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Digital Health Interventions for Breastfeeding Support: Evidence, Implementation Gaps, and The Next Generation of Equitable Lactation Care

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ABSTRACT

Breastfeeding is a high-impact maternal and child health intervention, yet global exclusive breastfeeding remains at 48% among infants younger than six months, below the 60% World Health Assembly target for 2030. At the same time, the period after hospital discharge is characterized by fragmented access to skilled lactation support, creating a strong rationale for digital health interventions (DHIs). This narrative evidence review synthesizes recent evidence on mobile health (mHealth), smartphone applications, short-message services, social media and peer-support platforms, telelactation, and hybrid digital-professional models. Particular emphasis is placed on randomized evidence and on the implications for low- and middle-income countries (LMICs). A 2026 systematic review and meta-analysis of 46 randomized or cluster-randomized trials involving 33,785 participants across 18 countries found that DHIs increased the odds of exclusive breastfeeding (OR 2.58, 95% CI 1.91–3.50; 39 trials; $n=11,601$), although heterogeneity was substantial ($I^2=83\%$) and certainty was very low. Breastfeeding duration showed a moderate standardized benefit (SMD 0.48, 95% CI 0.29–0.67), while any breastfeeding was not significantly improved (OR 1.09, 95% CI 0.90–1.31). Evidence suggests that digitally enabled support is most useful when it is timely, interactive, tailored, and linked to trained personnel rather than functioning as a stand-alone information repository. However, evidence on cost-effectiveness, safety, digital exclusion, implementation fidelity, and long-term scale-up remains sparse. This review argues that the next phase of digital breastfeeding support should shift from asking whether digital tools work to determining which components work, for whom, at what postpartum moment, and under what health-system conditions. Hybrid, equity-sensitive models integrated with routine maternal and newborn care appear the most defensible direction for policy and research.

Keywords: Breastfeeding, Exclusive Breastfeeding, Digital Health, Mhealth, Telelactation, Mobile Applications, SMS, Maternal Health, Lactation Support, LMICS

1. INTRODUCTION

Breastfeeding is simultaneously a biological process, a health behaviour, and a health-system outcome. Its success depends not only on maternal intention but also on early initiation, skilled counselling, management of lactation problems, family support, workplace conditions, social norms, and continuity of care. Globally, only 48% of infants younger than six months are exclusively breastfed. In 2025, WHO and UNICEF emphasized that this remains below the World Health Assembly target of 60% by 2030 and noted that millions of mothers still lack timely skilled breastfeeding support [1–3].

The support gap is particularly visible after discharge. Problems such as perceived insufficient milk, nipple pain, engorgement, poor latch, uncertainty about infant behaviour, and conflicting advice often arise at home and require rapid reassurance or clinical triage. Traditional lactation services are constrained by workforce availability, geography, cost, clinic timing, and the practical difficulty of attending appointments with a newborn. Digital health therefore offers an attractive proposition: move part of breastfeeding education and support from episodic facility contacts to continuous, on-demand or proactive support in the mother's daily environment.

The digital breastfeeding landscape now includes SMS and WhatsApp messaging, smartphone applications, web-based education, video demonstrations, moderated social media communities, peer-support groups, telephone and video lactation consultations, and hybrid platforms that combine automated content with human counselling. WHO's digital health guidance, however, is explicit that digital interventions should strengthen rather than substitute for functioning health systems [4]. This distinction is crucial in breastfeeding, where informational needs can often be addressed digitally, but complex feeding problems may require observation, physical assessment, or referral.

This review examines the current evidence for DHIs in breastfeeding support, with a focus on measurable breastfeeding outcomes, intervention design, equity, and health-system integration. Rather than treating 'digital health' as a single intervention, it distinguishes modalities and identifies the characteristics that appear to make digital support clinically and programmatically useful.

