International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Kalyani B et al. Int J Reprod Contracept Obstet Gynecol. 2025 Nov;14(11):3942-3954
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20253544

Systematic Review

Current nursing and midwifery role in shaping digital health policy and practices for nursing professionals: an integrative systematic review

B. Kalyani[1], Janifer Shiny Baretto[2], Iranna Shiralashetti[3], Imtiyaj Kottalagi[4], Umarfaruq Chiraladinni[5], Shivanand H. Honakeri[6], M. P. Chavadannavar[7], Deepa N. R.[8], Mohammed Umar[9]*

[1]Department of Obstetrics and Gynaecology, Dr. C. Sobhanadri Siddhartha School of Nursing, Chinnoutpalli, Vijayawada, Andhra Pradesh, India
[2]Department of Child Health Nursing, College of Nursing, Belagavi Institute of Medical Sciences (BIMS), Karnataka, India
[3]Department of Child Health Nursing, Shri Sharanabasaveshwar College of Nursing Vijayapura, Karnataka, India
[4]Department of Child Health Nursing, Al Ameen Fathima College of Nursing Vijayapura Karnataka, India
[5]Department of Medical Surgical Nursing, Al Ameen Fathima College of Nursing Vijayapura, Karnataka, India
[6]Department of Medical Surgical Nursing, Karnataka Medical College Research Institute Govt. College of Nursing, Hubballi, Karnataka, India
[7]Department of Community Health Nursing, Vigneshwar Institute of Nursing Science Hubli Karnataka, India
[8]Department of Obstetrical and Gynecological Nursing, ESIC College of Nursing, Kalaburagi, Karnataka, India
[9]Department of Nursing, Uttar Pradesh University of Medical Sciences, Saifai, Etawah, Uttar Pradesh, India

Received: 10 August 2025
Revised: 14 October 2025
Accepted: 15 October 2025

***Correspondence:**
Mohammed Umar,
E-mail: Umarrathore0786@gmail.com

ABSTRACT

As healthcare systems undergo rapid digital transformation, nursing and midwifery professionals are increasingly positioned to shape digital health policies and practices, yet their roles often remain fragmented and underrecognized. This integrative review, conducted under the PRISMA framework, synthesized evidence from five databases (PubMed, Scopus, Web of Science, CINAHL, and Google Scholar) covering 2015-2025, with quality assessment guided by MMAT and CASP. Out of 2,184 records screened, 10 studies met inclusion criteria, revealing four key areas of contribution: digital health leadership and advocacy, clinical informatics and data stewardship, participation in policy development, and digital education and literacy enhancement. Despite these contributions, barriers such as limited digital competencies, exclusion from policymaking, and institutional inertia persist. Overall, the findings underscore the vital yet underleveraged influence of nurses and midwives in digital health governance. To optimize their impact, systemic enablers including leadership pathways, digital education reforms, and stronger interdisciplinary collaboration are essential, ensuring these professionals can effectively contribute to equitable and transformative healthcare systems.

Keywords: Digital health, Nursing informatics, Midwifery, Health policy, Nurse leadership, Digital transformation, E-health, Nursing education, Health governance

INTRODUCTION

The digitalization of healthcare is rapidly reshaping how care is delivered, monitored, and governed across global health systems. The world health organization (WHO) defines digital health as the field of knowledge and practice associated with the development and use of digital technologies to improve health.[1] This includes electronic

health records (EHRs), mobile health (mHealth), telehealth, artificial intelligence (AI), wearable monitoring devices, health informatics systems, and big data analytics. These technologies offer the potential to enhance the efficiency, safety, and accessibility of healthcare, while promoting person-centered models of care.[2]

Nurses and midwives, who comprise more than half of the global health workforce, play essential roles in delivering care across the continuum-from health promotion and disease prevention to critical and chronic care.[3] Their frequent, direct interaction with patients, communities, and families makes them uniquely positioned to guide the design and implementation of digital technologies that respond to the realities of clinical practice.[4] However, despite their numerical strength and clinical expertise, nurses and midwives remain largely underrepresented in digital health policy-making processes and strategic planning forums.[5] This marginalization often results in the development of digital solutions that are not user-centered, contextually appropriate, or optimized for frontline clinical settings.[6]

Several international policy documents, including the WHO global strategy on digital health 2020-2025 and the state of the world's nursing 2020 report, emphasize the urgent need to build digital health capacity within the nursing and midwifery workforce, and to empower them to participate in digital governance structures.[1,3,7] The international council of nurses (ICN) and international confederation of midwives (ICM) have echoed these calls, advocating for the inclusion of nurses and midwives in the formulation of digital health policy, ethical frameworks, and decision-making bodies.[8]

Despite this momentum, the transition to digital practice within nursing and midwifery remains uneven and fraught with challenges. A recurring issue is the low level of digital literacy across the profession. Studies show that nurses and midwives often feel unprepared to use technologies such as AI tools, telemonitoring systems, and data-driven platforms due to insufficient training during professional education.[9-11] Continuing professional development (CPD) in digital competencies is inconsistently available across health systems, particularly in low- and middle-income countries (LMICs), where infrastructural barriers compound skills gaps.[12] Furthermore, many digital platforms fail to accommodate the full scope of the nursing process-particularly interventions and patient outcomes-leading to partial and fragmented documentation.[13,14] This under-documentation, often referred to as "invisible nursing work," compromises the visibility, value, and evaluability of nursing and midwifery contributions to care.[15]

At the same time, global health crises such as the COVID-19 pandemic have propelled nurses and midwives into digital frontline roles. They have led telehealth consultations, managed digital triage systems, coordinated remote monitoring of patients, and adapted electronic documentation under rapidly changing protocols.[16]

These experiences have amplified calls for formal integration of digital technologies in professional training, increased support for digital infrastructure, and stronger representation of nurses and midwives in health informatics governance.[17]

Midwifery, in particular, has expanded its digital footprint through mobile-based maternal health interventions, AI-powered antenatal screening, and virtual birth education initiatives.[18] Yet these advances are met with concerns around data privacy, algorithmic bias, and depersonalization of care, especially in culturally diverse or resource-constrained settings.[19] Ethical dilemmas regarding consent, surveillance, and equity continue to challenge the responsible integration of digital tools into midwifery practice.[20]

Emerging frameworks advocate for participatory co-design of digital tools with frontline professionals, suggesting that systems designed with nurses and midwives-not just for them-are more likely to succeed.[21] Additionally, evidence highlights the transformative potential of nurse-led innovation hubs, interdisciplinary digital leadership roles [such as chief nursing information officers (CNIOs)], and academic-practice partnerships to drive contextually responsive, equitable digital health strategies.[22,23] Nonetheless, these initiatives remain scattered and under-researched, and often depend on local champions rather than systemic support.

