scales (0–2, 2–5, 5–10, 10+ hours) to retrospectively estimate time spent

on specific curriculum redesign tasks including outcome development, course sequencing, and documentation. Three open-ended items gathered input on time-consuming tasks, barriers, and suggestions to enhance efficiency. For AI-assisted redesign, task duration, from prompt input to final output, was recorded using a stopwatch.

Data Analysis

Descriptive statistics summarized faculty rank, curriculum redesign experience, and manual task times. The manual task time estimates were converted to midpoint hour values. Comparisons between manual and AI-assisted workflows were conducted through **direct time comparison of recorded task completion durations**. Faculty responses to open-ended survey questions were analyzed using thematic analysis.

Rigor and Trustworthiness

To ensure reliability and credibility, AI-generated outputs were independently reviewed by at least two faculty experts from the curriculum modification team. Reviewers evaluated the outputs for alignment with curriculum standards, the AACN Essentials, and relevant accreditation expectations. Any discrepancies identified during the review process were discussed and resolved through consensus. To maintain reflexivity, researchers remain aware of their assumptions and potential biases especially when interpreting AI-generated contributions. Through team discussions and peer debriefing, researchers acknowledged potential biases, including prior experience with AI and with curriculum redesign, level of investment in the redesign process, and relationships with participants, as well as the potential influence of these factors on data analysis and interpretation. Triangulation was achieved through the integration of multiple data sources, including AI-generated drafts, faculty-edited

content, curriculum material, and structured time-logs documenting the redesign workflow.

Results

Time Spent on Manual Redesign

Of the 37 faculty members invited to participate in the survey, 25 responded (Table 1). Most were associate professors ($n=9$) or assistant professors ($n=7$). Ten reported having 11+ years of curriculum experience, indicating a seasoned faculty base. Despite this experience, 56% had participated in only one to two curriculum redesign projects, primarily tied to the Bachelor of Science in Nursing programs ($n=20$), suggesting curriculum work is often episodic, even for experienced educators.

Faculty reported substantial time demands when aligning curriculum components to the AACN Essentials. Twelve respondents estimated that developing level-specific outcomes and mapping competencies and sub-competencies would each require more than 10 hours.

For broader elements, like course sequencing, determination of clinical hours, and simulation integration, 56% ($n=14$) estimated over 10 hours to build a comprehensive program plan. Revisions based on critical stakeholder feedback were also time-intensive: 10 faculty estimated 5–10 hours, while 11 reported it would require more than 10 hours.

Finalizing the program plan, including documentation for internal or external review, was reported by 17 faculty to take 10 plus hours. From the initial curriculum review to finalizing the program plan (excluding individual course development), twelve faculty estimated investing more than 50+ hours. Faculty roles, redesign experience, and task-specific time estimates are summarized in Tables 1 and 2, with total estimated time presented in Table 3. Faculty with over six years of prior curriculum redesign experience were classified as experienced; those with five or less years as novice.

Table 1. Faculty Experience

Faculty Rank or Role	N (percent)
Adjunct Faculty	0 (0%)
Assistant Professor	7 (28%)
Associate Professor	9 (36%)
Full Professor	5 (20%)
Clinical Educator	3 (12%)
*Other	1 (4%)
Years of Curriculum Redesign Development	
0-2	6 (24%)
3-5	6 (24%)
6-10	3 (12%)
11+	10 (40%)

Number of Redesign Projects Involved In	
1-2	14 (56%)
3-5	8 (32%)
6-10	1 (4%)
10+	2 (8%)
Program Type Redesigned (multiple responses allowed)	
BSN	20 (47%)
MSN	8 (19%)
DNP	7 (16%)
Post-Graduate Certificate	5 (12%)
Other	3 (7%)

Note. *"Other" represents a faculty role not captured within the predefined rank categories. Percentages for Program Type exceed 100% because respondents could select multiple program types.

