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Assessing and Improving Life Saving Skills in Pregnancy and Childbirth through Focused Mentorship Approach: A Study on Selected Union Level Healthcare Providers in Two Districts of Bangladesh

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Abstract

Background: Bangladesh has made substantial gains in health outcomes; however, quality maternal and newborn health (MNH) services remain inadequate, particularly in rural districts such as Rangpur and Lalmonirhat. Family Welfare Visitors (FWVs) and midwives play a critical role in delivering primary MNH services, yet evidence on their competency gaps and the effectiveness of targeted mentorship models is limited. This study assessed the impact of a focused mentorship approach on improving Life-Saving Skills in Pregnancy and Childbirth (LSPC) among union-level healthcare providers.

Methods: A mixed-methods design was implemented from June to October 2025 across Union Level Health Centers. Baseline and endline assessments were conducted with 43 midwives and 34 FWVs. While 4 in-depth interviews (IDI) with healthcare providers and 5 key informant interviews (KII) were conducted with Health experts and Government stakeholders/policy makers. Quantitative data on knowledge, attitudes, practices and skills (KAPS) were analyzed using SPSS to show relevant statistical significance, while qualitative data were explored through thematic analysis. The mentorship intervention included on-site clinical coaching, case reviews, and competency-based skill reinforcement.

Results: Midwives showed notable gains in knowledge (35%), attitude (57%), practice (22%), and skills (63%), resulting in an overall 45% increase to endline compared to baseline. While FWVs demonstrated even greater advancement, with improvements of 38% in knowledge, 58% in attitude, 37% in practice, and a remarkable increase in skills which accumulated scores rose by 54%, indicating stronger overall progress compared to midwives in endline. Overall, the initiative led to a combined 51% improvement in KAPS scores across both provider groups. Qualitative findings reinforced these trends, highlighting structured operational guidance, regular supervision and consistent technical follow-up which are critical to ensuring the long-term effectiveness and scalability of the focused mentorship approach.

Conclusion: The focused mentorship approach showed the better-quality MNH services that have strong potential for integration and scale-up within government health systems.

Keywords: *Mentorship, Life-Saving Skills, Midwives, Family Welfare Visitors, Capacity Building, KAPS*

1. Introduction

1.1 Background

From last decades, Bangladesh has made significant progress in healthcare issues, but maternal and neonatal health remains a critical area of concern. The proportion of women receiving quality antenatal care (ANC) only of 21% by medically trained providers [1], while Rangpur division (10%) has lower than national average and Jononi project interventions have (11%) of quality ANC. Despite this, the government also aims to reduce the maternal mortality ratio (MMR) to 70 per 100,000 live births and neonatal deaths to fewer than 12 per 1,000 live births by 2030 [2].

The Family Welfare Visitors (FWV) and midwives play an essential role in delivering primary healthcare services along with maternal, neonatal and family planning services in ensuring quality maternal and newborn care, mitigation of crude of quality ANC gaps to the rural areas. On the other hand, FWV and Midwives, as key healthcare providers of maternal health services, have the potential to bridge gaps in care through evidence-based practices. However, there is a lack of systematic research focused on understanding the challenges, opportunities, and outcomes of FWV as well as midwifery services at union level health centers (ULHCs). Addressing these gaps through research can ultimately improve health outcomes and align national health targets and Sustainable Development Goals (SDGs), particularly SDG 3 (Good Health and Well-being).

The Jononi Project

This research is going to conduct under the program titled “Strengthening the Maternal and Neonatal Health System in Rangpur, Bangladesh (Jononi)” is a five-year initiative led by Save the Children in Bangladesh, with RDRS Bangladesh serving as the field implementation partner and International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b) providing Research and evaluation support, funded by the Korea International Cooperation Agency (KOICA) through Save the Children Korea (SCK), the project is being implemented in Rangpur and Lalmonirhat—two northern districts of Bangladesh that continue to report high rates of maternal and neonatal mortality, adolescent pregnancy, and poverty since 2023. These districts represent the realities faced by many rural families where access to quality, respectful, and skilled healthcare is still out of reach. The project aligns itself closely with national strategies and works through the existing public health infrastructure to build sustainable change. By reinforcing government facilities and services, and by improving coordination between providers, local authorities, and communities, Jononi helps to enhance the capacity of the national health system to respond to the needs of mothers and newborns — particularly in hard-to-reach and underserved areas. The Jononi Project is designed to support the government to tackle these barriers through a comprehensive, people-centered approach that integrates health system improvements with behavior change and policy advocacy at different levels. It works to strengthen maternal and newborn health service, facility readiness and referral systems so that women and newborns can access the care they need in a timely manner. It also focuses on improving the quality of services through the capacity enhancement of healthcare providers and community health workers, particularly midwives, ensuring that care is not only available but also respectful, skilled, and compassionate.

1.2 Literature review and the research gap

There is limited research exploring provider perspectives and the daily operational realities at the union level. Most assessments are top-down and fail to capture the voices of front-line health workers [3]. lacking. Moreover, provider attitudes toward low-income and adolescent mothers have been noted as a barrier to equitable service provision [3]. Longitudinal data to assess the effect of capacity-building initiatives on MNH outcomes over time is also missing. This Literature review explores current literatures on the capacity, performance, challenges, and gaps in service delivery by these providers, with a focus on how they address key MNH issues in Bangladesh.

Structure of Union-Level Health Service Providers

In Bangladesh, UH&FWCs are generally used to provide health services at the union level. These centers are staffed by Sub-Assistant Community Medical Officers (SACMOs), Family Welfare Visitors (FWVs), and they provide services such as antenatal care (ANC), delivery care, postnatal care (PNC), postpartum family planning, and basic newborn services [4]. However, studies show that the actual service provision is often limited due to operational and systemic challenges [5].

Challenges in Service Delivery

a) Human Resource shortage: Lack of employees is one of the most commonly mentioned problems. Many UH&FWCs face absenteeism and vacant posts, particularly among skilled birth attendants and female service providers [6].

b) Knowledge, Attitude, Practice and Skills of Health Providers: Frontline healthcare providers' knowledge, attitude, practice and skills (KAPS) are directly related to how well MNH services are delivered. The lack of proper job training with monitoring and supervision causes poor quality of care. A cross-sectional study [7] assessed the KAP of community-

level health providers and found significant variability. Emergency obstetric care and infection prevention control (IPC) procedures were lacking, despite the fact that many practitioners knew the fundamentals of prenatal and postnatal care protocols. Additionally, some service providers' attitudes on respectful maternity care were out of date, which had an impact on patient satisfaction and trust. Although training programs have made an effort to enhance clinical skills and knowledge, skill retention over time is still a problem.

c) Limited Community Engagement and Service Utilization: Many women prefer home delivery or traditional birth attendants (TBAs) due to cultural norms, perceived poor quality of care, or lack of trust in the public system as well as on the service providers. It highlights that despite the physical presence of health centers, utilization of services remains low, largely due to poor client-provider interaction and lack of awareness [8].

Assessment of Government and Donor Interventions

Programs such as MaMoni MNCSP (Maternal and Newborn Care Strengthening Project) by USAID and Save the Children have tried to improve service delivery by building provider capacity, enhancing community engagement, and strengthening referral systems [9]. While ANC visits and skilled birth attendance have increased somewhat as a result of these evaluations, questions about their scalability and sustainability still exist.

Despite national-level progress in maternal and neonatal health (MNH), Bangladesh continues to face critical gaps at the union level, where primary services are delivered through Union Health and Family Welfare Centers (UH&FWCs). These centers are typically staffed by SACMOs, FWVs, and in some cases, trained midwives.

Several studies [4] & [5] indicate that service provision at these centers is constrained by staffing shortages, limited training, and systemic operational challenges.

Evidence from [3] highlights a significant gap in understanding provider perspectives and operational realities at the frontline. Many assessments remain top-down in nature, often neglecting the lived experiences of FWVs and midwives. Provider biases—especially toward adolescent and low-income mothers—continue to hinder equitable service delivery. Further, while training programs exist to enhance provider skills, longitudinal data assessing their impact on provider competence and maternal outcomes remains limited.

