

From Training to Competency: An Operations Research Evaluation of Family Planning and Post-Abortion Care Capacity Building in Sierra Leone

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Abstract Sierra Leone faces persistent reproductive health challenges, including unmet need for family planning, unsafe abortion-related morbidity, and limited public-sector capacity to provide quality family planning and post-abortion care services. This retrospective mixed-methods operations research evaluation assessed whether a competency-based training, mentorship, and supportive supervision model implemented under the Saving Lives Phase 2 project was associated with improvements in provider knowledge, clinical competency, quality-of-care indicators, and post-abortion care service delivery in selected public-sector facilities in Sierra Leone. Kirkpatrick's four-level model and a programme theory linking training inputs to learning, workplace competency, service readiness, and service outputs guided the evaluation. The evaluation reviewed routine programme data from 2019 to 2020, including trainee reaction forms, pre- and post-test scores, competency assessment records, supervision and mentorship records, quality-of-care assessments, service statistics, programme reports, and exploratory financial and modelled impact estimates. Descriptive analysis summarised changes over time. Trainee reaction was highly positive. Mean knowledge scores increased from 28% at pre-test to 81% at post-test. The share of providers attaining Level 1 competency increased from 59% in Q3 2019 to 97% in Q4 2020. Model-site quality-of-care status increased from 3% in 2019 to 33% in 2020, while model-area status increased from 8% to 22%. Post-abortion care service volume increased from 442 in 2019 to 1,950 in 2020. The findings suggest programme-associated improvements across the training-to-practice pathway, but causal inference is limited by the retrospective descriptive design and absence of a comparison group.

Keywords Competency-Based Training, Family Planning, Operations Research, Post-Abortion Care, Supportive Supervision, Sierra Leone.

Introduction

Sierra Leone continues to face substantial reproductive health challenges, including high fertility, unmet need for family planning, adolescent pregnancy, unsafe abortion-related morbidity, and persistent gaps in access to quality reproductive health services. The 2019 Sierra Leone Demographic and Health Survey remains a key reference point because it reflects the reproductive health context during the 2019–2020 implementation period and documents continuing needs in family planning, maternal health, adolescent health, and service access [1]. More recent secondary analysis of the same dataset has highlighted deficiencies in the quality of contraceptive counselling received by young women, underscoring that improving service quality and client-centred counselling, not commodity availability alone, remains a critical priority [2]. These findings collectively indicate that strengthening provider competence and service readiness is essential for improving reproductive health outcomes in Sierra Leone.

Access to high-quality family planning and post-abortion care services is central to reducing unintended pregnancy, unsafe abortion-related morbidity, and preventable maternal deaths. Unsafe abortion continues to impose a clinical and economic burden on Sierra Leone's health system [3]. WHO guidance emphasises that abortion-related care, including post-abortion care, should be safe, timely, respectful, effective, accessible, acceptable, equitable, and efficient [4]. WHO recommendations on post-abortion contraception further emphasise that contraceptive options should be available as part of comprehensive care when desired by the client [19]. Despite these global standards, many health systems in low-resource settings struggle to translate guidelines into consistent, high-quality service delivery because of gaps in provider competence, facility readiness,

commodities, equipment, documentation, and supportive supervision.

Training health workers is a widely used strategy for improving reproductive health service delivery; however, evidence increasingly shows that classroom-based training alone rarely produces sustained improvements in clinical performance. Studies from low- and middle-income countries suggest that knowledge acquisition does not automatically translate into competent practice when providers face limited equipment, weak supervision, inadequate mentorship, poor documentation systems, commodity constraints, or few opportunities to practise newly acquired skills [21, 24]. These limitations highlight the need for training models that extend beyond didactic instruction. For clinical training to influence service quality, it must be linked to competency assessment, workplace mentorship, supportive supervision, action planning, and continuous quality improvement [11, 12, 20, 21].

Competency-based training offers a practice-oriented approach by focusing not only on what providers know, but also on what they can safely and consistently perform in routine service-delivery settings. WHO's global competency and outcomes framework for universal health coverage emphasises integrating the knowledge, skills, attitudes, and behaviours required for people-centred health service delivery [23]. In family planning and post-abortion care, this is particularly important because counselling, informed choice, implant and intrauterine contraceptive device provision, manual vacuum aspiration, infection prevention, emergency preparedness, documentation, consent, and incident reporting require both technical competence and clinical judgement. Recent evidence from low- and middle-income countries also shows that simulation-based and practice-based education can strengthen health-worker performance, especially when combined with contextualised mentorship and supervision [24].