Table 2. Manual Time Spent on Redesign Tasks

Task	Experience Level	0-2 hrs	2-5 hrs	5-10 hrs	10+ hrs	*Other
Develop Outcomes	Experienced (n=13)	0 (0%)	3 (23%)	3 (23%)	7 (54%)	0 (0%)
	Novice (n= 12)	1 (8%)	4 (33%)	1 (8%)	5 (42%)	1 (8%)
	All (n=25)	1 (4%)	7 (28%)	4 (16%)	12 (48%)	1 (4%)
Map Competencies	Experienced (n=13)	0 (0%)	4 (31%)	2 (15%)	7 (54%)	0 (0%)
	Novice (n= 12)	0 (0%)	4 (33%)	2 (17%)	5 (42%)	1 (8%)
	All (n=25)	0 (0%)	8 (32%)	4 (16%)	12 (48%)	1 (4%)
Develop Plan	Experienced (n=13)	0 (0%)	1 (8%)	4 (31%)	8 (62%)	0 (0%)
	Novice (n= 12)	1 (8%)	0 (0%)	3 (25%)	6 (50%)	2 (17%)
	All (n=25)	1 (4%)	1 (4%)	7 (28%)	14 (56%)	2 (8%)
Revise Plan	Experienced (n=13)	0 (0%)	0 (0%)	7 (54%)	6 (46%)	0 (0%)
	Novice (n= 12)	1 (8%)	2 (17%)	3 (25%)	5 (42%)	1 (8%)
	All (n=25)	1 (4%)	2 (8%)	10 (40%)	11 (44%)	1 (4%)
Finalize & Document Plan	Experienced (n=13)	0 (0%)	1 (8%)	2 (15%)	10 (77%)	0 (0%)
	Novice (n= 12)	0 (0%)	2 (17%)	2 (17%)	7 (58%)	1 (8%)
	All (n=25)	0 (0%)	3 (12%)	4 (16%)	17 (68%)	1 (4%)

Note. * Other responses reflect faculty estimates outside the predefined time ranges.

Table 3. Comparison of Faculty Experience Level and Total Time

Time	Experienced Faculty (n=13)	Novice Faculty (n=12)	All (n=25)
5-10 hours	1 (8%)	2 (17%)	3 (12%)
10-20 hours	2 (15%)	1 (8%)	3 (12%)
20- 50 hours	4 (31%)	2 (17%)	6 (24%)
50+ hours	6 (46%)	6 (50%)	12 (48%)
Other	0 (0%)	1 (8%)	1 (4%)

Qualitative Themes

Open-ended responses revealed three themes: cognitive workload associated with competency alignment tasks, structural barriers to collaborative curriculum development, and faculty interest in targeted AI-assisted support for foundational curriculum design activities. One respondent wrote, *"Mapping [competencies] across multiple courses is like solving a puzzle without all the pieces – it's frustrating and redundant."* Others emphasized the cognitive load of aligning multiple frameworks: *"There's a constant need to double-check alignment with Essentials, QSEN, and course objectives. It's exhausting."*

A frequent barrier was limited time for collaborative curriculum work: *"You can't do redesign piecemeal – it takes uninterrupted time and a cohesive team."* Faculty also cited turnover, siloed responsibilities, and unclear goals as sources of delay. Some respondents advocated for more centralized leadership and greater faculty development support during redesign efforts.

Several faculty expressed curiosities in AI's potential. One noted, *"If AI could just get me started on outcome language that would save me hours."* Another added, *"I don't need AI to make decisions for me, but I wouldn't mind it handling the paperwork."*

Time Spent on AI-Assisted Redesign

Utilizing predetermined ChatGPT-4 prompts, the curriculum modification team completed the same redesign tasks using the customized "AACN Assistant" as those represented in the faculty survey. AI-supported workflow took 2.9 hours, whereas the estimated manual redesign (using the converted midpoint hour values) took approximately 41.6 hours, saving nearly 39 hours (Table 4). The line graph in Figure 2 highlights the efficiency of human-in-the-loop AI integration in academic program design by displaying the average time (in hours) spent on each phase of curriculum redesign using traditional manual methods (blue line) versus AI-assisted methods using ChatGPT-4 (orange line).

Table 4. Manual Versus AI-Assisted Redesign Comparison

Redesign Process Step	Faculty Estimated Manual Time Estimate Distribution (Survey Responses) (in hours) n (%)		AI-Assisted Completion Time (Recorded)	Key AI Activities
Develop level outcomes aligned with the AACN Essentials, Domains and Competencies	0-2	1 (4%)	1 hour 3 minutes 46 seconds	- Upload AACN Essentials, program plan, course descriptions. - Generate leveled outcomes using Bloom's Taxonomy
	2-5	7 (28%)		
	5-10	4 (16%)		
	10+	12 (48%)		
	Other	1 (4%)		

Continue....