It reported inconsistent levels of knowledge, attitude, and practice (KAP) among community-level providers, particularly in emergency obstetric care and infection prevention control [7]. Respectful maternity care also remains a neglected area. Additionally, low community trust and poor client-provider interactions have discouraged service uptake, leading many women to opt for traditional birth attendants [8].

Internationally, frameworks such as the WHO's Quality of Care for Maternal and Newborn Health (2016) emphasize the importance of provider competence, respectful care, and community engagement. Aligning with these global standards, national interventions like MaMoni MNCSP [9] have attempted to address these gaps by strengthening referral systems, building capacity, and improving quality of care. However, challenges remain in ensuring the sustainability and scalability of these interventions, especially in rural and under-resourced districts such as Rangpur and Lalmonirhat.

Support health systems strengthening by generating evidence to inform policy and guide the implementation of sustainable, scalable mentorship interventions aligned with SDG-3 and national health priorities

1.3. Rationale

Based on the gaps identified in the literature and field experience, it can be said that there is a critical need for context-specific evidence on the capacities and constraints of union-level service providers. This study aims to fill that gap by assessing the impact of a structured mentorship approach grounded in the Life Saving Skills in Pregnancy and Childbirth (LSPC) protocol, developed by the Obstetrical and Gynecological Society of Bangladesh (OGSB) and endorsed by the Ministry of Health and Family Welfare (MoHFW). Based on the context described above, this research on FWV and midwifery practices can:

- ✎ Identify gaps in quality of maternal and newborn health services in rural Bangladesh like Rangpur and Lalmonirhat districts, where access to quality midwifery services is often underutilized.
- ✎ Enhance the quality of FWV and midwifery services via addressing specific needs identified through research.
- ✎ Strengthen policy and program implementation for maternal and newborn health services in Bangladesh by providing evidence-based recommendations to improve FWV and midwifery services.
- ✎ Support health systems strengthening by generating evidence to inform policy and guide the implementation of sustainable, scalable mentorship interventions aligned with SDG 3 and national health priorities.

This study has been followed by a targeted focused mentorship approach (detailed in annexes) through standard protocols of Life Saving Skill in Pregnancy and Childbirth (LSPC) designed by Obstetrical and Gynecological Society of Bangladesh (OGSB) and endorsed by Ministry of Health and Family Welfare (MoHFW) through its two Directorates e.g. Directorate General of Health Services (DGHS) and Directorate General of Family Planning (DGFP).

The findings tailored evidence-based capacity-building initiatives that empower frontline providers, improve maternal and neonatal health outcomes, and ensure that service delivery aligns with both national goals and international standards of respectful and effective care.

2. Study details

2.1 Objectives

The primary objective of this research was to measure the effectiveness of focused mentorship intervention in improving LSPC knowledge and practices amongst targeted healthcare providers. The specific objectives of the study were:

- ☐ To assess the current knowledge, attitudes, skills and practices of FWVs and project supported midwives on LSPC at ULHCs.
- ☐ To measure the effectiveness of focused mentorship intervention in improving LSPC knowledge and practices amongst targeted healthcare providers.
- ☐ To recommend strategies for improving the quality of MNH services given by ULHCs healthcare providers.

2.2. Research key questions

This study was tried to find out the answers to the key research questions below:

- Is focused mentorship intervention effective in improving LSPC knowledge and practices amongst targeted healthcare providers?
- What strategies can be considered to improve the quality of MNH services given by ULHCs healthcare providers?

2.3. Methodology

Study Design: A mixed-methods approach combining quantitative and qualitative research was applied in this research. One baseline and one endline on Knowledge, Attitude, Practice and Skills was carried out to measure the effectiveness of focused mentorship intervention in improving LSPC knowledge and practices amongst targeted healthcare providers. In addition, qualitative techniques will be used with the relevant study participants to explore stakeholder's opinion and recommendations and to complement the quantitative findings.

Study Area: This research was implemented in the 40 selected Union Level Health Centers across Jononi project intervention areas of Rangpur and Lalmonirhat districts under the Rangpur division in Bangladesh from July to December 2025.

Data Collection Methods and Techniques: Both qualitative and quantitative techniques were used to collect data which are described below:

- **Quantitative part:** A Knowledge, Attitude, Practice and Skills (KAPS) survey with structured, self-administered questionnaire was used in both baseline and endline. The questionnaire was adapted from LSPCs protocols validated through pre-tested before finalization.
- **Qualitative part:** In-depth Interviews (IDI) with healthcare providers, and Key Informant Interviews (KII) with health experts e.g. Mentors and Coaches from OGSB, district and divisional level stakeholders of DGHS and DGFP were carried out to complement the quantitative findings and to generate recommendations from the relevant stakeholders on how to improve the quality of MNH services given by ULHCs healthcare providers.

This mixed-methods approach allowed triangulation of data, deeper exploration of provider experiences, and capture of expert insights into improving maternal and newborn health (MNH) services at union-level health facilities (ULHCs).

Table 1: Sampling distributions

Respondent	Number	Selection technique	Tools
Healthcare providers	34 FWVs assigned in the project areas and 43 project supported midwives	All posted health providers selected	Survey Questionnaire
	Total 4 - 2 FWVs and 2 midwives (2 from Rangpur and 2 from Lalmonirhat)	Purposively based on skills and experiences	IDI

Health experts and Government stakeholders/ policy makers	Total 5 - 2 Mentors and Coaches from OGSB (1 from Rangpur and 1 from Lalmonirhat), 2 central level authorities from both DGHS and DGFP and 1 public health experts and policy makers.	Purposively based on role and experiences	KII
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Table 2: Study inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
- Currently providing health services at the project supported ULHCs within the study area including the attached FWVs to the facilities. - Minimum of 3 months of professional experience in the intervention area. - Willing to participate and provide informed consent.	- Healthcare providers in non-intervention areas. - Temporary/Ad hoc deployment at the project supported ULHCs within the study area during the data collection period.

Data Analysis: Quantitative data were analyzed using statistical software e.g. SPSS to identify trends and correlations between background variables and knowledge, attitude, practice and skills of the FWV and midwives. Qualitative data were analyzed thematically and utilizing statistical software e.g. NVivo to capture insights and scientific narratives.

2.4. Ethical Considerations and Accountability

Ethics approval: The ethical review of this study was taken from the Bangladesh Institutional Review Board (IRB) under the Institute of Health Economics (IHE) of University of Dhaka (Ref. No. IHE/IRB/DU/39/2025).

Consent: Informed consent was obtained from the survey and interviewed participants by providing the informed consent form. The decision for participation in the study was made voluntarily, and if the potential participant agrees to participate, they were signed the informed consent form.

Confidentiality and Data Protection Plan: Upon ethics review approval, the study was strictly followed the protocol for confidentiality and data protection.

2.5. Study limitations

The study relied on self-reported data, which may be affected by social desirability and recall bias. Since this was a cross-sectional KAPS study, findings reflect conditions at a single point in time and do not allow for causal inference or assessment of change over time. Reported practices and skills were not independently verified through observation, which may limit their accuracy.

Additionally, while efforts were made to contextualize the questionnaire, some concepts may have been interpreted differently by respondents. Finally, the sampling approach may limit the generalizability of findings beyond the study population.

3. Findings

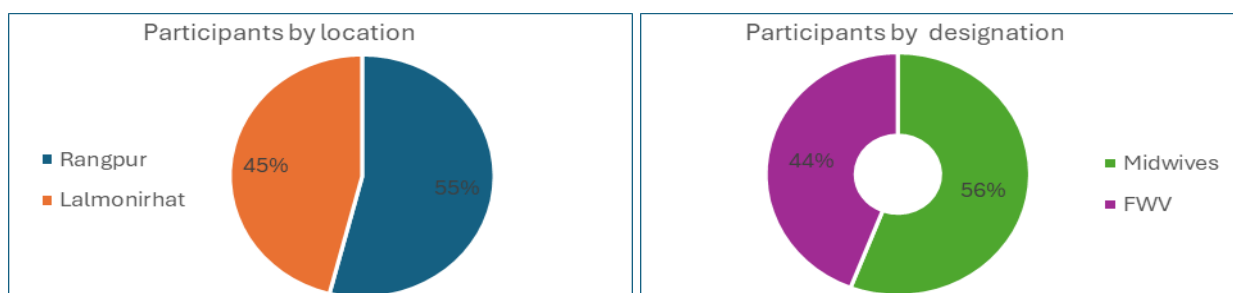
The findings of this study were organized into two sections which include: 3.1. quantitative and 3.2. qualitative.