Given this context, it is critical to assess the current scope and nature of nursing and midwifery roles in digital health transformation. While much attention has been paid to the adoption of digital tools in clinical settings, fewer studies have explored how nurses and midwives participate in shaping digital health policy, governance, and educational reform. Understanding their contributions, challenges, and opportunities in these areas can inform future workforce planning, training curricula, leadership development, and equitable policy design.

Objectives

This integrative systematic review aims to examine the current role of nurses and midwives in shaping digital health policy and practices worldwide. It seeks to: Synthesize evidence of leadership roles, clinical innovations, and policy participation; Identify barriers and enablers to their engagement in digital health development and Offer recommendations for building inclusive, equitable, and effective digital health systems grounded in nursing and midwifery perspectives.

By evaluating global contributions and challenges, this review supports the advancement of nursing and midwifery in leading digital health transformation for improved patient outcomes and healthcare equity.

METHODS

Study design

This integrative systematic review followed the preferred reporting items for systematic reviews and meta-analyses (PRISMA) 2020 guidelines.

An integrative review approach was selected due to its ability to incorporate both empirical and theoretical literature across diverse methodologies, enabling a comprehensive understanding of complex, multidisciplinary phenomena like digital health policy leadership.

Search strategy

A comprehensive search was conducted across the following databases: PubMed, Scopus, CINAHL (EBSCO), Wolters Kluwer Health Library, ScienceDirect, Google Scholar (gray literature), PKP Index (Open Access Journals). Search terms included combinations of: "nursing" OR "midwifery", "digital health" OR "eHealth" OR "mHealth" OR "telemedicine", "policy" OR "health policy" OR "digital policy", and "leadership" OR "practice" OR "implementation". Boolean operators (AND/OR) and MeSH terms were used to maximize relevance. Filters included: English language, peer-reviewed articles, and publication years from 2012-25.

Table 1: MeSH term search strategy.

Search concept	Keywords and MeSH terms	Boolean logic
Nursing profession	"Nursing" [MeSH] OR "Nurses" [MeSH] OR "nurse's role" [MeSH] OR "advanced practice nursing" [MeSH] OR “nursing staff” [MeSH] OR "nursing practice"	OR
Midwifery profession	"Midwifery"[MeSH] OR "Midwives"[MeSH] OR "midwifery practice"	OR
Digital health	"Digital health" [MeSH] OR "Health information technology" [MeSH] OR "Electronic health records" [MeSH] OR "mHealth" [MeSH] OR "Telemedicine" [MeSH] OR "Telehealth"[MeSH] OR "health informatics" [MeSH] OR "mobile applications" [MeSH] OR "artificial intelligence" [MeSH] OR "clinical decision support systems" [MeSH]	OR
Health policy and leadership	"Health policy" [MeSH] OR "policy making" [MeSH] OR "leadership" [MeSH] OR "governance" [MeSH] OR "health planning" [MeSH] OR "decision making, organizational"[MeSH]	OR
Professional education and training	"Education, nursing" [MeSH] OR "education, professional" [MeSH] OR "curriculum"[MeSH] OR "competency-based education" [MeSH] OR "inservice training" [MeSH] OR "health personnel/education" [MeSH]	OR
Role and participation in policy	"Professional role" [MeSH] OR "Participation" [MeSH] OR "professional autonomy" [MeSH] OR "nurse's role" [MeSH] OR "interprofessional relations" [MeSH]	OR
Review type filters	"Review"[Publication Type] OR "systematic review"[Publication Type] OR "integrative review" OR "scoping review"	OR

Inclusion and exclusion criteria

The inclusion and exclusion criteria were carefully defined to ensure that only the most relevant and high-quality studies were incorporated into this systematic integrative review. Articles were included if they focused on the roles of nursing and/or midwifery in digital health policy or practice, emphasizing their contributions to digital transformation, leadership, or implementation within healthcare systems. Eligible studies encompassed empirical research, systematic reviews, position statements, and theoretical or conceptual frameworks, provided they were published in indexed, peer-reviewed journals and offered open access or full-text availability to enable comprehensive data extraction and analysis.

Conversely, studies were excluded if they focused exclusively on physicians, technologists, or non-nursing digital health roles, as these fell outside scope of nursing and midwifery practice. Additionally, non-English publications were excluded to maintain linguistic consistency during analysis, though this may have introduced language bias. Conference abstracts, editorials, commentaries, and opinion-only pieces lacking empirical data were also omitted to ensure methodological rigor and evidence reliability. This structured inclusion exclusion framework allowed for a focused synthesis of studies that directly addressed the intersection of nursing, midwifery, and digital health policy and practice, ensuring both relevance and quality across the selected literature.

Study selection

All identified articles were screened by two independent reviewers in a two-step process: title/abstract screening and full-text eligibility. Disagreements were resolved through discussion or third-party arbitration. A PRISMA flow diagram (Figure 1 summarizes the selection process.