Map AACN competencies and sub-competencies to the new curriculum	0-2 2-5 5-10 10+ Other	0 (0%) 8 (32%) 4 (16%) 12 (48%) 1 (4%)	18 minutes 44 seconds	- Map AACN Domains, Spheres, Concepts, Competencies, and Sub-competencies to program plan - Perform gap analysis and generate new courses based on identified gaps with rationale - Align new mapping to AACN Domains, Spheres, Concepts, Competencies, and Sub-competencies, program outcomes, and leveled program outcomes
Develop redesigned curriculum program plan	0-2 2-5 5-10 10+ Other	1 (4%) 1 (4%) 7 (28%) 14 (56%) 2 (8%)	10 minutes 47 seconds	- Identify curriculum goals (e.g., credit reduction) via web searches of comparable programs (e.g., psychology as a prerequisite) - Justify courses focused on diversity, equity and inclusion, and social determinants of health
Revise plan based on stakeholder feedback	0-2 2-5 5-10 10+ Other	1 (4%) 2 (8%) 10 (40%) 11 (44%) 1 (4%)	38 minutes 12 seconds	- Uploaded stakeholder's survey responses for analysis and comments. - Revise courses and program plan based on feedback - Update competency mapping and indicate integration levels (introduce, reinforce, demonstrate)
Finalize program plan, prepare documents: internal and external review, proposed course descriptions, and rationale for proposed changes	0-2 2-5 5-10 10+ Other	0 (0%) 3 (12%) 4 (16%) 17 (68%) 1 (4%)	31 minutes 50 seconds	- Draft course descriptions - Provide rationale for major course changes - Propose next steps

Continue....

Total time for Curriculum Redesign Tasks:	5-10	3 (12%)	2.9 hours	
	10-20	3 (12%)		
	20-50	6 (24%)		
	50+	12 (48%)		
	Other	1 (4%)		

Note. Manual time estimates reflect faculty survey responses. AI-assisted times represent recorded task completion using the customized ChatGPT-4 workflow.

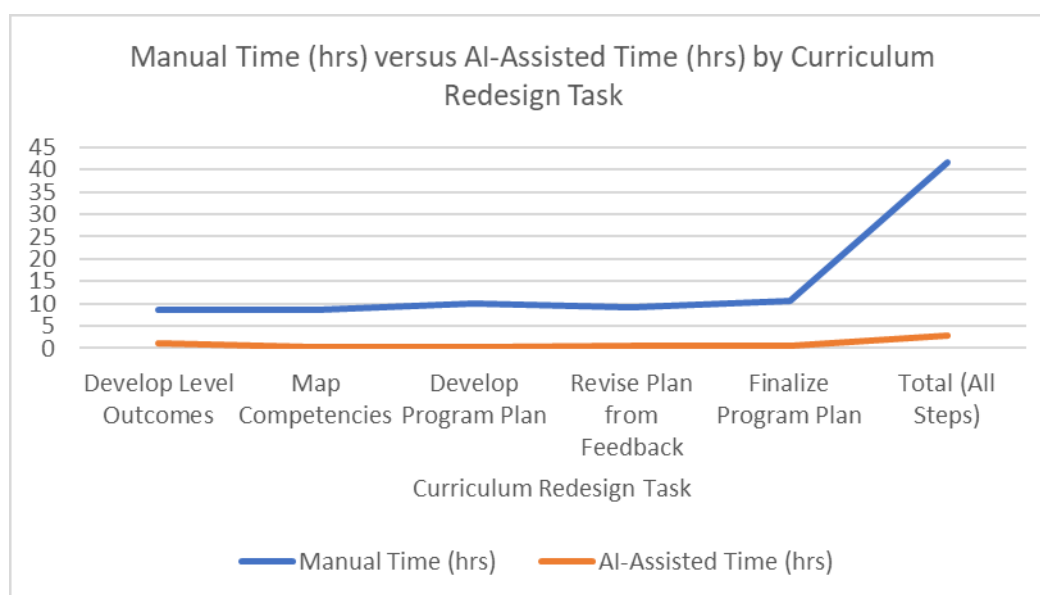


Figure 2. Line graph comparing manual and AI-assisted curriculum redesign time across five design phases.

Discussion

Curriculum redesign is a complex, time-intensive endeavor requiring pedagogical expertise and sustained commitment. Findings highlight the substantial time burden associated with curriculum redesign, even among experienced faculty. This timeline does not include developing individual courses. These results reaffirm prior literature: curriculum work is time-intensive and often require aligning complex elements such as regulatory standards, competency frameworks, and institutional priorities⁴.

The first objective of this study was to quantify the amount of time faculty spend completing

manual curriculum redesign tasks. Survey results demonstrated that the most time intensive phases included developing leveled program outcomes, mapping competencies and sub-competencies, and preparing final documentation for internal and external review. Nearly half of respondents estimated that several of these tasks required more than ten hours, highlighting the substantial workload associated with competency-based curriculum redesign.

The second objective examined whether faculty experience influenced time demands associated with redesign work. Responses revealed that novice faculty were more likely to report extended timelines for tasks like outcome development and stakeholder

revisions, but even experienced educators spent 10+ hours on several critical tasks. This reinforces that curriculum redesign requires not only expertise, but also sufficient time and institutional support.