3.1. Quantitative findings

3.1.1. Socio-demographic information

Participant background information: A total of 77 healthcare providers participated in the baseline and endline survey. Majority of participants, 42 (55%) were from the Rangpur district, while the remaining 35 (45%) were from the Lalmonirhat district. On the other hand, 43 (56%) participants were from the Jononi project midwives and the rest 34 (44%) of family welfare visitors (FWV) from DGFP of MoHFW.

Chart 1: Distribution of participants



Age distribution of participants by role: The age distribution of service providers shows marked differences between Midwives and FWVs. Largely, the workforce is mainly young, with more than half of all providers (57.1%) falling within the 23–29 years age group. However, this youthful profile is almost entirely driven by Midwives, whereas FWVs display a substantially older age structure.

93.0% of Midwives (n=40) are aged 23–29 years. Only 7.0% are aged 30–39 years while no Midwives were observed above 39 years of age. Apparently, FWVs demonstrate a much older and more dispersed age distribution that only 11.8% (n=4) are aged 23–29 years while 38.2% (n=13) aged 50–59 years.

The concentration of FWVs aged 50–59 years raises concerns about workforce sustainability over the next 5–10 years if replacement recruitment is not ensured.

Table 3: Age distributions by role

Age group	23-29	30-34	35-39	40-49	50-59	Total
Midwives	40	2	1	-	-	43
FWV	4	8	6	3	13	34
Total	44	10	7	3	13	77

3.1.2. Knowledge

Average knowledge score: Participants showed a strong improvement in knowledge from baseline to endline. The average score increased from 11.49 to 15.66, indicating a 4.17-point gain. Minimum scores improved (3 to 7), and maximum scores also increased (16 to 18), showing progress across all performance levels. Additionally, the slight reduction in standard deviation (SD) (2.469 → 2.257) suggests scores became more consistent, indicating more uniform learning among participants.

Table 4: Rate of Knowledge of participants

		N	Minimum	Maximum	Mean	Std. Deviation
Knowledge	Baseline	77	3	16	11.49	2.469
	Endline	77	7	18	15.66	2.257

Knowledge compares score: The paired-samples t-test (table 3) revealed a statistically significant increase in knowledge scores among midwives, $t(42) = -11.771$, $p < .001$, and FWVs, $t(33) = -6.897$, $p < .001$, following the intervention. Mean knowledge scores increased by approximately 4 points in both groups (Midwives: +4.28 and FWVs: +4.03). The 95% confidence intervals (CI) did not include zero, confirming the strength of the intervention effect.

Table 5: Comparison of Knowledge between Midwives and FWVs

Designation		Paired Differences					t	df	Significance	
		Mean	Std. Deviation	Std. Error Mean	95% CI of the Difference				One-Sided p	Two-Sided p
					Lower	Upper				
Midwives	baseline - endline	-4.279	2.384	0.364	-5.013	-3.545	-11.771	42	<.001	<.001
FWV	baseline - endline	-4.029	3.407	0.584	-5.218	-2.841	-6.897	33	<.001	<.001

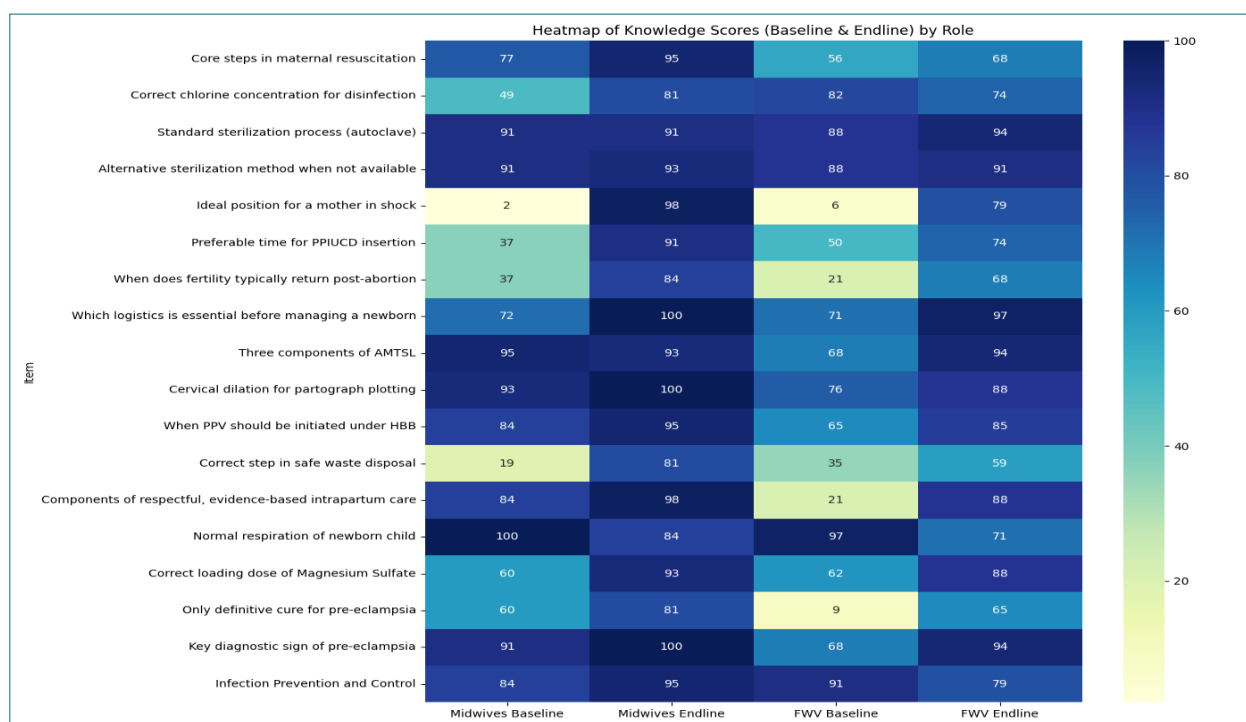
Similarly, the one-way ANOVA (table 6) revealed statistically significant differences between groups in both baseline ($p=.002$) and endline ($p<.001$) knowledge scores. These results indicate that the intervention had a differential impact between groups, with one group benefiting more substantially. However, all groups demonstrated significant improvement over time.

Table 6: ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
baseline score	Between Groups	56.590	1	56.590	10.437	.002
	Within Groups	406.657	75	5.422		
	Total	463.247	76			
endline score	Between Groups	74.141	1	74.141	17.761	<.001
	Within Groups	313.080	75	4.174		
	Total	387.221	76			

The heatmap illustrates the variation and improvement in knowledge (%) across all assessed items for both groups, showing baseline and endline performance side by side to highlight topic-specific gains and remaining gaps.

Figure 1: Heatmap comparing (%) knowledge items between Midwives and FWVs



3.1.3. Attitudes

Attitude scores: The attitude outcomes were assessed on a 5-point Likert scale (1= Strongly Disagree, 2=Disagree, 3=Neutral, 4= Agree and 5=Strongly Agree) for six priority statements related to respectful, safe, and timely maternal–newborn health and family planning. Participants demonstrated a significant and meaningful positive change in attitude from baseline to endline. The endline mean (23.26) indicates that most participants now agree or strongly agree with positive statements related to the topic, compared to more neutral or slightly negative responses at baseline.

Table 7: Attitude scores

		N	Minimum	Maximum	Mean	Std. Deviation
Attitude	Baseline	77	10	21	14.75	2.402
	Endline	77	14	27	23.26	2.598

Comparatively, Midwives mean scored slightly higher (23.42) than FWVs (23.06) at endline, but the difference is small, implying that both groups develop positive attitude.