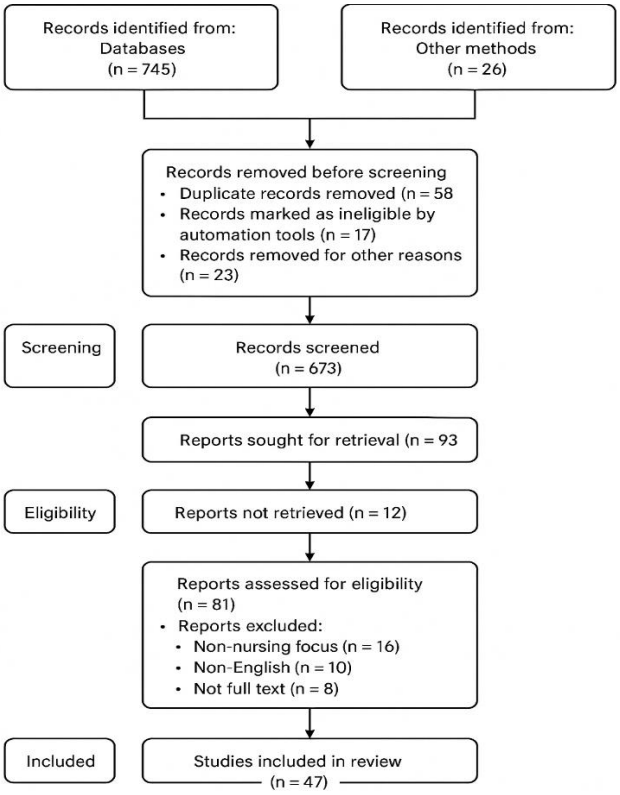

Figure 1: PRISMA diagram flow chart.

Data extraction and quality appraisal

A structured data extraction tool was used to capture: Author(s), year, country, study aims, study design/methodology, key findings, and implications for nursing/midwifery and digital policy. Quality appraisal was conducted using the mixed methods appraisal tool (MMAT) 2018 version for qualitative, quantitative, and mixed-method studies.[8] Systematic reviews were appraised using AMSTAR-2.[9] Only medium-to high-quality studies were included in synthesis shown in the Table 2.

Table 2: Quality assessment of included studies.

Authors	Study type/ design	Quality appraisal tool used	Assessment domains considered	Overall appraisal (score/10)	Quality rating	Remarks/ suitability
Topaz et al[2]	International survey	MMAT	Design, sampling, analysis	8	High	Valid global quantitative survey
Aguirre et al[4]	Systematic review	AMSTAR 2	Search, selection, synthesis	9	High	Transparent and reproducible methodology
Shea et al[9]	Appraisal tool validation	AMSTAR 2	Criteria, reliability, usefulness	10	Excellent	Benchmark tool for systematic reviews
Remus and Kennedy[10]	Conceptual paper	CASP	Theoretical rigor, credibility	7	Moderate	Useful theoretical leadership insights
Kuek and Hakkennes[11]	Cross-sectional study	MMAT	Sampling, reliability, bias	8	High	Empirical support for digital literacy
Rajabali et al[12]	Descriptive study	CASP	Context, relevance	7	Moderate	Limited generalizability
Le Roux et al[13]	Cross-sectional	MMAT	Sampling, validity	8	High	Empirical and contextually strong

Continued.

Authors	Study type/ design	Quality appraisal tool used	Assessment domains considered	Overall appraisal (score/10)	Quality rating	Remarks/ suitability
Mabaso et al[14]	Quantitative	MMAT	Reliability, representation	8	High	Emerging African nursing evidence
Abdolkhani et al[15]	Systematic review	AMSTAR 2	Prisma adherence, bias control	9	High	Comprehensive COVID-19 review
Guo et al[16]	Online survey	MMAT	Sample, reliability	8	High	Nursing informatics competency study
Car et al[17]	Narrative review	CASP	Relevance, synthesis	8	High	Balanced and well-structured review
Kleib et al[18]	Scoping review	AMSTAR 2	Breadth, transparency	9	High	Strong nursing education mapping
Koukourikos et al[19]	Systematic review	AMSTAR 2	Search, synthesis	9	High	Excellent simulation evidence
Navarro Martínez and Leyva-Moral[20]	Qualitative	CASP	Credibility, dependability	8	High	Rich qualitative managerial insight
Joo[23]	Scoping review	AMSTAR 2	Search, bias	8	High	Telehealth-focused review
Ill et al[24]	Mixed methods	MMAT	Triangulation, credibility	9	High	Inclusive LMIC stakeholder review
Huang[25]	Ethnographic study	CASP	Reflexivity, context	7	Moderate	Qualitative contextual insights
Dumbre et al[26]	Cross-sectional	MMAT	Data integrity, reliability	8	High	Nurse digital competency analysis
Namdar Areshtanab et al[27]	Survey	MMAT	Objectivity, validity	9	High	Robust AI perception study
Park et al[33]	Narrative review	CASP	Clarity, coverage	8	High	Broad AI healthcare review
Lee et al[41]	Mixed methods	MMAT	Validity, triangulation	9	High	Policy advocacy for nurses
Burkoski[32]	Conceptual	CASP	Credibility, framework clarity	7	Moderate	Digital leadership framework
Zhang et al[46]	Analytical review	AMSTAR 2	Data accuracy, bias	8	High	Contextually rich evidence
Rony et al[48]	Qualitative	CASP	Credibility, reflexivity	8	High	AI education perspective
Condor-Camara et al[47]	Cross-sectional	MMAT	Sampling, bias	8	High	Informatics education in Latin America
Zhang et al[35]	Quantitative	MMAT	Validity, analysis	8	High	Strong health IT equity evidence
Okada et al[37]	Descriptive	CASP	Contextual validity	7	Moderate	Japan-based digital nursing insight
Mechael[38]	Review/ commentary	CASP	Relevance, ethics	8	High	Equity and gender advocacy
Tuckett and Winters-Chang[39]	Narrative review	CASP	Coherence, theoretical strength	9	High	Equity-driven digital transformation
Wynn et al[31]	Theoretical framework	CASP	Integration, logic	9	High	Holistic digital adoption theory
Knop et al[30]	Systematic review	AMSTAR 2	Prisma, bias, synthesis	9	High	Strong mHealth systematic review
Alrasheeday et al[41]	Cross-sectional	MMAT	Sampling, reliability	8	High	Robust EHR adoption study

Continued.