2. REVIEW APPROACH

This article is a narrative evidence review informed by targeted searches of PubMed/Medline-indexed literature and authoritative sources from WHO and UNICEF, with emphasis on systematic reviews, meta-analyses, randomized controlled trials (RCTs), and recent implementation evidence. Search concepts included combinations of 'breastfeeding', 'exclusive breastfeeding', 'digital health', 'mHealth', 'mobile application', 'SMS', 'text messaging', 'WhatsApp', 'telelactation', 'virtual lactation', 'social media', and 'peer support'. Priority was given to evidence published from 2018 onward, while earlier reviews were used to describe the evolution of the field. The synthesis is interpretive rather than a de novo systematic review; consequently, pooled estimates reported here are taken from published meta-analyses rather than recalculated.

3. WHY DIGITAL BREASTFEEDING SUPPORT MATTERS

3.1 A high-impact intervention with a persistent support gap

Breastfeeding provides protection against infectious disease and contributes to healthy growth and development. UNICEF and WHO estimate that improving breastfeeding rates could prevent more than 820,000 child deaths annually [2]. Yet breastfeeding behaviour is highly time-sensitive: decisions made in the first hours and days can affect subsequent exclusivity and duration. Digital support is potentially well matched to this pattern because it can deliver anticipatory guidance before problems arise and immediate support when problems occur.

3.2 The post-discharge 'continuity gap'

Facility-based counselling is necessary but often insufficient. Mothers may leave a maternity facility before mature milk production is established, while common breastfeeding difficulties peak later. Digital channels can extend the reach of lactation teams beyond discharge and create repeated contacts without requiring repeated travel. This is consistent with WHO's postnatal care framework, which emphasizes consistent information, reassurance, support, and responsive health systems [5].

3.3 Digital reach is large, but not universal

The scalability argument must be balanced against digital exclusion. In 2026, GSMA estimated that women in LMICs were 12% less likely than men to use mobile internet, with approximately 810 million women still unconnected; more than two-thirds of these women live in South Asia and sub-Saharan Africa [6]. Thus, an intervention delivered only through data-intensive smartphone applications may systematically miss women who could benefit most. Low-bandwidth channels, shared-device privacy safeguards, local-language content, offline functionality, and assisted digital access should be treated as intervention design requirements rather than optional features.

4. WHAT DOES THE BEST CURRENT EVIDENCE SHOW?

The strongest recent synthesis is the 2026 systematic review and meta-analysis by Jackson and colleagues, which included 46 randomized or cluster-randomized trials, 33,785 participants, and 18 countries [7]. Twenty-five interventions were classified as mHealth, eight as computer-based eHealth, four as telehealth, and nine as combinations of eHealth or mHealth with telehealth. Importantly, 41 of 46 studies (89%) were judged to have either some concerns or high risk of bias, underscoring the need for cautious interpretation [7].