Attitude compares score: Paired samples t-tests (table 6) compared baseline vs. endline among midwives and FWVs. Across all six items, endline scores were significantly higher (all $p < .001$), indicating extensive and meaningful positive shifts.

- 1. Respect birthing positions:** Support for women's preferred birthing positions increased substantially (mean gain $\approx +1.27$ points, $t(76)=-8.63$, $p<.001$; large effect, $dz\approx 0.98$).
- 2. Disinfection is secondary during emergencies:** The belief that disinfection is secondary during emergencies decreased sharply (gain $\approx +1.04$, $t(76)=-5.47$, $p<.001$; medium–large effect, $dz\approx 0.62$), indicating stronger prioritization of IPC even under time pressure.
- 3. Breastfeeding support is not my responsibility:** Providers increasingly accept responsibility for breastfeeding support; also shifted positively (gain $\approx +0.79$, $t(76)=-4.78$, $p<.001$; medium effect, $dz\approx 0.55$), aligning practice expectations with early essential newborn care.
- 4. Referral only after full documentation:** Also became far less likely to delay referrals pending complete documentation (gain $\approx +1.71$, $t(76)=-13.40$, $p<.001$; very large effect, $dz\approx 1.53$), reflecting improved readiness for timely emergency referral.

5. Family planning too sensitive post-delivery: Participants reported more comfort with post-delivery family planning counseling (gain $\approx +0.87$, $t(76)=-5.50$, $p<.001$; medium-large effect, $dz\approx 0.63$).

6. PPFP counselling for adolescent mothers is important: The biggest shift was in recognition that Postpartum Family Planning (PPFP) counseling for adolescent mothers is important (gain $\approx +2.82$, $t(76)=-23.60$, $p<.001$; very large effect, $dz\approx 2.69$), highlighting strong movement toward youth-friendly, rights-based services.

The pattern of results shows consistent and sizable improvements across attitudes critical for quality of care, safety, timeliness, and inclusive family planning counseling. Effect sizes range from medium to very large, indicating not only statistical significance but also practical importance likely to translate into better client experience and clinical decision-making. Paired t-test results showed statistically significant positive changes across all attitude items following the intervention ($p<0.001$). The strongest improvements were observed in attitudes toward PPFP counseling for adolescent mothers, respectful maternity care, infection prevention, referral practices, and breastfeeding support, indicating a meaningful shift toward more client-centered and rights-based service delivery.

Table 8: Paired Attitude results of baseline and endline

Attitude items	Paired Differences					t	df	Significance	
	Mean	Std. Deviation	Std. Error Mean	95% CI of the Difference				One-Sided p	Two-Sided p
				Lower	Upper				
Respect birthing positions	-1.273	1.294	.147	-1.566	-.979	-8.630	76	<.001	<.001
Disinfection secondary during emergency	-1.039	1.666	.190	-1.417	-.661	-5.473	76	<.001	<.001
Breastfeeding support is not my responsibility	-.792	1.454	.166	-1.122	-.462	-4.781	76	<.001	<.001
Referral only after full documentation	-1.714	1.122	.128	-1.969	-1.460	-13.404	76	<.001	<.001
Family planning too sensitive post-delivery	-.870	1.389	.158	-1.185	-.555	-5.496	76	<.001	<.001
PPFP counseling of adolescent mothers is important	-2.818	1.048	.119	-3.056	-2.580	-23.599	76	<.001	<.001

3.1.4. Practice

Practice by role: Across all 77 providers, practice scores (derived from binary-coded items i.e. 0 = incorrect, 1 = correct) showed a significant improvement from baseline to endline. Overall mean practice score (table 7) increased from 8.88 ± 1.78 at baseline to 11.39 ± 1.14 at endline, representing a +28% increase in correct clinical practices. Midwives improved from 9.56 ± 1.22 to 11.70 ± 0.77 , gaining +2.14 correct practices while FWVs ($n = 34$): improved from 8.03 ± 2.01 to 11.00 ± 1.39 , gaining +2.97 correct practices.

Comparatively, FWVs, who started significantly lower, showed larger gains, narrowing the performance gap with midwives from 1.53 points at baseline to 0.70 points at endline.

Table 9: Practice scores

	N	Minimum	Maximum	Mean	Std. Deviation
Baseline	77	5	12	8.88	1.777
Endline	77	7	12	11.39	1.137

Practice compares score: The paired-samples t-test (table 10) demonstrated a statistically significant improvement in most labour room clinical competencies following the intervention. Significant gains were observed in equipment preparedness, post-delivery documentation, infection prevention practices, and partograph monitoring ($p < 0.05$). The largest improvements were noted in equipment checking ($t = -10.149$, $p < .001$) and record maintenance ($t = -9.325$, $p < .001$), indicating a substantial enhancement in patient-safety behaviors.

However, no significant improvement was observed in newborn oxygen assessment, episiotomy decision-making, and communication during referral ($p > 0.05$).

These findings suggest that while the intervention effectively improves procedural knowledge and routine practices, higher-order clinical judgement and communication competencies may require simulation-based or mentorship-based training approaches.

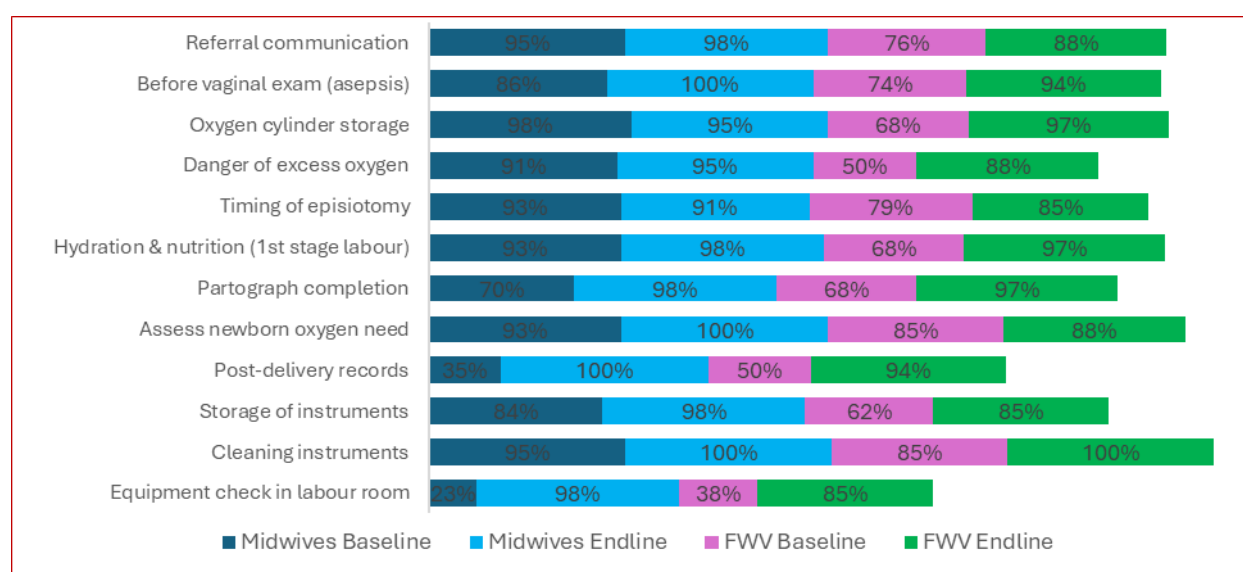
Table 10: Comparison of practice items between baseline and endline

Practice items	Paired Differences				T	df	Significance		
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference			One-Sided p	Two-Sided p	
				Lower					Upper

Regularity of equipment check in labor room	-.623	.539	.061	-.746	-.501	-10.149	76	<.001	<.001
What do you use to clean an instrument?	-.091	.289	.033	-.157	-.025	-2.757	76	.004	.007
How do you store cleaned instruments?	-.182	.506	.058	-.297	-.067	-3.153	76	.001	.002
What records do you maintain post-delivery?	-.558	.525	.060	-.678	-.439	-9.325	76	<.001	<.001
How do you assess a newborn's need for oxygen?	-.052	.394	.045	-.141	.037	-1.157	76	.125	.251
How often do you complete and update the partograph?	-.286	.509	.058	-.401	-.170	-4.923	76	<.001	<.001
Steps to promote hydration and nutrition during 1st stage labor	-.156	.431	.049	-.254	-.058	-3.172	76	.001	.002
When do you perform an episiotomy?	-.013	.444	.051	-.114	.088	-.257	76	.399	.798
Danger of using too much oxygen for too long?	-.195	.488	.056	-.306	-.084	-3.505	76	<.001	<.001
Where should oxygen cylinders be kept?	-.117	.428	.049	-.214	-.020	-2.394	76	.010	.019
Before performing a vaginal exam	-.169	.441	.050	-.269	-.069	-3.357	76	<.001	.001
Explaining situation to family during referral	-.065	.408	.047	-.158	.028	-1.395	76	.084	.167

Overall, chart-3 demonstrates a marked improvement in most essential labor room practices following the intervention. The largest gains were observed in equipment readiness, documentation, and partograph utilization. Improvements were more pronounced among FWVs compared to midwives. However, practices requiring clinical assessment practice, such as episiotomy timing and referral communication, showed minimal change.