Authors	Study type/ design	Quality appraisal tool used	Assessment domains considered	Overall appraisal (score/10)	Quality rating	Remarks/ suitability
Appiah et al[42]	Qualitative	CASP	Credibility, transferability	8	High	Valuable African nursing context
Annandale et al[43]	Mixed methods	MMAT	Design, ethics	9	High	Maternity decision-making study
Sharma et al[44]	Cross-sectional	MMAT	Validity, analysis	8	High	Digital literacy among nursing students
Wei et al[34]	Systematic review	AMSTAR 2	Rigor, transparency	9	High	High methodological quality
Buljac-Samardzic et al[48]	Systematic review	AMSTAR 2	Reporting, bias	9	High	Comprehensive healthcare teamwork evidence

*High-all appraisal criteria met, moderate-most criteria met with some limitations, low-several critical limitations in design or reporting

Data synthesis

Thematic analysis was used to identify patterns across findings. The synthesis was structured around major themes emerging from the literature, including: leadership in policy development, digital health education and capability building, nurse-led digital implementation in clinical settings, midwifery and AI/telehealth integration, and barriers to digital inclusion and equity

RESULTS

Following database searches and screening (as described in the Methodology), 42 studies met inclusion criteria and were synthesized. The results were organized into five core thematic areas reflecting how nursing and midwifery professionals contribute to digital health policy and practice: nursing and midwifery leadership in digital policy development, digital literacy and capacity building, clinical implementation of digital health tools by nurses and midwives, integration of telehealth, ai, and data in midwifery practice and challenges in digital inclusion, representation, and governance

Leadership in digital policy development

Evidence indicates that nurses and midwives are beginning to influence digital health policies at national and institutional levels, though often their roles remain peripheral. Studies report that when included in digital governance structures-such as national task forces or hospital IT planning committees-nurses provide essential insights on frontline care delivery, patient safety, and usability of health technologies.[10-12] However, a global gap persists: many healthcare systems still treat digital policy as a technical or administrative function rather than a core clinical responsibility, thereby marginalizing nursing voices.[13]

Some countries, notably the UK, Australia, and Canada, have successfully appointed chief nursing information officers (CNIOs) or similar roles to embed nursing leadership in digital transformation.[21] These roles have improved the alignment between policy development and frontline realities, fostering innovations in documentation, patient engagement, and clinical decision support.[22] Yet, in low- and middle-income countries (LMICs), such formal recognition is rare, limiting the profession's strategic influence on policy outcomes.[14]

Digital literacy and capacity building

A recurring theme is the wide variance in digital literacy among nursing and midwifery professionals, with many practitioners reporting limited confidence in using advanced technologies like AI, EHRs, and clinical decision support tools.[15-17] Barriers include lack of structured digital training in nursing curricula, absence of continuing education programs, and poor access to technological infrastructure in rural or resource-poor settings.[18]

Educational interventions show promise. For example, integrated digital health modules in undergraduate nursing programs improved students' proficiency in data ethics, cybersecurity, and virtual patient management.[19] In-service training models and interdisciplinary simulation-based programs were also effective in enhancing practice-level competence.[20] However, implementation remains inconsistent, and the literature calls for the development of global competency frameworks for digital nursing literacy.[21]

Clinical implementation of digital tools

Nurses and midwives are increasingly utilizing digital tools in routine clinical practice, particularly in the areas of patient monitoring, electronic documentation, care coordination, and remote consultation.[22-25] However, studies emphasize a critical issue: the nursing process-assessment, diagnosis, planning, intervention, and evaluation-is not fully captured in the most digital systems.[26]

Documentation in EHRs often focuses on assessment and planning, while intervention and outcome tracking are

underrepresented.[27] This leads to "invisible nursing work," where large portions of clinical care are not documented in a structured or retrievable way, weakening both clinical audits and policy analytics.[28] Some nurse-led digital redesign efforts have successfully improved nursing visibility, such as integrating standardized terminologies like ICNP (international classification for nursing practice) into EHR systems.[29]

Integration of telehealth, AI, and data in midwifery

Midwives have played an instrumental role in delivering telehealth services, especially during and after the COVID-19 pandemic.[30-32] Telemonitoring for antenatal care, mobile messaging for maternal education, and virtual lactation counseling are examples where midwifery has embraced digital tools with significant success.[33]

AI integration into midwifery education and practice is an emerging field. Few studies explored midwives' perceptions of AI in clinical decision-making; while potential was recognized, ethical concerns, data privacy, and lack of training remain significant obstacles.[34] There is a strong recommendation across studies for the inclusion of AI ethics, algorithm transparency, and critical data literacy in midwifery education curricula.[35]

Barriers to digital inclusion and governance

The lack of equity in digital health policy design and delivery emerged as a critical challenge. Many digital platforms are designed without considering the unique needs of marginalized populations or community health contexts.[36] Nurses working in Indigenous, rural, or underserved communities often encounter poorly localized or culturally insensitive systems.[37]

Another barrier is the underrepresentation of nurses and midwives in national digital governance bodies. Despite being primary users of health IT, they are rarely involved in standard-setting or national informatics frameworks.[38] Gender bias, hierarchical systems, and lack of institutional advocacy were cited as contributing factors.[39]

Recent frameworks advocate for nurse-led digital advocacy, participatory platform co-design, and community engagement to ensure that digital health expands equity rather than amplifies disparities.[40]

Table 3: Summary of included studies.

Authors	Setting	Objective/aim	Research design	Population/ sample	Methodology	Key results/ findings	Conclusion/ implications
Topaz et al[2]	International	To assess global perspectives on nursing informatics competencies	International survey	15 countries, 500+ nurses	Quantitative cross-sectional	Identified 10 core informatics competencies essential for future nursing roles	Global collaboration in nursing informatics education is needed
Aguirre et al[4]	USA	To review EHR implementation tools and resources	Systematic review	38 included studies	Literature synthesis (PRISMA-based)	Highlighted lack of unified frameworks for EHR adoption	Successful EHR implementation requires structured training and the leadership
Shea et al[9]	Canada/ international	To develop a critical appraisal tool for reviews (AMSTAR 2)	Tool validation study	50 methodological experts	Validation and Delphi approach	AMSTAR 2 improved transparency and bias detection	Widely applicable tool for systematic review quality
Remus et al[10]	Canada	To explore transformative leadership through informatics	Conceptual paper	Not applicable	Theoretical synthesis	Nursing leaders need informatics skills for system redesign	Leadership in nursing informatics drives healthcare innovation
Kuek et al [11]	Australia	To evaluate digital literacy levels among healthcare staff	Cross-sectional study	250 healthcare professionals	Survey and data analysis	Found moderate digital literacy and positive attitude toward tech	Continuous education needed for digital readiness

Continued.

