

Perspectives of Auxiliary Nurse Midwives [ANMs] on Using Digital learning in Bihar: A Qualitative Study

Running Title: ANMs perspectives of using digital learning in Bihar

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Abstract: Background: Digital learning platforms are transforming how frontline health workers access continuous professional education, particularly in low-resource settings. **Objective:** This qualitative study explores the experiences of Auxiliary Nurse Midwives [ANMs] in Bihar, India, who participated in an eight-week blended learning intervention using the e-Kshamata digital platform. **Methods:** Focus Group Discussions [FGDs] were conducted during both the pre- and post-assessment phases of the study. The pre-assessment FGD involved 15 randomly selected participants and explored initial perceptions of digital learning and baseline familiarity with the e-Kshamata platform. The post-assessment FGD was conducted after eight weeks of platform use and focused on learning outcomes, user experience, and the perceived value of integrating digital tools into the ANM curriculum. **Results:** Thematic analysis identified five major themes: digital learning as a source of confidence and motivation, accessibility and flexibility, barriers to engagement, mentorship as a catalyst for skill reinforcement, and shifting attitudes toward technology in health education. **Conclusion:** Findings revealed that while digital learning enhanced confidence, motivation, and clinical application, persistent challenges such as poor connectivity and low digital literacy hindered

optimal engagement. The study concludes that blended digital learning holds strong potential for empowering ANMs, provided structural and technological barriers are addressed through context-specific solutions.

Keywords: - Auxiliary Nurse Midwives, Bihar, Blended learning, Digital learning, e-Kshamata, Maternal health, Professional development, Qualitative study.

Introduction

Frontline health workers, including ANMs, form the backbone of India's rural health system, delivering critical maternal and child healthcare services[1]. Despite their importance, access to high-quality, continuous training remains limited due to logistical barriers such as geographic isolation, staff shortages, and outdated curricula[2]. In this context, digital learning has emerged as a promising tool to enhance workforce competency and bridge training gaps[3] [4].

In Bihar—one of India's most resource-constrained states—strengthening the capacity of ANMs is particularly important given the high burden of maternal and neonatal health challenges[5]. The e-Kshamata digital learning platform was introduced to support both pre-service and in-service ANMs through interactive modules, videos, quizzes, and structured mentorship. While quantitative components of the broader intervention demonstrated

improvements in knowledge and skills, qualitative exploration is essential to understand how ANMs experience digital learning, perceive its usefulness, and navigate contextual barriers to engagement[6].

This paper presents the qualitative findings from the larger mixed-methods study “Empowering Auxiliary Nurse Midwives in Bihar Through Digital Learning”, focusing on the experiences, attitudes, and perceived barriers among ANMs using the e-Kshamata like platform[7]. The aim of this qualitative study was to Evaluate the effectiveness of the digital learning app, e-Kshamata in empowering ANMs in Bihar, focusing on knowledge and skill enhancement among both pre-service and in-service ANMs. The primary research questions were: Does digital learning improves the competency of ANMs? And what challenges do ANMs face while accessing or using digital learning platform.

Methods

Study Design and Participants

A qualitative study design using FGDs was embedded within a pre–post intervention study conducted between January and July 2025 in Saran district, Bihar. A total of 77 ANMs participated in the overall digital learning intervention. From this cohort, 15 participants were selected for the qualitative component.

Participants were chosen using purposive random sampling to ensure representation across key characteristics, including pre-service and in-service status, age group, geographic location [rural and semi-urban], and varying levels of prior exposure to digital technology. The selected sample size aligns with qualitative research standards, where in-depth exploration and thematic saturation are prioritized over statistical representation. Thematic saturation was achieved, as no new themes emerged during the post-assessment FGD.

Data Collection

Two FGDs were conducted: one during the pre-assessment phase and one during the post-assessment phase following eight weeks of platform use. Each FGD included all 15 participants and lasted approximately 60–75

minutes. Discussions were held in a private, quiet room within the training institution to ensure participant comfort and confidentiality. A semi-structured FGD guide was developed based on a review of relevant literature, study objectives, and expert input from public health and maternal health specialists. The guide was pilot-tested and refined prior to data collection. Key domains included prior exposure to digital learning, initial perceptions of the e-Kshamata platform, usability and accessibility, perceived impact on knowledge and confidence, barriers and facilitators to engagement, comparison with traditional training methods, and suggestions for improvement. Probing questions were used to elicit deeper reflections and clarify responses.

FGDs were conducted in Hindi, the preferred language of participants. The sessions were moderated by the principal investigator, and supported by a note-taker who documented non-verbal cues and group dynamics. All discussions were audio-recorded with participants' written informed consent.

Data Analysis

Audio recordings were transcribed verbatim in Hindi and subsequently translated into

English. Translations were cross-checked against the original transcripts to preserve contextual meaning. Data were analyzed using an inductive thematic analysis approach following Braun and Clarke's six-step framework.

Two researchers independently coded the transcripts line-by-line to generate initial open codes. Codes were compared and organized into a shared codebook through consensus meetings. Related codes were grouped into categories, which were further refined into sub-themes and overarching themes through iterative discussion. Thematic saturation was assessed by comparing pre- and post-assessment FGDs; no new codes or themes emerged in the later stages of analysis.

Ethical Considerations

Ethical approval for the study was obtained from the Institutional Ethics Committee of the Indian Institute of Public Health, Gandhinagar [IIPHGIEC/2024-25/21-69]. Written informed consent was obtained from all participants prior to data collection. Participants were informed about the voluntary nature of participation, their right to withdraw at any time, and measures taken to ensure confidentiality and anonymity. All data were de-identified and securely stored.