Chart 2: Correct practice comparison (baseline and endline) by roles



3.1.5. Skills

Average skills score: The 15 items skill assessment covering case management skills (5 items e.g. introductions, Situation, Background, Assessment, Recommendation (SBAR), counseling, danger sign communication etc.) and clinical skills (10 items e.g. Postpartum Hemorrhage (PPH) management, danger signs, magnesium sulfate, uterotonic use, cord clamping, newborn resuscitation, etc.) were used to evaluate participants' competency at baseline and endline. Scores represent the number of skills correctly demonstrated, with higher scores indicating stronger performance. At baseline, participants performed an average of 7.9 skills correctly (table 11), reflecting moderate competency while at endline, the mean increased to 14 indicating near-mastery of both communication and clinical skills. The minimum score improved from 3 to 9, showing that even the lowest-performing providers demonstrated substantial improvement. The decrease in standard deviation (2.15 → 1.52) suggests that skills became more standardized and consistent across providers after the intervention.

Table 11: Skills score

	N	Minimum	Maximum	Mean	Std. Deviation
Skills baseline	77	3	12	7.90	2.150
Skills endline	77	9	15	14.00	1.522

Skills compares score: Across all 15 items, the paired samples test (table 12) demonstrates statistically significant improvements in 13 of 15 skills, with p-values ranging from $p < .001$ to $p = .019$. Confidence intervals for mean differences are all below zero (except one item), confirming reliable improvement. The largest improvements are seen in postpartum danger sign communication, newborn resuscitation steps, recognition of magnesium sulfate toxicity, and post-delivery documentation skills. These findings indicate that the intervention produced meaningful and measurable enhancements in frontline providers' competencies, leading to more consistent, safer, and higher-quality maternal and newborn care practices among both Midwives and FWVs.

Table 12: Skills paired results

Skill items	Paired Differences					t	Df	Significance	
	Mean	Std. Deviation	Std. Error Mean	95% CI of the Difference				One-Sided P	Two-Sided P
				Lower	Upper				
How you introduce yourself to a service recipient	-.429	.572	.065	-.558	-.299	-6.576	76	<.001	<.001
How often do you use SBAR communication during referrals?	-.195	.514	.059	-.311	-.078	-3.326	76	<.001	.001
What should be prioritized when a patient refuses PFP?	-.143	.506	.058	-.258	-.028	-2.479	76	.008	.015
How do you typically communicate danger signs to postpartum mothers?	-.831	.377	.043	-.917	-.746	-19.343	76	<.001	<.001
During KMC counseling, what elements are essential?	-.558	.525	.060	-.678	-.439	-9.325	76	<.001	<.001
First-line uterotonic agent for PPH prevention/treatment	-.351	.507	.058	-.466	-.236	-6.069	76	<.001	<.001
Critical sign to monitor for magnesium sulfate toxicity	-.805	.399	.045	-.896	-.715	-17.724	76	<.001	<.001
Ideal timing for umbilical cord clamping	-.156	.461	.053	-.260	-.051	-2.968	76	.002	.004
Most appropriate criterion for immediate referral	-.364	.511	.058	-.480	-.248	-6.249	76	<.001	<.001
Intervention most supported by evidence to reduce maternal mortality	-.091	.332	.038	-.166	-.016	-2.405	76	.009	.019
When is oxygen therapy indicated in PPH?	-.377	.539	.061	-.499	-.254	-6.132	76	<.001	<.001
Loading dose of Magnesium Sulfate as per eclampsia protocol	-.519	.528	.060	-.639	-.400	-8.627	76	<.001	<.001
How often should uterine massage be done after placenta delivery?	-.234	.484	.055	-.344	-.124	-4.240	76	<.001	<.001
Next step for mother in labor with fetal distress	-.208	.522	.059	-.326	-.089	-3.496	76	<.001	<.001
Immediate action if newborn fails to initiate breathing	-.844	.365	.042	-.927	-.761	-20.290	76	<.001	<.001

Skills comparison by role: The baseline-endline comparison (table 13) demonstrates a substantial and consistent increase in knowledge and practice scores among both midwives and family welfare visitors. The greatest gains were observed in emergency obstetric and newborn care components, particularly newborn resuscitation, postpartum danger sign counseling, and magnesium sulfate administration. The larger improvement among FWVs indicates successful capacity strengthening of lower-skilled providers. Overall, the intervention significantly enhanced provider readiness to manage maternal and neonatal complications, suggesting potential reduction in preventable maternal and neonatal morbidity and mortality.

Table 13: Comparison skills result (baseline and endline) by roles

#	Skill items		Midwives		FWV	
			Baseline	Endline	Baseline	Endline
1	Communication	Introducing yourself to service recipient	63%	93%	29%	88%
2		SBAR communication during referral	74%	98%	74%	88%
3		Priority when patient refuses PFP	77%	95%	74%	82%
4		Communicating postpartum danger signs	12%	98%	18%	97%
5		Kangaroo Mother Care (KMC) counseling essential elements	44%	95%	29%	91%
6	Clinical	First-line uterotonic (PPH)	86%	100%	35%	97%
7		Magnesium sulfate toxicity sign	5%	91%	12%	85%
8		Umbilical cord clamping timing	95%	98%	56%	88%
9		Immediate referral criterion	60%	98%	59%	94%
10		Intervention in reducing maternal mortality	91%	98%	79%	91%
11		Oxygen therapy in PPH	67%	93%	29%	82%
12		Loading dose MgSO ₄ (eclampsia)	42%	100%	47%	91%
13		Uterine massage after placenta	86%	93%	50%	94%

14	Fetal distress management	77%	95%	71%	94%
15	Newborn fails to breathe (resuscitation)	5%	95%	9%	85%

Note: indicators with green colors highlighted as significant improvement.

3.1.6. Summary of KAPS score

Domain score by role: Overall, the results of knowledge, attitude, practice and skills (KAPS) score from paired sample test (table 14) increased from 45.56 at baseline to 66.05 at endline (midwives) and 39.82 baseline to 62.12 endline (FWV). The improvement was statistically significant. This represents a 51% improvement in participants' overall knowledge, attitude, and practice skills following the intervention.

Table 14: KAPS score summary

Domain	Midwives			FWV		
	Baseline	Endline	Change (%)	Baseline	Endline	Change (%)
Knowledge	12.26	16.53	35%	10.53	14.56	38%
Attitude	14.91	23.42	57%	14.56	23.06	58%
Practice	9.56	11.70	22%	8.03	11.00	37%
Skills	8.84	14.40	63%	6.71	13.50	100%
Total KAPS Score	45.56	66.05	45%	39.82	62.12	56%

Both Midwives and FWVs benefited significantly from the mentorship program, as seen in improved scores across all KAPS domains. Midwives consistently scored higher at both time points, indicating a stronger baseline knowledge and performance. FWVs demonstrated greater relative improvement, particularly in practice and skills, showing that mentorship was especially impactful for this group.

Attitude improvement was consistent across groups, reflecting strong alignment in interpersonal development. Skill enhancement shows the largest proportional improvement which is an indicator of hands-on learning effectiveness.

