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Systematic Review

Innovation in nursing led maternal and infant care: emerging trends and impact in Indian clinical setting

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ABSTRACT

Nursing-led models of maternal and infant care are increasingly recognised as pivotal strategies for improving survival, quality of care, and patient experience in India's evolving health system. Despite substantial gains in institutional delivery and service coverage, preventable maternal and neonatal deaths persist, largely due to gaps in quality, continuity and respectful care. This systematic review synthesises evidence on nursing- and midwifery-led innovations across community, facility, digital and quality-improvement domains in Indian clinical settings. Evidence indicates that community-based interventions such as home-based newborn care (HBNC), delivered through trained and supervised nursing cadres, significantly reduce neonatal mortality and improve early breastfeeding and care-seeking behaviours. Facility-based midwifery-led care, including midwifery-led care units (MLCUs), demonstrates lower intervention rates, enhanced maternal autonomy and high satisfaction without compromising neonatal outcomes among low-risk women. In neonatal intensive care units (NICUs), nurse-led developmental supportive care, Kangaroo mother care (KMC), breastfeeding counselling and maternal participation interventions improve neurobehavioural outcomes, thermoregulation, bonding and maternal mental wellbeing. Digital health innovations implemented by nurses, auxiliary nurse midwives (ANMs) and accredited social health activists (ASHAs) enhance health communication, tracking and service utilisation, while quality-improvement initiatives such as LaQshya strengthen intrapartum safety, teamwork and adherence to evidence-based practices. Key enablers include competency-based education, regulatory recognition of advanced nursing roles, supportive supervision, adequate staffing and integrated digital systems. Persistent fragmentation across the continuum of care remains a challenge, underscoring the need for integrated pathways linking community, labour room, postnatal and neonatal services.

Keywords: Nursing-led care, Midwifery, Maternal health, Newborn care, India, HBNC, MLCU, NICU, Kangaroo mother care, mHealth, LaQshya

INTRODUCTION

Maternal and newborn health remains a central priority of India's public-health agenda. Over the past two decades, the country has achieved substantial reductions in maternal and neonatal mortality, driven largely by expansion of institutional deliveries, conditional cash-transfer schemes and large-scale community health worker programmes.[1-4] India's maternal mortality ratio declined by nearly 70% between the late 1990s and early 2020s, while neonatal mortality also fell steadily during the same period.[1-3] Despite these achievements, preventable deaths due to haemorrhage, hypertensive disorders, sepsis, prematurity and intrapartum complications continue to account for a significant proportion of maternal and neonatal mortality, with wide interstate and intrastate disparities persisting.[3-5]

High coverage of services has not uniformly translated into high-quality, respectful and continuous care. Overmedicalisation, particularly rising caesarean section rates in both public and private sectors, coexists with avoidable delays in recognition and management of complications, inadequate postnatal follow-up and suboptimal newborn care practices.[5-7] These challenges underscore the need to move beyond access-oriented strategies towards models that emphasise quality, continuity, person-centredness and equity.

Within this evolving landscape, nursing and midwifery cadres occupy a pivotal position in India's maternal and infant health system. Staff nurses, ANMs, ASHAs and the emerging nurse practitioner in midwifery (NPM) workforce collectively form the backbone of care across community, primary, secondary and tertiary levels.[8-10] National initiatives such as HBNC, facility-based newborn care (FBNC), LaQshya labour-room quality improvement and the midwifery initiative explicitly position nurses and midwives as leaders in delivering evidence-based, respectful and continuous care.[9-13]

In parallel, a growing body of Indian research documents nursing-led and midwifery-led innovations that extend beyond routine task execution to redesign how maternal and infant care is organised, delivered and experienced. These innovations span community-based home-visiting models, midwife-led intrapartum units, nurse-driven neonatal and postnatal interventions, digital health tools implemented by frontline workers and system-level quality-improvement initiatives.[14-19]

For this review, nursing-led innovation is defined as any new or adapted model, intervention, technology or quality-improvement approach in which nurses, midwives, ANMs or ASHAs lead the design, delivery or coordination of care, with the primary aim of improving outcomes for pregnant women, postpartum mothers, newborns or mother-infant dyads. Such innovations may involve technological components, but more often represent organisational and relational changes that reposition nurses as coordinators, educators, advocates and clinical leaders rather than solely task performers.[14,15]

These innovations can be broadly categorised into: Community and home-based models led by ANMs or ASHAs, such as HBNC and integrated counselling packages; midwifery-led intrapartum care, including MLCUs staffed by NPMs; facility-based nurse-led clinical interventions in labour rooms, postnatal wards and NICUs; Digital and mHealth innovations implemented by nursing cadres; and nurse-led quality-improvement and health-system initiatives.