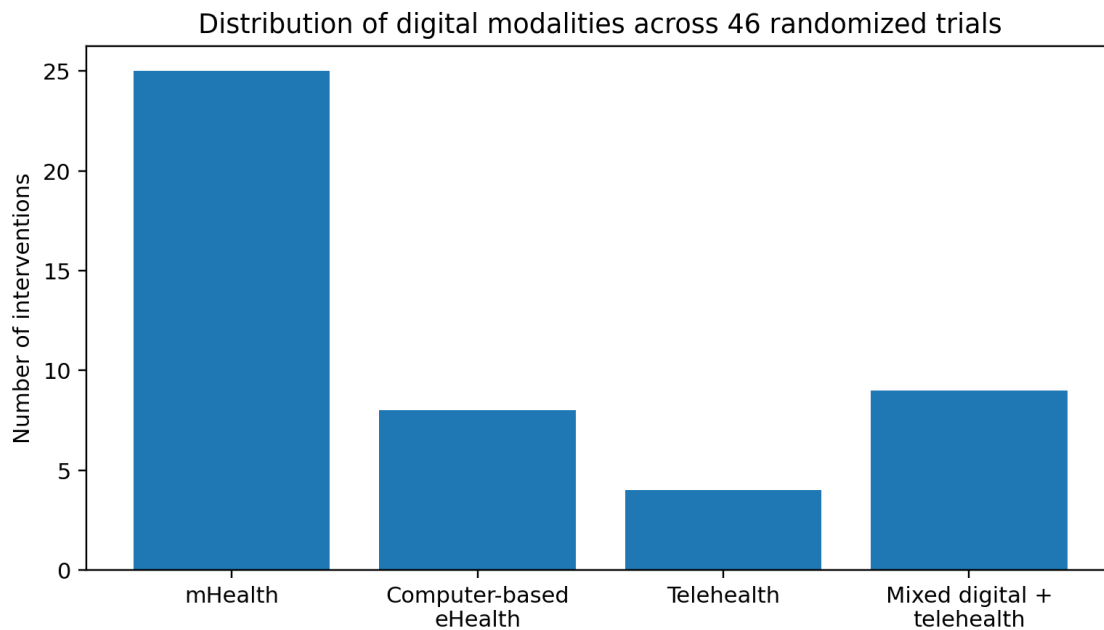


Chart-1: Distribution of digital intervention modalities in 46 randomized studies included in Jackson et al. (2026) [7].

4.1 Exclusive breastfeeding

Across 39 trials involving 11,601 participants, DHIs were associated with higher odds of exclusive breastfeeding (OR 2.58, 95% CI 1.91–3.50). The absolute evidence table in the review corresponded to approximately 200 additional exclusively breastfeeding mothers per 1,000, although the certainty was graded very low. Heterogeneity was high ($I^2=83\%$), meaning that the pooled effect should not be interpreted as a universal treatment effect [7]. A sensitivity analysis excluding trials at high risk of bias still suggested benefit (OR 2.03, 95% CI 1.40–2.96), but substantial heterogeneity remained.

4.2 Duration and any breastfeeding

For breastfeeding duration, seven trials involving 716 participants produced a standardized mean difference of 0.48 (95% CI 0.29–0.67; $I^2=0\%$), graded as moderate-certainty evidence. In contrast, 21 trials involving 8,991 participants found no clear improvement in 'any breastfeeding' (OR 1.09, 95% CI 0.90–1.31; $I^2=19\%$), with very-low-certainty evidence [7]. This pattern is conceptually important: digital support may be more capable of protecting exclusivity and extending duration among mothers who are already breastfeeding than of changing the broader binary outcome of whether any breastfeeding occurs.