The paired samples statistics (table 15) demonstrate clear, consistent, and meaningful improvements in knowledge, attitude, practice, skills, and overall competence for both cadres. These results provide strong evidence that the intervention was effective, equitable, and transformative.

Table 15: Baseline vs Endline between Midwives and FWVs

Designation			Mean	N	Std. Deviation	Std. Error Mean
Midwives	Pair 1	Knowledge baseline score	12.26	43	2.036	.311
		Knowledge endline score	16.53	43	1.470	.224
	Pair 2	Attitude baseline score	14.91	43	2.328	.355
		Attitude endline score	23.42	43	2.342	.357
	Pair 3	Practice baseline score	9.56	43	1.221	.186
		Practice endline score	11.70	43	.773	.118
	Pair 4	Skills baseline score	8.84	43	1.745	.266
		Skills endline score	14.40	43	1.178	.180
	Pair 5	Total baseline score	45.56	43	4.687	.715
		Total endline score	66.05	43	3.773	.575
FWV	Pair 1	Knowledge baseline score	10.53	34	2.654	.455
		Knowledge endline score	14.56	34	2.596	.445
	Pair 2	Attitude baseline score	14.56	34	2.513	.431
		Attitude endline score	23.06	34	2.912	.499
	Pair 3	Practice baseline score	8.03	34	2.007	.344
		Practice endline score	11.00	34	1.393	.239
	Pair 4	Skills baseline score	6.71	34	2.038	.350
		Skills endline score	13.50	34	1.762	.302
	Pair 5	Total baseline score	39.82	34	5.452	.935
		Total endline score	62.12	34	4.922	.844

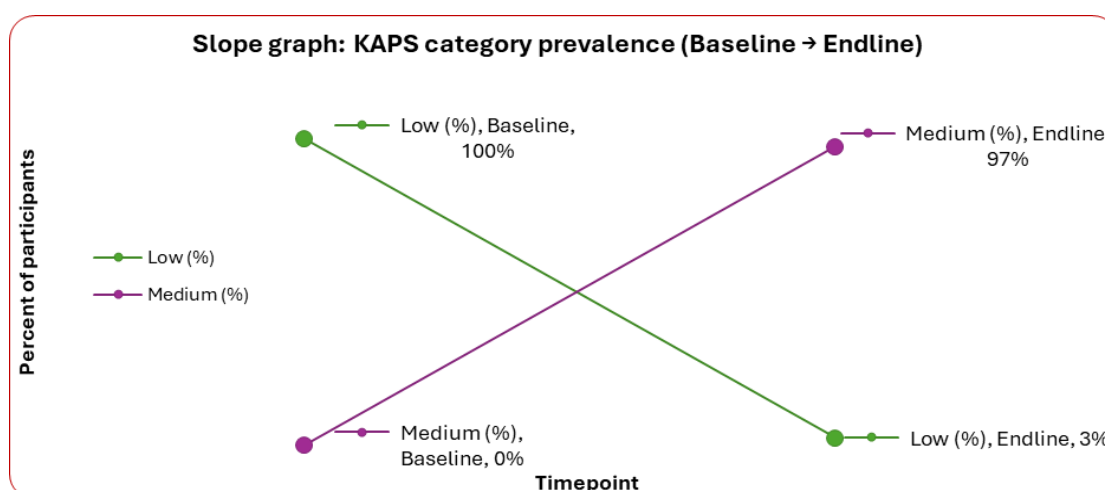
In the combined paired sample t-test (table 16) revealed statistically significant improvements between baseline and endline scores across all KAPS domains. Knowledge scores increased significantly ($t = -12.779$, $p < 0.001$), as did attitude ($t = -21.324$, $p < 0.001$), practice ($t = -11.600$, $p < 0.001$), and skills ($t = -24.435$, $p < 0.001$). The total KAPS score showed the greatest improvement ($t = -32.568$, $p < 0.001$). The 95% confidence intervals for all domains did not include zero, confirming the true effect of the intervention. These findings indicate that the mentorship program significantly enhanced provider competency in maternal and newborn care.

Table 16: Paired Samples Test (Midwives, FWVs)

	Paired Differences	t	Df	Significance
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		Mean	Std. Deviation	Std. Error Mean	95% CI of the Difference				One-Sided p	Two-Sided p
					Lower	Upper				
Pair 1	Knowledge baseline score - endline score	-4.169	2.863	.326	-4.819	-3.519	-12.779	76	<.001	<.001
Pair 2	Attitude baseline score - endline score	-8.506	3.500	.399	-9.301	-7.712	-21.324	76	<.001	<.001
Pair 3	Practice baseline score - endline score	-2.506	1.896	.216	-2.937	-2.076	-11.600	76	<.001	<.001
Pair 4	Skills baseline score - endline score	-6.104	2.192	.250	-6.601	-5.606	-24.435	76	<.001	<.001
Pair 5	Total baseline score - endline score	-21.286	5.735	.654	-22.587	-19.984	-32.568	76	<.001	<.001

KAPS individual category: At baseline, all participants (100%) were marked as “Low” (<50). Following the mentorship intervention, there was a significant improvement in overall competency levels. At endline, 75 participants (97%) had progressed into the “Medium” performance category (50–80), while only 2 participants (3%) remained in the “Low” category. The below Slope graph illustrates the prevalence of Low and Medium categories from baseline to endline. The proportion in Medium increased from 0% to 97%, while 3% remained Low.



This marked shift in categorical distribution reflects a significant positive change in knowledge, attitudes, skills and practice scores over the intervention period. Although most participants achieved medium-level competency, the persistence of a small proportion in the Low category suggests the need for ongoing mentorship and targeted follow-up to support full attainment of higher-level performance standards and ensure sustainability of gains over time.

3.2 Qualitative Findings

3.2.1. Background information

Participant characteristics: The qualitative analysis included 4 In-Depth Interviews (IDIs) with healthcare providers (2 midwives and 2 Family Welfare Visitors from different UHFWCs of Rangpur and Lalmonirhat) and 5 Key Informant Interviews (KIIs) with national, divisional and district level stakeholders (OGSB, DGHS, DGFP, and a medical college professor). IDIs captured experiential and practice-level insights, while KIIs provided system-level, policy, and implementation perspectives.

3.2.2. Thematic summarization

Theme 1 - Focused Mentorship Versus Routine Supervision: Both IDI and KII respondents consistently distinguished focused mentorship from routine or traditional supervisory visits. Routine supervision was described as checklist-driven, time-limited, and performance-oriented, emphasizing registers, logistics, and reporting compliance. In contrast, focused mentorship was perceived as structured, supportive, and provider-centered, prioritizing individualized skill development.

On the other hand, healthcare providers emphasized that mentorship visits involved direct observation of clinical practice, case-based discussions, and immediate corrective feedback, which were largely absent in routine monitoring. KIIs corroborated these findings, characterizing focused mentorship as more systematic and outcome-oriented, with a stronger emphasis on real-time application of clinical skills and performance improvement.

Theme 2 - Capacity Building Through Hands-on Clinical Mentorship: All IDI respondents reported substantial improvements in clinical competence following mentorship exposure. Key areas of learning included ANC, PNC, normal

vaginal delivery, emergency obstetric care, newborn resuscitation, infection prevention and control, postpartum hemorrhage management, eclampsia, and partograph use.

Hands-on demonstrations, simulations, and bedside coaching were repeatedly identified as the most valuable components. Providers reported increased confidence in managing emergencies and improved adherence to national clinical protocols. KIIs reinforced these findings, noting that focused mentorship strengthened problem-based learning and practical decision-making, particularly in MNH services.

Theme 3 - Behavioral and Professional Transformation: Beyond technical skills, mentorship influenced providers' professional attitudes and behaviors. IDI participants reported enhanced confidence, patience with clients, improved communication, and greater reliance on standardized protocols rather than memory-based practice.

KIIs highlighted mentorship's role in adopting teamwork, professional collaboration, and service orientation. Most experts noted that mentorship contributed to positive behavioral change and improved interpersonal dynamics within facilities, although variability in mentor competency could affect consistency of outcomes.