Rationale and objectives

While evidence on individual nursing-led interventions exists, it remains fragmented across disciplines and settings. Few reviews synthesise evidence across the full continuum of care in India, from pregnancy and childbirth to postnatal and early infancy, or examine how nursing-led innovations interact with policy and health-system reforms. This systematic review therefore aims to synthesise empirical evidence on nursing- and midwifery-led innovations in maternal and infant care in Indian clinical and community settings, assess their impact on clinical and experiential outcomes, identify enabling and constraining factors, and highlight priorities for future research, education and policy.

METHODS

Design

This review followed the preferred reporting items for systematic reviews and meta-analyses (PRISMA) framework and guidance from the Cochrane handbook for systematic reviews of interventions, adapted for mixed quantitative and qualitative evidence show in Figure 1.[20,21]

Eligibility criteria

Studies were selected using the population-intervention-comparison-outcome (PICO) framework. Eligible studies included pregnant women, postpartum mothers and infants up to 12 months in India; interventions led by nurses, midwives, ANMs or ASHAs; comparisons with routine or non-nurse-led care; and outcomes related to mortality, morbidity, breastfeeding, care-seeking, maternal psychological wellbeing and experience of care. Randomised controlled trials, quasi-experimental studies, observational studies and implementation evaluations published between January 2000 and May 2025 were included. Editorials and commentaries without empirical data were excluded.

Search strategy

A comprehensive search was conducted in PubMed/Medline, CINAHL, Scopus, Web of Science, Cochrane Library, IndMED and Google Scholar using

combinations of keywords and MeSH terms related to nursing-led care, midwifery, maternal health, newborn care and India, Reference lists of relevant reviews and national guideline documents were hand-searched to identify additional studies.

Study selection and data extraction

Titles and abstracts were screened independently by two reviewers, followed by full-text assessment. A standardised data-extraction form captured study characteristics, intervention details, outcomes and implementation insights show in Table 2. Due to heterogeneity in interventions and outcomes, a narrative synthesis approach was adopted.

Quality appraisal

Methodological quality was assessed using the Cochrane risk of bias tool for randomised trials, ROBINS-I for non-randomised studies and CASP checklists for observational and qualitative studies.[21,22]

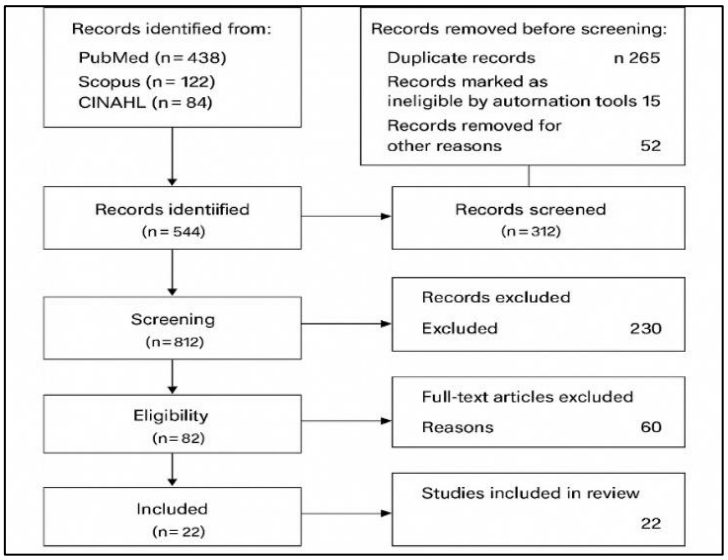

Figure 1: PRISMA flow diagram.

Table 1: Comprehensive search.