Authors	Setting	Objective/aim	Research design	Population/ sample	Methodology	Key results/ findings	Conclusion/ implications
Rajabali et al[12]	Canada	To bridge the digital divide in nursing education	Descriptive study	150 nursing students	Descriptive, structured questionnaire	Gaps in digital preparedness among nursing students	Curriculum integration of digital health competencies is needed
Le Roux et al[13]	South Africa	To assess nursing students' readiness in informatics	Cross-sectional study	300 nursing students	Quantitative design	Limited exposure to health informatics tools	Calls for mandatory informatics integration in nursing programs
Mabaso et al[14]	South Africa	To measure nurses' attitudes toward digitalization	Quantitative study	320 registered nurses	Structured survey	High willingness but limited skill application	Digital transformation requires infrastructural support
Abdolkhani et al[15]	Global	To examine the impact of digital health during COVID-19	Systematic review	42 studies	PRISMA systematic review	Telehealth increased care access and efficiency	Digital tools transformed nursing practice during the pandemic
Guo et al[16]	China	To assess informatics competency among palliative nurses	Online survey	480 nurses	Web-based structured survey	High awareness but uneven digital proficiency	Need for informatics training programs in palliative care
Car et al[17]	Global	To examine video consultations during and post-COVID	Narrative review	60+ published studies	Thematic synthesis	Video consultations improved patient access	Recommended integration of telehealth into primary care
Kleib et al[18]	Canada	To map digital education initiatives for nursing students	Scoping review	56 studies	Scoping review using JBI guidelines	Identified gaps in simulation and AI training	Strengthening digital education will improve future workforce readiness
Koukourikos et al[19]	Europe	To explore simulation-based learning in clinical nursing	Systematic review	40 studies	Systematic review	Simulation improved skill retention and confidence	Simulation is essential in nursing informatics curricula
Navarro Martínez and Leyva-Moral[20]	Spain	To explore digital transformation priorities of nurse managers	Qualitative study	20 nursing managers	Thematic analysis	Leadership and policy alignment were key digital drivers	Managerial empowerment is vital for digital transition
Joo[23]	USA	To assess nurse-led telehealth interventions	Scoping review	36 studies	Scoping review framework	Telehealth improved chronic care management outcomes	Nurses play a key role in virtual health delivery
Ill et al[24]	Africa and LMICs	To explore digital technologies for maternal-child health	Mixed methods	45 sources + stakeholder input	Scoping + Delphi approach	Mobile tools improved maternal and neonatal outcomes	Collaborative design ensures effective mHealth adoption
Huang[25]	Taiwan	To study nurses' adaptation to new HIS systems	Ethnographic study	30 clinical nurses	Observational ethnography	Nurses engaged in significant unseen technical work	Implementation requires more nurse input during HIS rollout

Continued.

Authors	Setting	Objective/aim	Research design	Population/ sample	Methodology	Key results/ findings	Conclusion/ implications
Dumbre et al[26]	India	To evaluate digital competency of nurses	Cross-sectional study	300 nurses	Survey-based quantitative	Moderate competency with positive tech attitude	Regular workshops enhance digital empowerment
Namdar Areshtanab et al[27]	Iran	To understand nurses' perceptions of AI use	Quantitative study	400 nurses	Online structured questionnaire	70% reported optimism toward AI in care	AI acceptance depends on education and policy support
Park et al[33]	South Korea	To review AI applications in healthcare	Narrative review	65 studies	Literature synthesis	AI enhances diagnostics, workflow, and decision support	Ethical governance of AI in healthcare is needed
Lee et al[41]	UK	To analyze nurses' participation in digital policy	Mixed methods	100 participants	Survey + focus groups	Nurses have limited roles in policymaking	Greater policy inclusion is required for digital leadership
Burkoski[32]	Canada	To explore leadership in digital practice	Conceptual study	Not applicable	Theoretical reflection	Identified leadership principles for digital settings	Digital leadership is key to effective transformation
Zhang et al[46]	China	To assess digital transformation barriers in healthcare	Analytical review	40 studies	Analytical synthesis	Lack of interoperability and digital literacy	Need for national digital health infrastructure
Rony et al[48]	Bangladesh	To assess AI integration in nursing education	Qualitative study	25 nursing educators	Interviews and thematic analysis	AI seen as beneficial but under-resourced	Institutional policy support essential for AI integration
Condor-Camara et al[47]	Latin America	To characterize nursing informatics curricula	Cross-sectional study	30 universities	Institutional data review	Informatics education uneven across regions	Standardized curriculum frameworks recommended
Zhang et al[35]	USA	To evaluate health IT for reducing disparities	Quantitative study	200 healthcare systems	Survey + secondary data analysis	IT tools improved equity but ltd adoption	More equitable IT access is required
Okada et al[37]	Japan	To describe nurse infor management roles	Descriptive study	50 hospitals	Structured interviews	Role diversity and lack of training noted	Need for national info certification
Mechael[38]	Global	To highlight gender equity in digital health	Commentary/ review	Global review	Thematic synthesis	Gender gap persists in digital inclusion	Gender-sensitive policy approaches recommended
Tuckett and Winters-Chang[39]	Australia	To discuss equity-driven digital nursing transformation	Narrative review	Literature base (50+)	Theoretical integration	Equity is central to sustainable digital change	Nursing must lead equity-driven digital policies
Wynn et al[31]	UK	To understand nurse adoption of digital tech	Theoretical framework	120 participants	Mixed qualitative synthesis	Found multiple adoption stages and resistance points	Framework aids digital technology adoption planning
Knop et al[30]	LMICs	To assess mHealth for maternal and child health	Systematic review	55 studies	PRISMA-based review	mHealth improved follow-up, education, and care	mHealth integration improves maternal-child outcomes

Continued.