Theme 4 - Systemic Barriers to Applying Life-Saving Skills: Despite improved skills, both IDI and KII respondents identified persistent health system constraints limiting the application of Life Saving Skills in Pregnancy and Childbirth (LSPC). These included:

- Inconsistent availability of drugs, equipment, and supplies
- Manpower shortages and high workload
- Weak referral and transport systems
- Limited access to blood transfusion services
- Inadequate technical follow-up and governance gaps

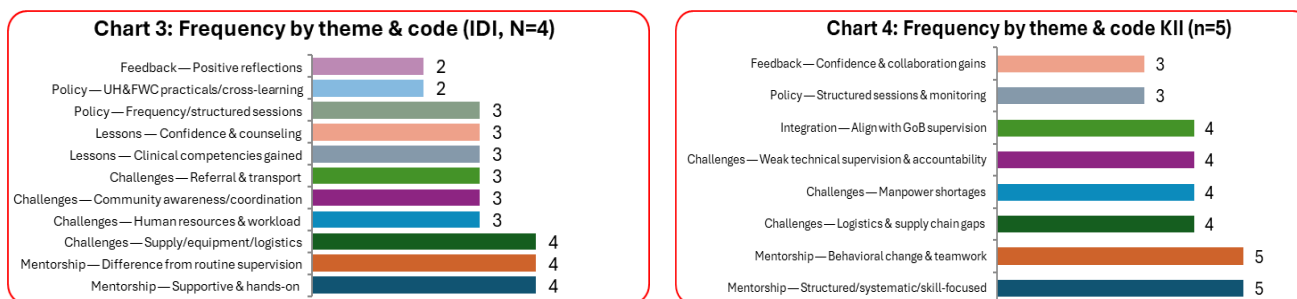
KIIs emphasized that mentorship alone cannot overcome structural deficiencies, and that weak logistics management, administrative delays, and poor coordination undermine service readiness and sustainability.

Theme 5 - Institutionalization, Sustainability, and Scale-up: KIIs strongly emphasized the need to integrate focused mentorship into Government of Bangladesh supportive supervision systems under DGFP and DGHS.

Recommended strategies included aligning mentorship with existing supervision guidelines, embedding accountability mechanisms, strengthening logistics and manpower planning, and maintaining collaboration with professional bodies such as OGSB. Both providers and experts agreed that regular, structured mentorship with follow-up is essential for sustaining gains in service quality and scaling the model nationally.

3.2.3. Thematic frequency and consensus patterns across IDIs and KIIs

The summary of 9 qualitative interviews (*IDI* = 4; *KII* = 5) revealed varying levels of consensus across the primary themes and associated codes. Themes categorized as “All” reflected strong, uniform agreement across participants, indicating areas of shared experience or consistently reported patterns. Themes coded as “Most” demonstrated majority agreement, representing viewpoints that were common but not universal, often shaped by contextual or institutional differences. Themes classified as “Some” captured less frequent but analytically meaningful insights, perspectives, and viewpoints.



3.2.4. Positive impact and Effectiveness of Mentorship interventions on service delivery dynamics

The synthesizes findings insights from IDI and KII text analysis regarding the perceived positive changes and effectiveness resulting from mentorship interventions.

Positive contributions and changes: The healthcare providers expressed that Mentorship interventions contributed to positive outcomes. The process was considered supportive and good. The respective Mentors facilitated behavioral change, improved teamwork and positively changes in their work dynamics.

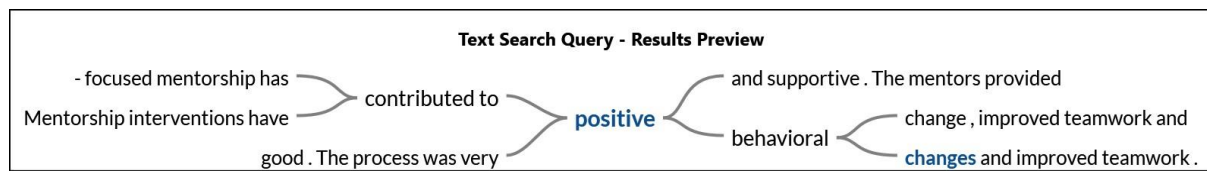


Figure 2: IDI text query

Illustrative quote:

"Before the mentorship, I wasn't confident about dealing with critical care of mother and newborn but now I feel much more confident. This program made me more patient with service recipients. I can follow protocols step by step instead of relying only on memories. Additionally, this hands-on mentorship session really helped me to improve my knowledge as well as technical skills."

- Family Welfare Visitor (FWV)

Effectiveness of mentorship: The findings from KII illustrated that Mentorship was widely regarded as effective and encouraging. Sessions introduced impactful approaches beyond traditional methods, enhancing quality ANC, PNC PPFP counselling along with emergency decision-making. The mentorship process was described as very good, though challenges were noted.

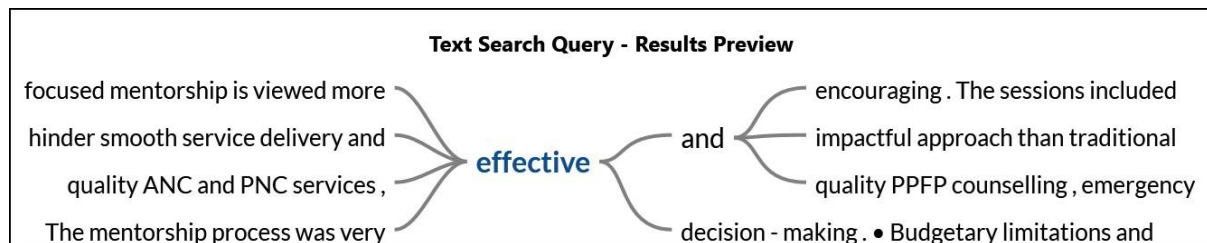


Figure 3: KII text query

Illustrative quote:

"Targeted focused mentorship is viewed as a more effective and impactful approach than any traditional methods, contributing to improved provider performance and strengthened problem-based learning within MNH services. Integration of this mentorship into routine government performance monitoring systems is essential to reinforce accountability and institutional oversight."

- Assistant Professor, Gynecology & Obstetrics, Rangpur Medical College & Hospital

3.2.5. Thematic summaries with illustrative quotes

IDI:

Experience with mentorship approach:

"The mentors observed my working skills directly, discussed case management in detail and corrected mistakes in a constructive manner. This helped me to improve my clinical skills." (R1)

"Routine monitoring visits are mainly checklist-based, where supervisors review records, registers, and reporting formats, and give general instructions within a limited time. There is little opportunity for in-depth technical discussion or practical skill improvement. But the mentorship visits are more structured, supportive, and problem-solving in nature." (R2)

Challenges in applying technical knowledge:

"Shortage of essential drugs and functional equipment, high workload with limited manpower, delayed referral and transport barriers, limited exposure to emergency cases, and lack of community awareness." (R1)

"High client load with limited support staff, delayed referral due to transport and family decision-making, limited hands-on exposure to complicated cases etc." (R2)

Lessons learned from mentorship:

"I developed a strong understanding of the partograph, and I now use it regularly for all patients." (R3)

"These sessions increased my confidence in the management of emergency cases. It also improved my patient counselling skills." (R2)

Policy recommendations:

“More frequent and regular with a fixed schedule. The sessions should be well structured, combining brief theory with more hands-on practice and case-based discussions. The content should be need-based and relevant to union-level facilities, focusing on common complications, available resources, and practical problem-solving to support quality service delivery. (R1)

Feedback & insights:

“As a service provider, I want more similar sessions to ensure the quality of service.” (R2)

KII:**Experience with mentorship approach:**

“Targeted focused mentorship is more structured and systematic than traditional mentorship, with stronger emphasis on performance improvement and real-time application of clinical skills.” (KII1)

“Mentorship interventions have contributed to positive behavioral change, improved teamwork and enhanced professional collaboration among service providers.” (KII5)

Challenges in applying technical knowledge:

“Inconsistent logistics supply, limited opportunities for regular knowledge updates and inadequate technical supervision from higher authorities.” (KII1)

“Budgetary limitations and administrative barriers delay implementation of essential system strengthening activities.” (KII5)

Integration & Sustainability:

“Integration of mentorship into routine government performance monitoring systems is essential to reinforce accountability and institutional oversight.” (KII3)

“Alignment of mentorship components with existing DGFP supervision guidelines is critical to ensure sustainability.” (KII3)

Policy Recommendations:

“Integrating mentorship into routine supportive supervision with structured session planning, periodic technical refreshers and standardized monitoring and reporting mechanisms.” (KII1)

“Capacity-building efforts should place greater emphasis on behavioral and attitudinal development of service providers.” (KII3)

Feedback & Insights:

“Targeted focused mentorship has positively influenced service orientation, professional confidence, communication and collaborative practice among MNH service providers.” (KII5)

4. Discussion

This study demonstrates that a structured focused mentorship approach can substantially improve healthcare providers' competencies across knowledge, attitudes, practices, and skills (KAPS) related to maternal and newborn health (MNH) at union-level facilities in Bangladesh. The findings show statistically significant improvements across all domains, with particularly large gains in skills and attitudes, indicating that mentorship is not only effective in enhancing theoretical understanding but also in transforming clinical behavior and service delivery practices.