Database	Free-text keywords (title/abstract)	Example Boolean search string
PubMed/ Medline	Nurs*; nurse-led; nursing-led; nurse practitioner*; midwi*; midwife-led; ANM; auxiliary nurse midwife; ASHA; accredited social health activist	("Nursing" [MeSH] OR "Nurses" [MeSH] OR "Midwifery" [MeSH] OR "Community Health Workers" [MeSH] OR nurs* OR nurse-led OR midwife-led OR ANM OR ASHA) AND ("Maternal Health Services" [MeSH] OR "Pregnancy" [MeSH] OR "Parturition" [MeSH] OR "Postpartum Period" [MeSH] OR "Infant, Newborn" [MeSH] OR maternal OR antenatal OR intrapartum OR neonatal)
CINAHL (EBSCO)	Nurs*; nurse-led; nurse managed; midwife-led; ANM; ASHA; community health worker*	(MH "Nurses+" OR MH "Midwifery+" OR MH "Community Health Workers" OR nurs* OR nurse-led OR midwife-led OR ANM OR ASHA) AND (MH "Maternal Health Services+" OR MH "Pregnancy" OR MH "Postnatal Care" OR MH "Neonatal Nursing") AND (India OR Indian)
Scopus	Nurs*; nurse-led; nurse practitioner*; midwi*; midwife-led; ANM; ASHA	TITLE-ABS-KEY (nurs* OR nurse-led OR nurse practitioner* OR midwife-led OR ANM OR ASHA) AND TITLE-ABS-KEY (maternal OR antenatal OR intrapartum OR postpartum OR neonatal OR infant*) AND TITLE-ABS-KEY (India OR Indian) AND TITLE-ABS-KEY (innovation)*
Web of Science	Nurs*; nurse-led; nurse practitioner*; midwife-led; ANM; ASHA	TS=(nurs* OR nurse-led OR nurse practitioner* OR midwife-led OR ANM OR ASHA) AND TS=(maternal OR antenatal OR intrapartum OR postpartum OR neonatal OR infant*) AND TS=(India OR Indian) AND TS=(innovation* OR HBNC OR MLCU OR LaQshya OR mHealth OR telemedicine OR quality improvement)
Cochrane Library	nurse-led; nursing-led; midwifery-led; ANM; ASHA	([Nurses] OR [Midwifery] OR [Community Health Workers]) AND ([Maternal Health Services] OR [Pregnancy] OR [Postpartum Period] OR [Infant, Newborn]) AND India
Google Scholar	nurse-led maternal India; midwife-led childbirth India; HBNC India; LaQshya labour room; MLCU India	Example searches: "nurse-led" AND maternal AND India; "home based newborn care" AND India; ASHA AND newborn care AND India

Table 2: Quality assessment.

Authors	Country/ setting	Study design	Sample/ unit	Nursing-led intervention	Appraisal tool	Key quality criteria met	Overall quality
Bang et al[24]	India (Rural Gadchiroli)	Cluster field trial	39 intervention vs 47 control villages	HBNC under nurse supervision	Cochrane RoB (Cluster RCT)	Randomisation, objective mortality outcomes, clear intervention	High
Bang et al[25]	India (Rural)	Longitudinal cohort	13-year follow-up cohort	Sustained HBNC model	CASP Cohort	Long follow-up, consistency of outcomes	High-moderate
Rasaily et al[26]	India (5 districts)	Cluster randomised trial	Multi-district clusters	HBNC via dedicated workers vs AWW	Cochrane RoB	Robust CRT design, low attrition	High
Hannah et al[27]	India (Urban)	Mixed-methods evaluation	ASHAs and beneficiaries	HBNC under national health mission	ROBINS-I	Real-world implementation data	Moderate
Neogi et al[14]	India (National)	Narrative review	National literature	Community newborn-care nursing models	Narrative checklist	Policy relevance, conceptual clarity	Moderate
Choudhury et al[16]	India (Tribal Jharkhand)	Quasi-experimental	Pregnant tribal women	ASHA-led mHealth counselling	ROBINS-I	Defined comparator, behavioural outcomes	Moderate
Singh et al[18]	India (BIMARU states)	Systematic review	Multiple studies	mHealth via frontline workers	AMSTAR-2	Comprehensive search, bias assessment	High-moderate
Mehta et al[19]	India (National)	Systematic review	Multiple studies	mHealth maternal–child health interventions	AMSTAR-2	Transparent methodology	Moderate
Beckingham et al[30]	India (Hyderabad)	Qualitative case report	Facility staff & mothers	Professional midwife-led maternity care	CASP Qualitative	Rich contextual analysis	Moderate
Podder et al[31]	India (Medical college)	Observational comparative	Low-risk labouring women	Midwifery-Led Care Unit (MLCU)	ROBINS-I	Clear comparison, outcome reporting	Moderate
Sandall et al[33]	Global (incl. LMICs)	Cochrane systematic review	RCTs	Midwife-led continuity of care	Cochrane RoB + GRADE	Gold-standard synthesis	High
Visithra et al[32]	India (South India)	Quasi-experimental	High-risk pregnant women	Nurse-led antenatal education	ROBINS-I	Structured intervention, validated tools	Moderate
Sanjoli et al[28]	India (Tertiary NICU)	Randomised controlled trial	Preterm infants and mothers	Nurse-guided maternal intervention	Cochrane RoB	Randomisation, validated stress scales	High–moderate
Lee et al[22]	Global	Scoping review	NICU studies	Developmentally supportive nursing care	Scoping review checklist	Broad evidence mapping	Moderate
Velasco Arias et al[23]	Global (incl. LMICs)	Systematic review	Preterm infants	Developmental-centred care	AMSTAR-2	Strong methodology, transparent synthesis	High–moderate
Boundy et al[36]	Global	Meta-analysis	Low-birth-weight infants	KMC	AMSTAR-2	Pooled effect estimates	High
Conde-Agudelo et al[37]	Global	Cochrane review	LBW infants	KMC	Cochrane RoB	Rigorous synthesis	High
O'Brien et al[38]	Global	Cluster RCT	NICU families	Family-integrated care	Cochrane RoB	Multisite, validated outcomes	High
Agarwal et al[39]	LMICs	Mixed-methods review	Frontline workers	mHealth implementation by CHWs	CASP Mixed-methods	Implementation depth	Moderate
Free et al[40]	Global	Systematic review	Behavioural interventions	Mobile-health behaviour change	AMSTAR-2	Large evidence base	High
Bhutta et al[44]	Global	Modelling review	Maternal–newborn deaths	Health-system interventions	CASP Modelling	Strong epidemiological logic	High
Kruk et al[46]	Global	Conceptual and empirical	Health systems	Quality-of-care framework	CASP observational	Policy relevance	High-moderate