Findings

Theme 1: Digital Learning as a Source of Confidence and Motivation

Participants described an increased sense of self-confidence and professional pride. They found the app's videos and quizzes useful for clarifying procedures such as blood pressure measurement and antenatal examinations. As one participant expressed, "Earlier, I hesitated to perform ANC procedures. After watching the videos repeatedly, I feel confident and independent." This aligns with evidence suggesting that self-paced learning promotes confidence and self-efficacy among health workers [2].

Theme 2: Accessibility and Flexibility of Learning

ANMs valued the ability to learn "anytime, anywhere," especially those balancing work and domestic responsibilities. The flexibility to review modules at their convenience reduced absenteeism from physical training sessions. One in-service ANM noted, "With this app, I can learn after work or during free time. I no longer have to travel far for refresher training." Similar benefits have been reported in global studies where digital education improved engagement and reduced logistical constraints[8].

Theme 3: Barriers to Effective Engagement

Despite positive perceptions, challenges included poor internet connectivity, inconsistent access to smartphones, and limited digital literacy. Some participants struggled with navigation and requested offline access. “Sometimes the video stopped midway due to poor signal,” one participant said. These barriers mirror broader implementation issues identified in other low-resource contexts [1] [9].

Theme 4: Mentorship as a Catalyst for Skill Reinforcement

Participants consistently emphasized that mentorship complemented digital learning by bridging theory and practice. Weekly follow-ups and demonstrations allowed for hands-on correction and reinforcement of correct techniques. This blended approach helped translate digital content into real-world performance. Such models of integrated mentorship have been proven to improve skill retention and clinical confidence [3].

Theme 5: Shifting Attitudes Toward Technology

Initially, many participants expressed scepticism about digital learning. However,

over time, attitudes evolved from reluctance to enthusiasm. Exposure to structured, accessible modules improved their digital confidence and willingness to engage with similar technologies in the future. This shift indicates a growing readiness among frontline workers to adapt to technology-enhanced learning ecosystems[10].

Discussion

This qualitative analysis highlights how digital learning fosters psychological empowerment, professional identity, and learning autonomy among ANMs in Bihar. The findings reinforce that knowledge acquisition through technology is not merely a cognitive process but also an affective experience that builds confidence and motivation.

The results echo prior research demonstrating that e-learning enhances self-efficacy, engagement, and satisfaction among nursing students and healthcare professionals[2][3]. Importantly, the integration of mentorship played a decisive role—ensuring that theoretical learning translated into tangible clinical competence. This supports global frameworks such as the WHO’s Digital Health for Education strategy, which advocates blended, mentorship-supported

learning for sustainable workforce development.[11]

However, persistent infrastructural and socio-digital barriers must be addressed for scalability. Poor connectivity and low digital literacy are consistent with challenges noted across low and middle-income countries[12] [8]. Addressing these issues through offline-compatible platforms, localized language content, and trainer capacity-building will be essential to ensure equity and sustainability.

From a theoretical perspective, these findings can be understood through the lens of Self-Determination Theory[13], which emphasizes autonomy, competence, and relatedness as key drivers of intrinsic motivation. The digital platform satisfied these needs by allowing self-paced learning [autonomy], providing structured feedback [competence], and fostering peer-mentor interactions [relatedness]. Consequently, ANMs not only improved their knowledge but also developed a stronger sense of professional empowerment.

Limitations

This study has few limitations. The qualitative sample was limited to 15 participants from a single district, which may restrict generalizability. Translation of FGDs

from Hindi to English may have resulted in subtle loss of meaning despite careful cross-checking. Social desirability bias may also have influenced participant responses during group discussions.

Conclusion

This qualitative study provides in-depth insights into how a blended digital learning intervention shaped the learning experiences, confidence, and professional self-perception of ANMs in Bihar. The findings reveal that digital learning, when combined with structured mentorship, can move beyond knowledge transmission to foster psychological empowerment, motivation, and greater autonomy in clinical practice. ANMs reported improved confidence in performing maternal and child health procedures, increased willingness to engage with technology, and appreciation for the flexibility and accessibility offered by the digital platform.

At the same time, the study highlights that the effectiveness of digital learning is strongly influenced by contextual factors. Persistent infrastructural challenges such as poor internet connectivity, limited access to personal devices, and varying levels of digital literacy constrained optimal engagement. Social context—including gendered

domestic responsibilities—and workplace dynamics further shaped how ANMs accessed and benefited from the intervention. These findings underscore that digital learning initiatives for frontline health workers must be designed with sensitivity to social, gender, and institutional realities, rather than assuming uniform access or readiness.

Several areas remain unclear and warrant further investigation. The long-term retention of knowledge and skills gained through digital learning, its sustained impact on service delivery outcomes, and the scalability of such interventions across diverse districts and health system settings were beyond the scope of this study. Additionally, perspectives of supervisors, mentors, and health system administrators were not

explored and may provide valuable insights into institutional facilitators and barriers to implementation.

Future research should adopt longitudinal designs to assess sustained learning outcomes and clinical practice changes over time. Mixed-methods studies incorporating supervisory and policy-level perspectives could help identify system-level enablers for successful integration of digital learning into routine ANM training. Investing in infrastructure, digital literacy support, and mentorship capacity will be essential to ensure that digital learning platforms contribute meaningfully to strengthening the frontline health workforce and improving maternal and child health outcomes in resource-constrained settings.

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