The observed improvement in knowledge scores (mean increase of 4.17 points, $p < .001$) aligns with existing evidence that mentorship and continuous professional development interventions are more effective than one-time training in sustaining knowledge retention among healthcare providers [10] & [11]. The reduction in standard deviation further suggests that mentorship contributed to more equitable learning outcomes, reducing variability between providers. This is particularly important in low-resource settings like Bangladesh where inconsistent provider competency often leads to unequal quality of care.

Attitudinal shifts observed in this study were both statistically significant and practically meaningful, especially in areas such as respectful maternity care, timely referral, infection prevention, and postpartum family planning (PPFP) counseling for adolescents. The large effect sizes across multiple items indicate deep behavioral transformation. These findings are consistent with literature suggesting that mentorship—through supportive supervision, role modeling, and reflective learning—can influence provider attitudes and intrinsic motivation more effectively than traditional didactic approaches [12] & [13]. Improved attitudes toward respectful care and adolescent-friendly services are particularly critical in addressing barriers to service utilization in Bangladesh.

Practice-related improvements, including gains in equipment readiness, infection prevention, and partograph use, highlight the effectiveness of hands-on mentorship in reinforcing routine clinical behaviors that directly impact patient safety. However, the lack of significant improvement in higher-order competencies such as clinical decision-making (e.g., episiotomy timing) and referral communication suggests that these areas may require more advanced, simulation-based or case-intensive mentorship models. This finding is supported by previous studies indicating that complex clinical reasoning skills often require repeated exposure, simulation, and feedback beyond routine mentorship [14].

The most notable improvements were observed in clinical and communication skills, with mean scores increasing from 7.9 to 14.0, indicating near command. Significant gains in critical areas such as newborn resuscitation, postpartum danger sign communication, and management of obstetric emergencies demonstrate the effectiveness of bedside coaching and simulation-based learning embedded within the mentorship model. These findings are consistent with global evidence showing that low-dose, high-frequency training combined with mentorship significantly improves MNH service quality and reduces preventable mortality [15] & [16].

Importantly, the study highlights that Family Welfare Visitors (FWVs), who had lower baseline scores, showed greater relative improvement compared to midwives. This suggests that focused mentorship is particularly effective in strengthening the capacity of relatively lower-skilled cadres, thereby reducing competency gaps within the health system. Such equity-enhancing effects are critical for strengthening primary healthcare systems and ensuring uniform service quality across providers.

The qualitative findings further reinforce the quantitative results by illustrating how mentorship differs from routine supervision. Participants consistently described mentorship as supportive, individualized, and practice-oriented, in contrast to checklist-based traditional supervision. This aligns with global frameworks advocating for supportive supervision models that emphasize coaching, problem-solving, and continuous feedback [17]. Additionally, reported improvements in confidence, teamwork, and communication reflect the broader professional development benefits of mentorship beyond technical skill acquisition.

Despite these positive outcomes, persistent systemic barriers—including shortages of essential supplies, workforce constraints, weak referral systems, and governance challenges—limit the full translation of improved competencies into service delivery outcomes. This finding underscores that while mentorship is highly effective at the provider level, it cannot substitute for broader health system strengthening. Similar constraints have been documented in other low- and middle-income countries (LMIC) settings, where structural limitations often hinder the impact of capacity-building interventions [10].

The study also highlights important considerations for sustainability and scale-up. Integration of mentorship into existing government supervision systems under DGHS and DGFP, alignment with national guidelines, and institutionalization through professional bodies are critical for long-term impact. Evidence suggests that embedding mentorship within routine health system functions enhances ownership, accountability, and sustainability [18].

Overall, this study provides strong evidence that focused mentorship is an effective, scalable, and transformative approach for improving MNH service quality at the primary care level. However, to maximize its impact, mentorship should be complemented by system-level investments in logistics, human resources, and referral infrastructure, as well as advanced training approaches for complex clinical competencies.

5. Recommendations

- Integration of focused mentorship should be considered into routine supportive supervision systems under DGHS and DGFP for sustainability.
- The mentorship approach should be contextually-tailored for hard-to-reach & underprivileged areas, incorporating local geographic and mobility constraints, health workforce capacity, and existing service delivery arrangements to ensure effectiveness.
- Institutionalization of regular, structured, and competency-based mentorship with standardized monitoring tools should be made.
- Strengthening of simulation-based and case-based training to improve higher-order clinical decision-making skills should be guaranteed.
- Consistent availability of essential drugs, equipment, and supplies to enable application of learned skills should be ensured.
- Workforce shortages and workload distribution to improve quality of care delivery should be managed.
- Referral systems, including transport and communication mechanisms, for timely emergency care should be strengthened.
- Mentor capacity and standardization to ensure quality and consistency of mentorship delivery should be strengthened.

- Promotion of behavioral and attitudinal competencies such as respectful maternity care and adolescent-friendly services should be prioritized.
- Accountability and feedback mechanisms should be ensured within mentorship and supervision systems.
- Collaboration should be fostered with professional bodies (e.g., OGSB) for technical guidance and scale-up.
- Further research on long-term retention of skills and impact on maternal and neonatal outcomes should be conducted

6. Conclusion

This study demonstrates that a structured focused mentorship approach can significantly improve healthcare providers' knowledge, attitudes, practices, and skills (KAPS) related to maternal and newborn health at the primary care level in Bangladesh. The observed improvements across all domains—particularly in clinical skills and provider attitudes—suggest that mentorship is an effective strategy for translating theoretical knowledge into improved service delivery and patient care practices.

The findings further indicate that focused mentorship is especially beneficial for strengthening the capacity of relatively lower-skilled providers, thereby reducing competency gaps and promoting more equitable quality of care. In addition to technical gains, the approach contributed to positive behavioral changes, including improved communication, adherence to protocols, and respectful maternity care practices, which are critical for increasing service utilization and patient trust.

However, the study also highlights that improvements in provider competency do not automatically translate into optimal service delivery in the presence of persistent systemic constraints, such as shortages of essential supplies, workforce limitations, and weak referral systems. These findings underscore the need to situate mentorship interventions within broader health system strengthening efforts.

From a policy and programmatic perspective, integrating focused mentorship into routine government supervision systems and aligning it with national guidelines may enhance sustainability and scalability. Future research should explore the long-term retention of competencies and assess the impact of mentorship on maternal and neonatal health outcomes.

Use of AI tools declaration

The authors declare they have not used Artificial Intelligence (AI) tools in the creation of this article.

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Authors' contributions

Uzzal Kumar Roy: Conceptualization, Funding acquisition, Supervision, lead the manuscript Writing – review & editing; Mohammad Sarwar Basher: Validation, Investigation; Md. Atikur Rahman: Data curation, Formal analysis, Software, Visualization, Writing – original draft; Golam Fakhruddin: Project administration; Sharmin Sultana Urmi: Methodology, Resources; Tania Tabassum: Data collection, supervision; Ashrafee Afreen: Data collection, supervision.

The final manuscript was approved by all authors.

Conflict of Interest

The authors declare that there are no conflicts of interest relevant to the content of this paper.

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