RESULTS

Community and home-based nursing-led models

The strongest evidence for nursing-inspired community innovations in India comes from HBNC. The landmark Gadchiroli field trial evaluated a comprehensive HBNC package delivered by trained village health workers under nurse-led supervision. The intervention resulted in a 62% reduction in neonatal mortality and a 46% reduction in infant mortality compared with control villages.[24] Long-term follow-up demonstrated sustained benefits, including reductions in maternal morbidities linked to improved home care and timely referral.[25]

Subsequent multicentre cluster randomised trials compared HBNC delivered by dedicated workers versus anganwadi workers and routine care. Significant reductions in neonatal mortality were observed only when care was delivered by dedicated, intensively trained workers supported by strong nursing supervision.[26]

These findings informed national HBNC guidelines implemented through ASHAs and ANMs, emphasising structured home visits, counselling and referral linkages.[9-11] Programme evaluations across multiple states show improvements in early breastfeeding, danger-sign recognition and referral adherence where ASHAs receive regular training and supportive supervision.[27-29] However, effectiveness varies with workload, incentive structures and supervision quality.

Midwifery-led intrapartum care and MLCUs

India's Midwifery Initiative represents a major policy shift towards professional midwifery. Early evaluations of MLCUs indicate lower caesarean section rates, reduced routine interventions and higher maternal satisfaction among low-risk women, with neonatal outcomes comparable to standard obstetric-led care.[30,31] Case studies of professional midwifery programmes highlight improved respectful care, maternal autonomy and continuity.[32] These findings align with global evidence supporting midwife-led continuity models.[33]

Nurse-led NICU and postnatal innovations

In NICUs, nurse-led developmental supportive care and family-integrated models are increasingly implemented. Randomised trials of nurse-guided maternal participation packages demonstrate reduced neonatal stress and improved neurobehavioural outcomes in preterm infants.[34] Nurse-led KMC and breastfeeding support significantly increase uptake and duration, improving thermoregulation, bonding and feeding outcomes.[35-37]

Emerging evidence also suggests benefits of nurse-led counselling for maternal mental health, particularly among mothers of preterm infants.[38]

Digital and mHealth innovations

Digital health interventions implemented by ASHAs, ANMs and nurses improve maternal knowledge, care-seeking and service utilisation. Quasi-experimental studies demonstrate improved awareness of antenatal and postnatal practices and increased facility deliveries.[39] Systematic reviews report positive behavioural outcomes but variable effects on clinical endpoints, highlighting the importance of integration with health-system workflows.[40–42]