Qualitative responses provided context to these findings. Faculty described redesign as cognitively demanding, particularly when aligning course outcomes with multiple educational frameworks such as the AACN Essentials, quality and safety competencies, and institutional program outcomes. Participants identified structural barriers including limited protected time, unclear expectations, and fragmented processes across courses and departments. These findings reinforce that the challenges extend beyond time demands to include cognitive workload, coordination barriers, and framework complexity.

The third objective of this study was to identify aspects of curriculum design that faculty perceived as well suited for AI-supported assistance. Survey responses suggested that foundational tasks such as drafting outcome language, mapping competencies, and organizing curriculum documentation were amenable to this support. Although essential for accreditation alignment and program coherence, these tasks often involve repetitive processes that can delay higher-level pedagogical planning and collaborative decision-making.

The fourth objective compared the time required to complete curriculum redesign tasks using a customized AI-assisted workflow. AI-assisted workflows reduced completion time from approximately 41.6 to 2.9 hours. This represents an estimated reduction of nearly 39 hours of faculty work time, or approximately 93%. These findings suggest that thoughtfully designed AI tools may significantly improve workflow efficiency in foundational curriculum alignment tasks.

Although faculty retained responsibility for review, collaboration, stakeholder input and final curricular approval, AI supported documentation and alignment tasks such as early drafting, structural language development, and curriculum organization. This allowed faculty to focus more fully

on higher-level work, including strategy, alignment, and innovation. In this way, the AI tool functioned as a digital partner rather than a replacement for academic judgment, consistent with emerging research, supporting the integration of AI to augment—not replace—expertise^{9, 10}. Collaboration, discussion, and revision amongst other faculty members or committees were outside the study's scope and excluded from time calculations.

While using AI, it is imperative to thoroughly evaluate the outputs produced. In the initial stages of AI-assisted redesign, response times were slower or less accurate when single prompts included complex steps. Breaking tasks into smaller prompts and reviewing outputs before advancing improved ChatGPT-4 results.

Limitations

This study provides valuable insights into the integration of generative AI in nursing curriculum redesign; however, several limitations should be acknowledged. First, the research was conducted at a single institution, with a small sample size from a single academic program which limits generalizability. Future studies involving multiple institutions, programs, and a broader range of faculty backgrounds are needed to evaluate the wider applicability of these findings.

Second, time estimates for manual redesign tasks were self-reported retrospectively, potentially introducing recall bias. Participants were asked to estimate the total time typically required to complete specific redesign tasks, however, in practice these tasks are often distributed across multiple meetings and completed incrementally over several months, which may have affected the accuracy of reported time estimates. Additionally, since participants knew their responses would be compared to those of faculty using AI tools, there is a risk of self-report bias—either under- or overestimating time based on perceptions of productivity or institutional expectations.

Third, the study focused on workflow efficiency and alignment with the 2021 AACN Essentials, without evaluating long-term outcomes, such as

curriculum quality, student learning outcomes, or sustained faculty engagement—areas that merit further exploration. Finally, the effectiveness of the AI tool is inherently tied to faculty comfort, digital fluency, and willingness to critically engage with AI-generated content. While validation protocols and prompt engineering strategies were used to enhance output quality, variability in user expertise may have influenced the tools overall utility.

Conclusions

In summary, this study opens several promising avenues for further research and practical innovation. As the landscape of nursing education continues to evolve, longitudinal studies are needed to evaluate the sustained impact of AI-assisted curriculum redesign—beyond time efficiency. This includes evaluating whether AI tools improve course quality, curricular cohesion, student learning outcomes, or faculty well-being. Tracking AI's influence across full curriculum cycles, from planning to implementation to outcomes assessment, would offer a more comprehensive understanding of its value.

The growing complexity of nursing education and the urgent need to align curricula with the 2021 AACN Essentials presents both a timely opportunity and a substantial challenge. Faculty must embed competency-based frameworks while balancing significant teaching, service, scholarly responsibilities, accreditation expectations and institutional constraints. This study offers insights into how generative AI, when deliberately customized and ethically implemented, can serve as a viable support mechanism. By comparing manual processes with AI assisted models, the findings demonstrate that tools like ChatGPT-4 can significantly reduce the time spent on foundational, time intensive tasks. These efficiencies do not replace faculty judgment: rather they create room for deeper pedagogical reflection, team-based collaboration, design and values driven innovation. The successful use of AI in education is not about the technology alone, but more thoughtful, purposeful integration. AI is not a shortcut; it is a scaffold. It can accelerate design work, but only when guided by expert insight and aligned with institutional mission and values.

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- **The authors have no conflicts of interest to disclose**

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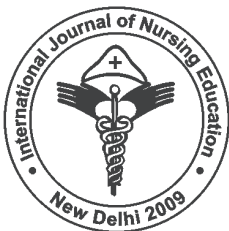
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