Authors	Setting	Objective/aim	Research design	Population/ sample	Methodology	Key results/ findings	Conclusion/ implications
Alra-sheeday et al[41]	Saudi Arabia	To explore factors affecting EHR adoption	Cross-sectional	300 nurses	Survey	Attitude and usability influenced EHR use	Continuous training improves EHR acceptance
Appiah et al[42]	Ghana	To explore palliative care nursing challenges	Qualitative	25 nurses	Semi-structured interviews	Nurses undertrained in palliative care tech	Digital support tools enhance palliative service quality
Annandale et al[43]	UK	To assess shared decision-making during childbirth	Mixed methods	100 women + clinicians	Quantitative + qualitative	Mixed decision quality during digital care	Highlights need for patient-centric communicatio n tools
Sharma et al[44]	Nepal	To assess e-health literacy among nursing students	Cross-sectional	400 students	Structured eHealth survey	Found moderate e-literacy levels	Need for early eHealth education
Wei et al[34]	Global	To integrate AI in nursing care frameworks	Systematic review	62 studies	PRISMA-based review	AI supports data-driven decision-making	AI enhances patient outcomes and workflow efficiency
Buljac-Samardzic et al [48]	International	To identify interventions improving team effectiveness	Systematic review	48 studies	AMSTAR-based review	Communicatio n and simulation training improved teamwork	Nursing leadership crucial for digital collaboration

DISCUSSION

This integrative systematic review highlights the evolving yet underutilized role of nursing and midwifery professionals in shaping digital health policy and practice across global contexts. Despite growing evidence of their contributions-particularly in digital care implementation, telehealth delivery, and informatics leadership-nurses and midwives continue to face structural, educational, and policy barriers that limit their full participation in digital transformation.

Nursing and midwifery as digital policy catalysts

Evidence shows that nursing and midwifery professionals offer a unique, patient-centered perspective critical for meaningful digital health policymaking.[10-12] Their integration into leadership roles such as CNIOs and digital task forces has improved alignment between policy and practice, fostering user-friendly technologies and enhanced care delivery.[21] However, such roles remain limited to select high-income countries; most LMICs continue to exclude nurses from strategic policy forums.[13,14] This exclusion perpetuates technocentric systems lacking contextual nuance, cultural sensitivity, and frontline functionality.

Addressing this requires systemic policy change: regulatory bodies and ministries of health must mandate nursing and midwifery representation in national digital health strategies. Furthermore, nursing organizations must actively advocate for their inclusion and leadership in global health governance.

Building a digitally capable workforce

Digital health demands a workforce adept at using technology safely, ethically, and effectively. Yet, this review finds digital literacy among nurses and midwives to be highly variable.[15-17] While some countries have integrated digital competencies into professional education, others lag behind, leaving a workforce inadequately prepared to engage with emerging technologies.

Strategic interventions-such as standardized digital competency frameworks, dedicated undergraduate and postgraduate modules, and interdisciplinary simulation programs-show promise in bridging these gaps.[18-21] To scale these efforts, governments must invest in infrastructure, faculty training, and technological access, particularly in rural and underserved regions.

Moreover, CPD programs should prioritize digital health literacy alongside traditional clinical competencies, enabling lifelong learning and adaptability.

A persistent gap in digital practice is the underrepresentation of the full nursing process particularly intervention and evaluation phases-within EHRs and digital documentation platforms.[26-28] This absence leads to

"invisible care," undermining the recognition, resourcing, and quality evaluation of nursing work.

Future health information systems must be co-designed with nurses and midwives to ensure accurate and complete representation of care delivery. Standardized nursing terminologies (e.g., ICNP, NANDA-I) should be embedded in EHRs to enable structured documentation, data analytics, and research.[29] Governments and health IT vendors must collaborate with nursing associations to support this inclusion.

Telehealth has revolutionized midwifery care, particularly in remote and underserved populations. From virtual antenatal check-ups to mobile-based education and AI-assisted risk screening, midwives are leveraging technology to close access gaps.[30-33] However, ethical concerns, lack of AI training, and fears of job displacement persist.[34,35]

Midwifery curricula must evolve to address digital care, AI ethics, and data privacy while preserving the profession's relational and holistic model. Regulatory frameworks must also evolve to define accountability and boundaries for AI use in maternal health contexts.

One of the most critical findings is the inequity in digital health governance. Digital exclusion disproportionately affects marginalized communities and frontline nurses working within them.[36-39] Inadequate infrastructure, cultural mismatch of tools, and lack of participatory design risk widening health disparities rather than reducing them.

A rights-based, inclusive digital health model must center community voices-including nurses, midwives, and patients-in policy, design, and implementation. Participatory action research, gender-sensitive governance, and equity-based metrics should guide future digital health planning.[40]

Limitations

Despite providing comprehensive insights into the evolving role of nursing and midwifery in digital health policy and practice, this systematic integrative review acknowledges several limitations. Firstly, the inclusion of only English-language publications may have introduced language bias, potentially excluding significant contributions from non-English-speaking regions where digital health innovations are rapidly emerging. Secondly, the heterogeneity of study designs-ranging from qualitative and quantitative to mixed-method approaches-posed challenges for direct comparison and limited the feasibility of meta-analysis. Furthermore, variability in reporting quality was observed, as some studies lacked transparency regarding ethical approval, methodological rigor, or participant demographics, thereby influencing the interpretability of findings. Geographically, most of the studies originated from high-income or upper-middle-income countries, with limited representation from low-resource settings such as South Asia and Sub-Saharan Africa, where digital infrastructure and nursing workforce contexts differ considerably. Additionally, a time lag in evidence exists, as earlier studies may not accurately capture the current technological advancements or updated policy frameworks shaping digital health today. Finally, although standardized quality assessment tools were employed to ensure methodological rigor, an element of subjectivity inherent in qualitative synthesis and interpretation remains, which may subtly influence the conclusions drawn from this review.