Nurse-led quality-improvement initiatives

LaQshya positions nurses as leaders of labour-room quality improvement. Early reports indicate improved adherence to evidence-based practices, enhanced teamwork and reductions in intrapartum-related adverse outcomes in well-implemented facilities.[12,43] Nurse-led audits, simulations and feedback loops strengthen intrapartum and newborn care processes.[44]

DISCUSSION

This systematic review demonstrates that nursing- and midwifery-led innovations constitute a foundational pillar of maternal and infant health improvement in India, particularly in translating high service coverage into meaningful gains in quality, continuity and equity of care. Across community, facility, digital and system-level interventions, the evidence consistently shows that when nurses, midwives, ANMs and ASHAs are empowered with appropriate training, autonomy and institutional support, they can deliver interventions that significantly improve maternal and neonatal outcomes.[24-26,30-34]

These findings reinforce the critical role of the nursing workforce not merely as implementers of physician-directed care, but as clinical leaders, educators and system-change agents within India's health system.

Community-based nursing-led care and mortality reduction

The most compelling evidence for nursing-led innovation emerges from community-based home-visiting models, particularly HBNC. The magnitude of neonatal mortality reduction observed in Indian HBNC trials-ranging from 25% to over 60%-is among the largest reported globally for community-level interventions.[24-26] These outcomes highlight the effectiveness of early postnatal home visits, infection recognition, breastfeeding support and timely referral when delivered through well-trained, supervised frontline workers operating under nursing oversight. Importantly, evidence indicates that effectiveness is contingent not only on technical training, but also on the intensity, focus and continuity of engagement, as demonstrated by the superior outcomes achieved by dedicated workers compared with the multi-tasked cadres.[26]

From a health-systems perspective, HBNC illustrates how nursing-led continuity bridges the gap between households and facilities, particularly in rural, tribal and hard-to-reach settings where facility-based care alone is insufficient.[9,27,29]

However, the variability in outcomes observed across programme evaluations underscores the vulnerability of such models to workforce overload, inconsistent supervision and incentive misalignment.[27-29] These findings suggest that scaling community nursing innovations requires sustained investment in supportive supervision, realistic caseloads and integration with referral facilities rather than reliance on task-shifting alone.

Midwifery-led intrapartum care and quality of childbirth experience

Midwifery-led intrapartum care represents a paradigm shift in India's maternity services, challenging historically obstetric-dominated models. Early evidence from MLCUs suggests that professional midwifery can reduce unnecessary medical interventions, including caesarean sections, while maintaining maternal and neonatal safety and improving women's satisfaction and autonomy.[30-32]

These findings are congruent with high-quality international evidence demonstrating the benefits of midwife-led continuity models.[33]

Beyond clinical outcomes, midwifery-led care addresses long-standing concerns related to disrespectful maternity care, lack of informed choice and limited emotional support during childbirth in Indian facilities.[5,6] The emphasis on physiological birth, non-pharmacological pain management and shared decision-making aligns with global rights-based frameworks for respectful maternity care. However, the success of MLCUs is highly dependent on regulatory clarity, interprofessional collaboration and acceptance by obstetric teams. Resistance arising from professional hierarchies, unclear scopes of practice and limited career pathways for midwives can undermine sustainability.[10–12]

Thus, while midwifery-led care holds transformative potential, its scale-up requires not only technical training but also systemic cultural change within institutions.

Nurse-led NICU and postnatal interventions: beyond survival

In NICUs, nurse-led developmental supportive care (DSC), KMC and family-integrated models demonstrate a shift from survival-focused care towards holistic neurodevelopmental and psychosocial outcomes.[34-37] Evidence from Indian trials shows that nurse-guided maternal participation reduces neonatal stress and improves behavioural organisation in preterm infants, outcomes that are increasingly recognised as predictors of long-term neurodevelopment.[34] These findings align with international literature affirming the central role of nurses in translating developmental care principles into daily clinical practice.[35-37]

Equally important are the benefits for maternal wellbeing. NICU admission is a major stressor for families, often associated with anxiety, depression and impaired bonding. Nurse-led counselling, education and peer-support interventions mitigate these risks by empowering mothers as active participants in care, strengthening confidence and attachment.[38] Such models reposition nurses as facilitators of family-centred care, highlighting their unique role at the intersection of technology, caregiving and emotional support.