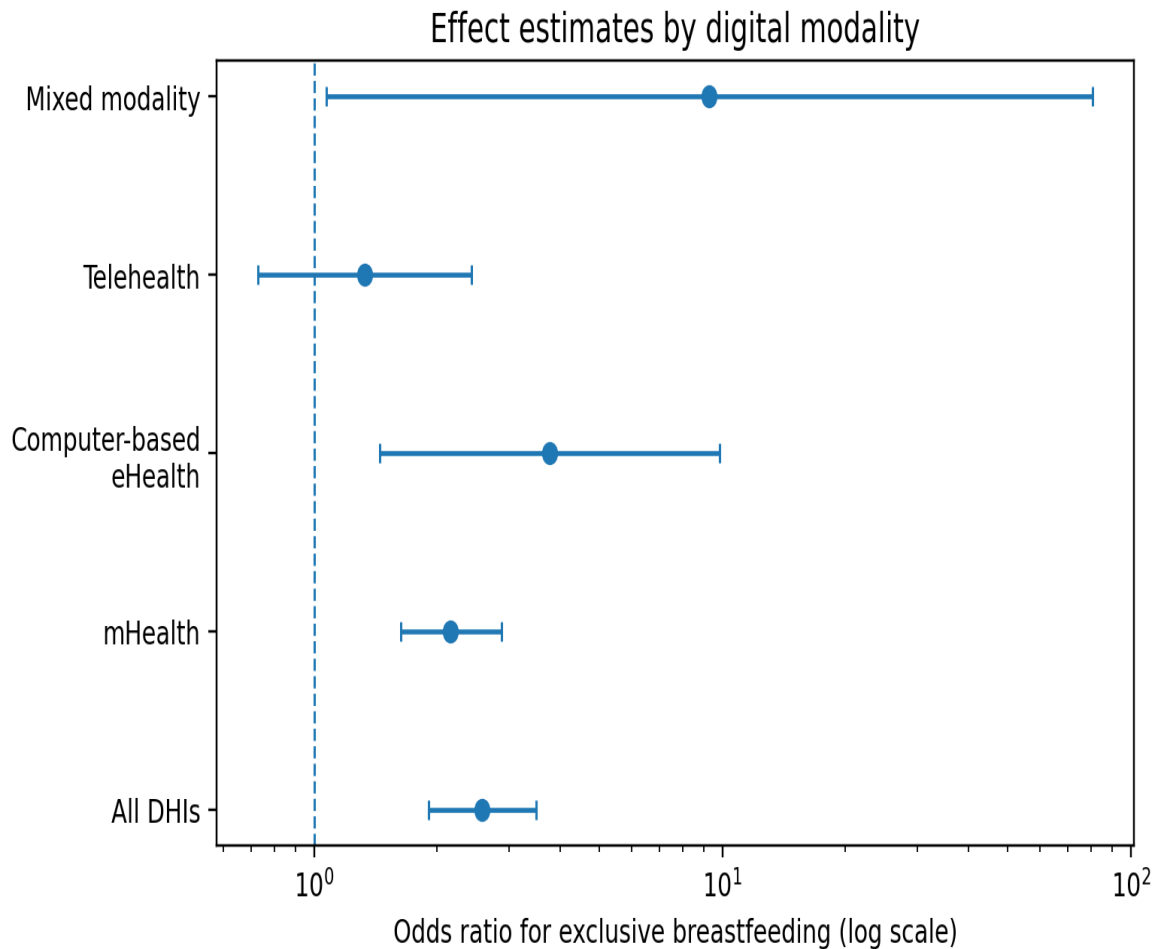


Chart-2: Published subgroup effect estimates for exclusive breastfeeding by digital modality. Error bars show 95% confidence intervals; the x-axis is logarithmic because the mixed-modality confidence interval is wide [7].

4.3 Modality appears to matter

Subgroup estimates suggest that mHealth interventions improved exclusive breastfeeding (OR 2.16, 95% CI 1.63–2.88), whereas telehealth alone showed a smaller and statistically uncertain effect (OR 1.33, 95% CI 0.73–2.43). Computer-based eHealth showed OR 3.78 (95% CI 1.45–9.83), and mixed-modality interventions showed the largest point estimate (OR 9.29, 95% CI 1.07–80.60), although the very wide confidence interval indicates substantial imprecision [7]. These findings should not be read as proof that mixed models are nine times 'better'; rather, they suggest that combining digital content with responsive human interaction deserves closer investigation.

4.4 Context and country income

The same meta-analysis reported stronger pooled effects in upper-middle-income countries (OR 4.35, 95% CI 2.42–7.83) and low/lower-middle-income countries (OR 2.73, 95% CI 1.43–5.21) than in high-income countries (OR 1.45, 95% CI 1.08–1.94). Heterogeneity was, however, substantially greater in the lower-income groups [7]. One plausible interpretation is that digital support yields larger marginal gains where conventional support is less consistently available, but this remains a hypothesis because health-system context, baseline breastfeeding prevalence, intervention intensity, and participant selection differ across trials.