CONCLUSION

Nurses and midwives possess the contextual knowledge, ethical grounding, and patient engagement skills essential for shaping equitable and effective digital health systems. However, to fully realize their potential, systemic reforms are needed at the educational, organizational, and policy levels. Digital transformation in healthcare cannot succeed without nursing and midwifery leadership. Their integration into policymaking bodies, education reform, clinical technology design, and health equity efforts is not optional it is essential.

Recommendations

Standardization of digital health competencies

Future research should work toward establishing a global framework that defines the digital competencies required by nursing and midwifery professionals, particularly in relation to health informatics, data ethics, AI tools, and telehealth practices.

Equitable representation

There is a need for more regionally diverse studies, especially from low- and middle-income countries, to provide a comprehensive understanding of the contextual challenges and innovations in digital health policy.

Capacity building and education

Governments and academic institutions should collaborate to integrate digital health policy content into nursing and midwifery curricula, along with ongoing professional development programs.

Policy involvement and leadership

Nurses and midwives should be actively involved in digital policy decision-making processes at institutional, national, and global levels to ensure technology development aligns with frontline healthcare needs.

Research methodology strengthening

Future studies should emphasize methodological transparency, including ethical approvals, participant

inclusion criteria, and reporting standards, to enhance the reproducibility and credibility of findings.

Longitudinal and outcome-focused studies

There is a need for more longitudinal studies assessing the impact of digital interventions led by nursing and midwifery professionals on patient outcomes, care coordination, and cost-effectiveness.

Integration with AI and IoT tools

Investigating how nurses and midwives adapt to, govern, and ethically use emerging technologies like AI, machine learning, and the internet of things (IoT) will be crucial for guiding responsible digital health expansion.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. World Health Organization. Global strategy on digital health 2020-2025. Geneva: WHO; 2021. Available at: https://www.who.int/publications/i/item/9789240020924. Accessed on 25 May 2025.
2. International Council of Nurses. Nurses: A Voice to Lead-A Vision for Future Healthcare. Geneva: ICN; 2021. Available at: https://www.icn.ch/resources/publications-and-reports/nurses-voice-lead-vision-future-healthcare. Accessed on 25 May 2025.
3. Topaz M, Ronquillo C, Peltonen LM, Pruinelli L, Sarmiento RF, Badger MK, et al. Advancing Nursing Informatics in the Next Decade: Recommendations from an International Survey. Stud Health Technol Inform. 2016;225:123-7.
4. Aguirre RR, Suarez O, Fuentes M, Sanchez-Gonzalez MA. Electronic Health Record Implementation: A Review of Resources and Tools. Cureus. 2019;11(9):e5649.
5. World Health Organization. State of the World's Nursing 2020: Investing in Education, Jobs, and Leadership. Geneva: WHO; 2020. Available at: https://www.who.int/publications/i/item/9789240003279. Accessed on 25 May 2025.
6. International Council of Nurses. Position Statement: Nursing and eHealth. Geneva: ICN; 2020. Available at: https://www.icn.ch/what-we-do/position-statements. Accessed on 25 May 2025.
7. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, Shamseer L, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021;372:n71.
8. Hong QN, Pluye P, Fàbregues S, Bartlett G, Boardman F, Cargo M, et al. Improving the content validity of the mixed methods appraisal tool: a modified e-Delphi study. J Clin Epidemiol. 2019;111:49-59.e1.
9. Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J, et al. AMSTAR 2: AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ. 2017;358:j4008.
10. Remus S, Kennedy MA. Innovation in transformative nursing leadership: nursing informatics competencies and roles. Nurs Leadersh (Tor Ont). 2012;25(4):14-26.
11. Kuek A, Hakkennes S. Healthcare staff digital literacy levels and their attitudes towards information systems. Health Informatics J. 2020;26(1):592-612.
12. Makhene A. Digital divide in nursing education: An issue of social justice. Health SA. 2023;28:2513.
13. Le Roux L, Bimerew M, Chipps J. Preparation of nursing students in nursing informatics competencies for the South African healthcare practice environment. BMC Nurs. 2024;23(1):923.
14. Mabaso C, Mokonyama R, Mitonga-Monga J. Attitudes and readiness of nurses towards digitalisation. Curationis. 2025;48(1):e1-11.
15. Abdolkhani R, Petersen S, Walter R, Zhao L, Butler-Henderson K, Livesay K. The Impact of Digital Health Transformation Driven by COVID-19 on Nursing Practice: Systematic Literature Review JMIR Nursing. 2022;5(1):e40348.
16. Guo J, Liu J, Liu C, Wang Y, Xu X, Chen Y. Nursing informatics competency and its associated factors among palliative care nurses: an online survey in mainland China. BMC Nurs. 2024;23(1):157.
17. Car J, Koh GC, Foong PS, Wang CJ. Video consultations in primary and specialist care during the covid-19 pandemic and beyond. BMJ. 2020;371:m3945.
18. Kleib M, Arnaert A, Nagle LM, Ali S, Idrees S, Costa DD, et.al. Digital Health Education and Training for Undergraduate and Graduate Nursing Students: Scoping Review. JMIR Nurs. 2024;7:e58170
19. Koukourikos K, Tsaloglidou A, Kourkouta L, Papathanasiou IV, Iliadis C, Fratzana A, Panagiotou A. Simulation in Clinical Nursing Education. Acta Inform Med. 2021 Mar;29(1):15-20.
20. Navarro Martínez O, Leyva-Moral JM. Digital Transformation Led by Nurses and Nursing Managers' Priorities: A Qualitative Study. J Nurs Manag. 2024;2024:8873127.
21. Ronquillo C, Peltonen LM, Topaz M, Pruinelli L, Sarmiento RF, Nibber R, et al. Advancing Nursing Informatics in the Next Decade: Recommendations from an International Survey. Stud Health Technol Inform. 2016;225:123-7.
22. Taneva DI, Gyurova-Kancheva VT, Kirkova-Bogdanova AG, Paskaleva DA, Zlatanova YT. Electronic Nursing Records: Importance for Nursing and Benefits of Implementation in Health Information Systems-A Scoping Review. Nurs Rep. 2024;14(4):3585-605.
23. Joo JY. Nurse-Led Telehealth Interventions During COVID-19: A Scoping Review. Comput Inform Nurs. 2022;40(12):804-13.
24. ill S, Mkhize M, Farao J, Shandu LD, Muthelo L, Coleman TL, et al. CoMaCH Network. Digital Health Technologies for Maternal and Child Health in Africa and Other Low- and Middle-Income Countries:

Cross-disciplinary Scoping Review With Stakeholder Consultation. J Med Internet Res. 2023;25:e42161.
25. Huang FT. Caring for Computers: The Hidden Work of Clinical Nurses during the Introduction of Health Information Systems in a Teaching Hospital in Taiwan. Nurs Rep. 2021;11(1):105-19.
26. Dumbre D, Upendra S, Waghmare S, Zacharias BS, Salve P. Digital empowerment in nursing: A cross-sectional exploration of digital competencies in healthcare services among nurses. J Educ Health Promot. 2025;14:26.
27. Namdar Areshtanab H, Rahmani F, Vahidi M, Saadati SZ, Pourmahmood A. Nurses perceptions and use of artificial intelligence in healthcare. Sci Rep. 2025;15(1):27801.
28. World Health Organization. Ethics and governance of artificial intelligence for health. Geneva: WHO; 2021. Available at: https://www.who.int/publications/i/item/9789240029200. Accessed on 25 May 2025.
29. Aijaz M, Lewis VA, Murray GF. Advancing equity in challenging times: A qualitative study of telehealth expansion and changing patient-provider relationships in primary care settings during the COVID-19 pandemic. Digit Health. 2024;10:20552076241233148.
30. Knop MR, Nagashima-Hayashi M, Lin R, Saing CH, Ung M, Oy S, et.al. Impact of mHealth interventions on maternal, newborn, and child health from conception to 24 months postpartum in low- and middle-income countries: a systematic review. BMC Med. 2024;22(1):196.
31. Wynn M, Garwood-Cross L, Vasilica C, Griffiths M, Heaslip V, Phillips N. Digitizing nursing: A theoretical and holistic exploration to understand the adoption and use of digital technologies by nurses. J Adv Nurs. 2023;79(10):3737-47.
32. Burkoski V. Nursing Leadership in the Fully Digital Practice Realm. Nurs Leadersh (Tor Ont). 2019;32(SP):8-15.
33. Park CW, Seo SW, Kang N, Ko B, Choi BW, Park CM, et al. Artificial Intelligence in Health Care: Current Applications and Issues. J Korean Med Sci. 2020;35(42):e379.
34. Wei Q, Pan S, Liu X, Hong M, Nong C, Zhang W. The integration of AI in nursing: addressing current applications, challenges, and future directions. Front Med (Lausanne). 2025;12:1545420.
35. Zhang X, Hailu B, Tabor DC, Gold R, Sayre MH, Sim I, et al. Role of Health Information Technology in Addressing Health Disparities: Patient, Clinician, and System Perspectives. Med Care. 2019;6(2):S115-20.
36. Mehjabeen D, Patel K, Jindal RM. Decolonizing global health: a scoping review. BMC Health Serv Res. 2025;25(1):828.
37. Okada M, Endo Y, Shobusawa S. The Current State of Nurses in Charge of Information Management in Japanese Hospitals. Stud Health Technol Inform. 2025;329:1706-7.
38. Mechael PN. State of gender in digital health: where we are and what needs to happen to maximize benefits for all. Womens Health Nurs. 2025;31(2):81-7.
39. Tuckett A, Winters-Chang P. Equity-driven digital transformation in nursing. Int Nurs Rev. 2022;69(1):3-9.
40. Lee C, Martin R, Johnson P, Clarke A, Smith J, Patel V, et al. Nurses and midwives at the digital policy table: A mixed-methods study. Digit Health. 2021;7:20552076211015234.
41. Alrasheeday AM, Alshammari B, Alkubati SA, Pasay-An E, Albloushi M, Alshammari AM. Nurses' Attitudes and Factors Affecting Use of Electronic Health Record in Saudi Arabia. Healthcare (Basel). 2023;11(17):2393.
42. Appiah EO, Menlah A, Xu J. Exploring the challenges and roles of nurses in delivering palliative care for cancer patients and co-morbidities in Ghana. BMC Palliat Care. 2023;22:121.
43. Annandale E, Baston H, Beynon-Jones S, et al. Shared decision-making during childbirth in maternity units: the VIP mixed-methods study [Internet]. Southampton (UK): National Institute for Health and Care Research; 2022 Dec. (Health and Social Care Delivery Research, No. 10.36.) References. Available at: https://www.ncbi.nlm.nih.gov/books/NBK587613/. Accessed on 25 May 2025.
44. Sharma S, Oli N, Thapa B. Electronic health-literacy skills among nursing students. Adv Med Educ Pract. 2019;10:527-32.
45. Zhang N, Ye J, Zhong Y, Chen Z. Digital Transformation in the Chinese Construction Industry: Status, Barriers, and Impact. Buildings. 2023;13:1092.
46. Condor-Camara DF, Pio-Del-Aguila C, Bendezu-Quispe G, González-Aguña A, Santamaría-García JM. Characterization of Nursing Informatics Courses in Latin America and the Caribbean. Healthc Inform Res. 2025;31(3):253-62.
47. Rony MKK, Ahmad S, Tanha SM, Das DC, Akter MR, Khatun MA, et.al. Nursing Educators' Perspectives on the Integration of Artificial Intelligence Into Academic Settings. SAGE Open Nurs. 2025;11:23779608251342931.
48. Buljac-Samardzic M, Doekhie KD, van Wijngaarden JDH. Interventions to improve team effectiveness within health care: a systematic review of the past decade. Hum Resour Health. 2020;18(1):2.

Cite this article as: Kalyani B, Baretto JS, Shiralashetti I, Kottalagi I, Umar M, Chiraladinni U, et al. Current nursing and midwifery role in shaping digital health policy and practices for nursing professionals: an integrative systematic review. Int J Reprod Contracept Obstet Gynecol 2025;14:3942-54.