Digital health innovations and the nursing interface

Digital and mHealth innovations increasingly shape maternal and infant care delivery in India, with nurses, ANMs and ASHAs serving as the critical interface between technology and families.[39-42] Evidence suggests that digital tools enhance counselling quality, tracking and care coordination, leading to improvements in maternal knowledge, service utilisation and selected behavioural outcomes.[39,40]

However, the mixed impact on hard clinical endpoints reflects broader challenges in digital health implementation, including short project durations, fragmented platforms and insufficient integration with routine health systems.[41,42]

Nursing leadership in quality improvement and system reform

Quality-improvement initiatives such as LaQshya highlight the evolving leadership role of nurses within health-system reform. By positioning nurses as champions of labour-room safety, audit and simulation-based training, LaQshya leverages their continuous presence and operational knowledge to drive change.[12,43,44]

Early evidence of improved adherence to evidence-based practices and reductions in intrapartum-related adverse outcomes in high-performing facilities suggests that the nurse-led quality improvement can yield system-level benefits.

Implications for research and policy

Future research must prioritise rigorous evaluation of nursing-led models using implementation-science frameworks, cost-effectiveness analyses and long-term outcome measures.

Policymakers should view nursing-led innovation not as a substitute for physician care, but as a complementary and essential strategy for achieving universal, high-quality maternal and newborn health coverage in India.

Table 3: Results summary of included studies.

Authors	Objective	Purpose	Domain	Setting/ area	Country	Research design	Sample and population	Sampling technique and methodology	Key results	Conclusion
Bang et al[24]	To assess effect of HBNC on neonatal mortality	Evaluate community neonatal care	Community newborn care	Rural villages (Gadchiroli)	India	Cluster field trial	Newborns and mothers (39 vs 47 villages)	Cluster sampling; home visits, sepsis mgmt, counselling	62% ↓ neonatal mortality; 46% ↓ infant mortality	HBNC under nurse supervision is highly effective in rural settings
Bang et al[25]	To assess long-term effects of HBNC	Determine sustainability	Community maternal–newborn care	Rural Gadchiroli	India	Longitudinal cohort	Mothers and infants (13-year follow-up)	Cohort follow-up of HBNC villages	Sustained ↓ maternal morbidity and neonatal illness	Long-term benefits of nurse-led HBNC sustained
Rasaily et al[26]	Compare HBNC delivery cadres	Identify effective workforce model	Community newborn care	Multi-district	India	Cluster RCT	Newborns across districts	Cluster randomisation; HBNC by cadres	25% ↓ neonatal mortality in dedicated worker arm	Dedicated, trained workers essential for HBNC success
Hannah et al[27]	Evaluate HBNC under NHM	Assess urban implementation	Community newborn care	Urban slums	India	Mixed-methods evaluation	ASHAs and beneficiaries	Programme evaluation + interviews	Improved breastfeeding and referral; variable coverage	Urban HBNC feasible but supervision critical
Neogi et al[14]	Synthesise community newborn care	Policy guidance	Community nursing	National	India	Narrative review	National literature	Literature synthesis	Identified scalable nurse-led strategies	Nursing roles central to community newborn survival
Choudhury et al[16]	Improve maternal awareness via mHealth	Evaluate digital counselling	Digital maternal health	Tribal Jharkhand	India	Quasi-experimental	Pregnant tribal women	ASHA-led mobile counselling	↑ knowledge, ↑ facility delivery	mHealth effective when nurse/ASHA-led
Singh et al[18]	Review mHealth in BIMARU states	Assess system strengthening	Digital health	BIMARU states	India	Systematic review	Multiple studies	AMSTAR-2 methodology	Improved tracking and counselling	Digital tools strengthen frontline care
Mehta et al[19]	Assess health impact of mHealth	Summarise outcomes	Digital maternal-child health	National	India	Systematic review	Multiple interventions	Structured review	Positive behaviour change; limited clinical outcomes	mHealth promising but needs robust trials
Beckingham et al[30]	Document midwife-led care implementation	Feasibility analysis	Midwifery care	Tertiary hospital	India	Qualitative case study	Women and staff	Interviews and observation	Improved dignity and autonomy	Midwife-led care culturally feasible
Podder et al[31]	Assess MLCU effectiveness	Compare intrapartum outcomes	Midwifery-led care	Medical college	India	Observational comparative	Low-risk labouring women	Convenience sampling	↓ C-sections; ↑ satisfaction	MLCUs safe and respectful

Continued.