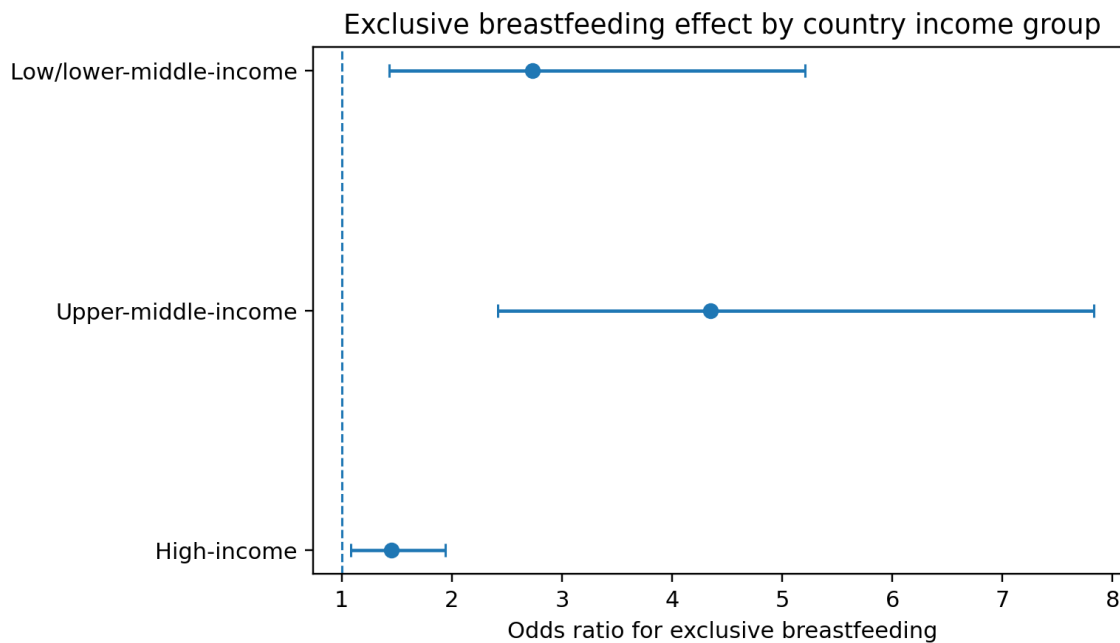


Chart-3: Published subgroup estimates for exclusive breastfeeding by World Bank country-income grouping in Jackson et al. (2026) [7].

5. DIGITAL MODALITIES: WHAT WORKS, FOR WHOM, AND WHY?

5.1 SMS and mobile messaging: low-tech, high-reach support

SMS remains one of the most scalable digital approaches because it works on basic mobile phones, uses little bandwidth, and can deliver timed content. In the Mobile WACH randomized trial in Kenya, 300 pregnant women were allocated to one-way SMS, two-way SMS with a nurse, or control and followed through 24 weeks postpartum [8]. The design is instructive because it distinguishes information delivery from interactive support. Across the broader evidence base, bidirectional communication is particularly relevant to breastfeeding because mothers' problems are individualized and evolve rapidly.

India has also generated important evidence. A 2025 cluster randomized trial evaluated a mobile messaging service delivering WHO postnatal recommendations from birth through six weeks postpartum across hospitals in four states [9]. Such platforms illustrate how breastfeeding messages can be embedded within broader postnatal care rather than deployed as isolated applications. A separate Indian randomized trial used smartphone-delivered breastfeeding technique videos via WhatsApp among 144 multigravida mothers, reflecting the feasibility of using familiar consumer platforms rather than requiring users to learn a new app [10].

5.2 Smartphone applications: convenience does not guarantee effectiveness

Dedicated breastfeeding apps can provide searchable information, videos, reminders, symptom guidance, tracking, and personalization. However, evidence shows that app availability alone is insufficient. In the multicentre COMLACT trial in Spain, 270 women were randomized to access LactApp or standard care. Six-month breastfeeding was 43.6% in the intervention group versus 41.6% in controls ($p=0.826$), showing no meaningful improvement despite personalized app access [11].

Other smaller trials have reported improvements in intermediate or short-term outcomes. A Turkish RCT of 73 mothers found higher exclusive breastfeeding and fewer breastfeeding problems during follow-up among users of a mobile application-based breastfeeding program [12]. A smartphone-based educational trial also reported significant improvements in maternal breastfeeding knowledge, attitudes, and practices [13]. These mixed results suggest that knowledge gain is easier to achieve than sustained behaviour change, and that app engagement, timing, human support, baseline care quality, and behavioural design may determine whether digital education translates into breastfeeding outcomes.