Authors	Objective	Purpose	Domain	Setting/ area	Country	Research design	Sample and population	Sampling technique and methodology	Key results	Conclusion
Sandall et al[33]	Compare midwife-led models	Global effectiveness	Midwifery continuity	Multi-country	Global	Cochrane review	RCTs	Systematic synthesis	↓ intervention rates; ↑ satisfaction	Strong evidence for midwife-led care
Visithra et al[32]	Evaluate antenatal education	Improve self-care	Antenatal nursing	Hospital clinics	India	Quasi-experimental	High-risk pregnant women	Purposive sampling	↑ knowledge and self-care	Nurse-led education improves preparedness
Sanjoli et al[28]	Reduce neonatal stress	Test nurse-guided care	NICU nursing	Tertiary NICU	India	RCT	Preterm infants & mothers	Parallel randomisation	↓ neonatal stress; ↑ behaviour scores	Nurse-guided maternal care beneficial
Lee et al[22]	Map DSC evidence	Identify trends	NICU developmental care	NICUs	Global	Scoping review	Multiple studies	Evidence mapping	Improved neurobehaviour and the weight gain	DSC is core nursing practice
Velasco Arias et al[23]	Evaluate DSC interventions	Consolidate evidence	NICU developmental care	NICUs	Global	Systematic review	Preterm infants	AMSTAR-2	Improved feeding and behaviour	Supports nurse-led DSC
Boundy et al[36]	Assess KMC outcomes	Mortality reduction	Neonatal care	Hospitals	Global	Meta-analysis	LBW infants	Pooled analysis	↓ mortality and the infection	KMC highly effective
Conde-Agudelo et al[37]	Evaluate KMC effectiveness	Evidence synthesis	Neonatal care	Hospitals	Global	Cochrane review	LBW infants	RCT synthesis	↓ morbidity and mortality	Strong support for KMC
O'Brien et al[38]	Evaluate family-integrated care	Improve NICU outcomes	NICU family care	NICUs	Global	Cluster RCT	NICU families	Multisite clusters	↑ parental confidence; ↓ stress	Family-integrated nursing care effective
Agarwal et al[39]	Assess mHealth feasibility	Worker usability	Digital health	LMICs	Global	Mixed-methods review	Frontline workers	Implementation synthesis	Improved communication	mHealth supports nurse workflows
Free et al[40]	Assess mHealth behaviour change	Effectiveness review	Digital health	Global	Global	Systematic review	Behavioural studies	Meta-synthesis	Positive behaviour outcomes	Mobile health effective
Bhutta et al[44]	Identify life-saving interventions	System modelling	Health systems	Global	Global	Modelling review	MNH deaths	Epidemiological modelling	Large preventable death burden	System strengthening critical
Kruk et al[46]	Define quality health systems	Framework development	Health systems	Global	Global	Conceptual + empirical	Health systems data	Framework analysis	Quality drives outcomes	High-quality systems essential

CONCLUSION

This review provides comprehensive evidence that nursing-and midwifery-led innovations are central to strengthening maternal and infant health outcomes in India. Across community, facility and system levels, nurse-led models have demonstrated substantial effectiveness in reducing neonatal mortality, improving quality and continuity of care, enhancing maternal and family experiences, and advancing equity-particularly in underserved rural, tribal and urban-poor settings. These findings affirm that nurses, midwives, ANMs and ASHAs are not merely auxiliary providers but core agents of health-system transformation. Community-based interventions such as HBNC illustrate how nurse-supervised continuity of care can bridge critical gaps between households and facilities, yielding some of the largest documented reductions in neonatal mortality globally when supported by adequate training and supervision. Facility-based innovations, including MLCUs and nurse-driven neonatal and postnatal interventions, demonstrate that empowering nurses with clinical autonomy and leadership roles improves respectful maternity care, reduces unnecessary interventions and enhances developmental and psychosocial outcomes for newborns. Digital and quality-improvement initiatives further highlight the expanding role of nurses as coordinators, communicators and quality champions within an increasingly complex health system. In conclusion, strengthening nursing- and midwifery-led models of care is not optional but essential for achieving India's maternal and newborn health goals and advancing universal health coverage. By investing in the leadership, autonomy and capacity of its nursing workforce, India can consolidate past gains, close persistent quality and equity gaps, and offer a scalable model for other low- and middle-income countries seeking to transform maternal and infant care through nursing-led innovation.

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