5.3 Hybrid app plus professional counselling

Hybrid platforms may address the central weakness of static apps: they can connect standardized information to individualized clinical judgement. In a randomized trial of a smartphone-based counselling and support platform, postpartum women received daily feedback and access to a multidisciplinary lactation support team in addition to routine care [14]. More recent trials similarly combine educational content with live counselling [15]. The 2026 meta-analysis found that 33 of 46 interventions required some contribution from trained or qualified personnel, while only 13 were fully automated [7]. This distribution itself is informative: much of the evidence labelled 'digital' is actually evidence for digitally mediated human support.

5.4 Telelactation and virtual consultation

Telelactation can reduce geographic and scheduling barriers by enabling real-time assessment through telephone or video. A 2022 systematic review and meta-analysis specifically examining virtual lactation support concluded that virtual approaches can support breastfeeding outcomes, although the evidence base was heterogeneous [16]. Telelactation is particularly attractive for rural families, mothers with mobility constraints, and situations where in-person services are disrupted. However, virtual assessment has limits when infant weight, oral anatomy, maternal breast pathology, or direct observation of milk transfer requires hands-on examination.

5.5 Social media and online peer support

Online communities provide something that clinical apps often do not: normalization, emotional reassurance, shared experience, and continuous peer presence. An integrative review of 14 studies found that mothers often turned to online peer support when they felt isolated or lacked professional support; users valued accessibility, community, and experiential knowledge, but evidence for direct effects on breastfeeding outcomes remained inconclusive [17]. A 2024 review of online lactation support groups identified themes including practical and emotional support, normalization, reciprocity, and improved self-efficacy, while also documenting problems with online groups [18].

The principal risk is information quality. Qualitative evidence shows that online groups can simultaneously provide reassurance and expose users to judgement, polarized debate, or misinformation [19]. A 2025 assessment of breastfeeding information on Instagram reinforced concerns regarding variable accuracy and quality [20]. For public health programmes, the implication is not to reject social media but to introduce moderation, verified content, referral pathways, and clear escalation rules.

6. THE MECHANISMS THAT MAY EXPLAIN EFFECTIVENESS

6.1 Timeliness

Breastfeeding problems are episodic and often urgent from the mother's perspective. A message delivered at 2 a.m. during cluster feeding, or rapid access to a counsellor during painful feeding, may have more behavioural value than a comprehensive antenatal lecture. Digital systems can therefore function as 'just-in-time' support.

6.2 Repetition and anticipatory guidance

Repeated, stage-specific messaging can reinforce recommendations as infant needs change. Antenatal preparation, first-week troubleshooting, growth-spurt reassurance, return-to-work guidance, expression and storage advice, and complementary feeding transitions require different content. Digital platforms can sequence these messages without increasing clinic visits.

6.3 Personalization and two-way interaction

The strongest theoretical advantage of digital health is not digitizing pamphlets but adapting support to user context. Personalization can be based on infant age, parity, mode of birth, feeding status, reported problems, maternal goals, and prior engagement. Two-way systems can also distinguish reassurance from referral.

6.4 Self-efficacy and social support

Breastfeeding self-efficacy is consistently associated with breastfeeding outcomes, making confidence a plausible mediator. However, the latest global meta-analysis did not demonstrate a clear pooled effect of DHIs on self-efficacy and cautioned that relevant studies may have been missed because inclusion required breastfeeding outcomes [7]. Digital peer communities may contribute through social support and normalization, but this mechanism requires better measurement.

6.5 Human escalation

A clinically mature digital breastfeeding pathway should be able to recognize when education is insufficient. Red flags such as poor urine output, lethargy, significant weight loss, fever, mastitis symptoms, severe nipple trauma, jaundice concerns, or persistent feeding difficulty should trigger professional review. Digital tools should therefore be designed as part of a stepped-care model: automated information for common questions, asynchronous human support for individualized problems, and rapid referral for clinical concerns.

7. IMPLEMENTATION CHALLENGES AND RISKS

Table-1: Key implementation challenges and design responses for digital breastfeeding support

Challenge	Why it matters	Design response	Research indicator
Digital exclusion	Women without smartphones, data, literacy, or private device access may be systematically excluded.	SMS/IVR options; local languages; offline content; assisted access; shared-device privacy.	Reach by socioeconomic status, rurality, literacy, device ownership.
Low engagement	Downloading an app does not mean sustained use.	Short content; proactive prompts; stage-specific messages; frictionless login; human response.	Activation, retention, message open/read rate, active days.

Misinformation	Unmoderated content can conflict with clinical guidance.	Evidence governance; clinical review; moderation; source labelling; escalation protocols.	Content accuracy audits; misinformation incidents.
Clinical safety	Some lactation problems require examination or urgent referral.	Red-flag algorithms; counsellor escalation; emergency instructions; audit trails.	Referral completion; adverse events; missed red flags.
Fragmentation	Standalone apps may duplicate or contradict routine services.	Integrate with postnatal workflows, lactation teams, community health workers and records.	Provider adoption; referral turnaround; continuity indicators.
Privacy and trust	Sensitive maternal and infant data may be exposed.	Data minimization; consent; encryption; role-based access; transparent data policy.	Privacy incidents; consent comprehension; trust measures.
Cost and sustainability	Pilot funding may not translate into scaled service.	Use existing platforms where appropriate; measure provider time and total implementation cost.	Cost per user; cost per additional EBF case; budget impact.

7.1 Evidence quality and heterogeneity

The central methodological problem is that 'digital breastfeeding intervention' describes a family of interventions rather than a single treatment. Trials differ in recruitment timing, baseline care, intervention intensity, duration, platform, degree of human involvement, breastfeeding definitions, and outcome measurement. The I^2 of 83% for exclusive breastfeeding in the 2026 meta-analysis is therefore not merely statistical noise; it reflects real clinical and implementation diversity [7]. Future reviews should increasingly use component-level analyses rather than only modality-level pooling.

7.2 Cost-effectiveness is a major blind spot

Despite frequent claims that digital health is low-cost, only one study in the 2026 review reported relevant cost outcomes. In that study, telephone-based intervention delivery averaged US\$69.04 compared with US\$37.28 for control, with an incremental cost-effectiveness ratio of US\$63.65 in relation to the reported improvement in exclusive breastfeeding [7]. One study cannot support broad economic conclusions. Future trials should prospectively collect development cost, licensing, data, provider time, training, maintenance, and scale-up costs.

7.3 Equity can improve or worsen

Digital support can extend specialist knowledge into underserved settings, but it can also preferentially benefit digitally connected, literate, urban users. Equity analysis should therefore move beyond reporting average treatment effects. Trials should test differential reach and effectiveness by income, education, rurality, language, age, parity, disability, and phone ownership. The 2026 GSMA figures demonstrate that the population excluded from mobile internet remains very large [6].

7.4 The AI question

Generative AI and conversational agents could make breastfeeding support more interactive, multilingual, and personalized. However, the current randomized breastfeeding evidence is still dominated by mHealth messaging, apps, telehealth, and human-mediated support; robust clinical evidence for autonomous AI lactation counselling remains limited. AI systems should therefore be evaluated for factual accuracy, hallucination risk, triage safety, cultural appropriateness, privacy, and their ability to defer to qualified professionals. The appropriate near-term model is likely AI-assisted rather than AI-replacing lactation care.

8. IMPLICATIONS FOR LOW- AND MIDDLE-INCOME COUNTRIES

LMICs may derive disproportionate benefit from well-designed digital breastfeeding support because specialist lactation services are often scarce while mobile communication is increasingly widespread. The pooled effect for exclusive breastfeeding in low/lower-middle-income settings was OR 2.73, although heterogeneity was high [7]. The implementation opportunity is therefore substantial but should be approached through existing health-system channels.

A pragmatic LMIC model could link antenatal enrolment to automated local-language messages, short videos or voice notes; provide two-way messaging with trained nurses, midwives, or community health workers; use a structured triage protocol for common breastfeeding concerns; and escalate high-risk cases to facility-based care. In India, this could potentially align with antenatal and postnatal contacts, frontline worker counselling, and widely used messaging platforms rather than relying solely on a new stand-alone application. Such integration is more likely to achieve scale, continuity, and trust.

9. A PROPOSED RESEARCH AGENDA

Table-2: Priority questions for the next generation of digital breastfeeding research

Priority	Key question	Recommended measurement
Active ingredients	Which components drive effect: reminders, video, peer support, personalization, or professional response?	Factorial/SMART designs; component exposure; mediation analysis.

Timing	At which antenatal/postpartum windows is digital support most effective?	Time-stamped exposure; outcomes at 1, 6, 12, 24 weeks.
Dose and engagement	How much engagement is needed before benefit occurs?	Usage logs, response latency, active days, dose-response analysis.
Equity	Who is not reached or does not benefit?	PROGRESS-Plus variables; digital access and literacy measures.
Clinical integration	Does linkage to providers outperform stand-alone information?	Referral metrics; provider workload; continuity of care.
Economics	Is the intervention affordable at population scale?	Cost-effectiveness, budget impact, provider time, maintenance.
Safety	Can digital triage identify breastfeeding and neonatal red flags reliably?	Sensitivity/specificity, adverse events, escalation appropriateness.
AI	Can conversational AI safely personalize lactation support?	Accuracy benchmarks, hallucination rate, clinician concordance, user trust.

10. DISCUSSION

The evidence base has matured considerably. In 2014, a systematic review of internet-based breastfeeding interventions identified only one eligible study and concluded that rigorous evidence was insufficient [21]. By 2026, the global randomized evidence base had expanded to 46 trials involving more than 33,000 participants [7]. This growth reflects both technological diffusion and recognition that breastfeeding support cannot be confined to maternity wards.

The direction of evidence is encouraging but should not be oversold. The pooled estimate for exclusive breastfeeding is large, yet certainty is very low and heterogeneity is substantial. Individual trials such as COMLACT demonstrate that a well-designed app can fail to improve long-term breastfeeding when compared with existing care [11]. Conversely, smaller app and messaging studies often show improvements in knowledge, problems, or exclusivity [12–14]. These apparent contradictions are useful: they suggest that the clinically meaningful unit of analysis is not 'app versus no app' but the support function delivered through the technology.

Three conclusions emerge. First, digital breastfeeding support should be conceptualized as continuity infrastructure. Its greatest value may be in extending access between formal contacts, not replacing skilled care. Second, interactivity appears central. Static information is abundant; what mothers frequently lack is timely interpretation of their own situation. Third, scale must be judged together with equity. A highly effective smartphone intervention that reaches only digitally advantaged women may have less population impact than a modestly effective, low-bandwidth service integrated with community and primary care.

The field should also resist technological solutionism. Breastfeeding is shaped by maternity practices, family support, paid leave, workplace conditions, commercial determinants, and social norms. No digital tool can compensate for harmful facility practices or structural barriers. WHO's broader digital health guidance is therefore directly applicable: technology is a means of strengthening care, not a substitute for a functioning health system [4].

11. CONCLUSION

Digital health interventions have moved from experimental adjuncts to plausible components of modern breastfeeding support. The most recent randomized evidence suggests that they may improve exclusive breastfeeding and probably increase breastfeeding duration, but the certainty and consistency of evidence remain insufficient to justify a one-size-fits-all digital solution. The strongest future model is likely hybrid: automated, personalized and low-burden digital support for routine needs, combined with rapid access to trained human counsellors and clear pathways to clinical care.

For researchers, the next question is no longer simply 'Do digital interventions work?' It is 'Which digital functions work, for which mothers, at what moment, and within which health-system conditions?' Answering that question requires better-designed trials, standardized breastfeeding outcomes, implementation and engagement metrics, equity analyses, economic evaluation, and explicit safety assessment. If these requirements are met, digital health could help transform breastfeeding support from an episodic service into a continuous, responsive system of care.

12. ACKNOWLEDGEMENT

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