What is already known is that family planning and post-abortion care quality depends on trained providers, informed choice, method-specific counselling, respectful care, technical competence, continuity, and appropriate service organisation [9, 13-18]. Supportive supervision and performance-enhancing approaches can also strengthen health-worker performance when they are collaborative, problem-solving oriented, and linked to service-delivery improvement [20, 21]. However, existing studies have several limitations. First, much of the published evidence on family planning and post-abortion care training in low- and middle-income countries comes from small-scale pilot projects, NGO-led interventions, or health-worker training studies with limited documentation of outcomes within public-sector systems [21, 24]. Second, many studies assess immediate post-training knowledge gain but do not measure competency progression over time, despite global recognition that competency requires longitudinal assessment and workplace-based practice [10, 23]. Third, fewer studies examine how competency-based models influence facility-level quality-of-care indicators or service-delivery outputs, which remain under-reported in reproductive health implementation literature [22, 25]. Fourth, published evidence from Sierra Leone remains limited on whether competency-based family planning and post-abortion care training, when combined with mentorship and supportive supervision, yields measurable improvements beyond knowledge acquisition. Existing Sierra Leone evidence has focused more on counselling quality or abortion-related morbidity than on provider competency, facility readiness, or quality-performance indicators [2, 3].

The Saving Lives Phase 2 project provided an opportunity to address this gap. Marie Stopes Sierra Leone, in collaboration with the Ministry of Health and Sanitation and programme partners, implemented a public-sector capacity-building intervention focused on family

planning and post-abortion care services between 2019 and 2020. The model included a 10-day training programme, competency assessment, mentorship, workplace observation, supportive supervision, facility action planning, and quality-of-care monitoring. The original programme evaluation report documented trainee reaction, pre-test and post-test performance, competency progression, quality-of-care indicators, service-output trends, and exploratory return-on-training investment estimates [5]. However, these findings had not been synthesised into a peer-reviewed analysis, nor had they been critically examined within the broader evidence base.

This manuscript's conceptual framework combines Kirkpatrick's four-level training evaluation model with an implementation pathway linking training inputs to learning, workplace behaviour, facility readiness, and programme results. Kirkpatrick's model remains useful because it assesses reaction, learning, behaviour, and results [6]. At the same time, critiques of the model caution against assuming a simple linear causal chain between these levels and highlight the need to consider contextual and organisational factors [7]. Therefore, this evaluation interpreted findings as programme-associated changes across a training-to-practice pathway rather than as definitive causal effects.

This study aimed to evaluate whether a competency-based family planning and post-abortion care training and supportive supervision model was associated with improvements in provider knowledge, clinical competency, quality-of-care indicators, and post-abortion care service delivery in selected public-sector facilities in Sierra Leone between 2019 and 2020. The study hypothesis was that a combined training, mentorship, and supportive supervision model would be associated with improvement across multiple levels of the evaluation pathway: trainee reaction, provider learning, workplace

competency, quality-of-care status, and service-delivery outputs.

Materials and Methods

Study Design

This study was a retrospective operations research evaluation of a competency-based family planning and post-abortion care training and supportive supervision model implemented under the Saving Lives Phase 2 project in Sierra Leone. The retrospective design was appropriate because the purpose was to analyse existing routine programme data generated during implementation and to determine whether the capacity-building model was associated with changes in knowledge, competency, quality-of-care indicators, and service delivery over time.

An operations research design was also appropriate because the evaluation addressed a practical service-delivery question: how a real-world public-sector capacity-building model functioned under routine programme conditions. The evaluation was not designed as a clinical trial or controlled effectiveness study. Findings were therefore interpreted as descriptive programme-associated changes rather than causal estimates of intervention effect.

Study Setting

The evaluation was conducted in Sierra Leone within selected public-sector health facilities supported under the Saving Lives Phase 2 project. Marie Stopes Sierra Leone implemented the project in collaboration with the Ministry of Health and Sanitation as part of a broader public-sector reproductive health system-strengthening initiative. The intervention focused on strengthening the capacity of public-sector providers to deliver long-acting reversible contraception and post-abortion care services. Facility selection was conducted in consultation with government and implementing partners, prioritizing sites such as Emergency Obstetric and Neonatal Care

facilities, high-catchment-population sites, border-town community health centres, and hard-to-reach locations [5].

In addition to training, the intervention sought to strengthen service readiness at supported facilities. The intervention issued training materials and practical job aids, including family planning manuals, family planning and post-abortion care flipcharts, and other provider-support tools, to participating facilities. Essential equipment and commodities were also supplied to help newly trained providers begin applying their skills under supervision after training. Providers were expected to practise under mentorship and supportive supervision until they were assessed as Level 1 competent, after which they could provide services independently, subject to periodic reassessment and ongoing quality monitoring [5]. This approach is consistent with current guidance that reproductive health service quality depends not only on provider knowledge, but also on method-specific guidance, appropriate commodities, equipment readiness, supervision, referral capacity, and client-centred counselling [4, 9].

Programme Description

The programme consisted of a competency-based training and post-training support model for public-sector providers. The intervention included a 10-day training programme on family planning and post-abortion care, followed by competency assessment, mentorship, workplace observation, supportive supervision, facility action planning, and quality-of-care monitoring. Training content covered long-acting reversible contraceptive methods, post-abortion care, clinical governance, medical emergency management, clinical documentation, consent, infection prevention, and incident reporting.

Before the cascade training, Marie Stopes Sierra Leone, through its Medical Development Team, worked closely with the Reproductive Health/Family Planning Department of the

Ministry of Health and Sanitation to strengthen national training capacity. This included facilitating the establishment of a core group of National Master Trainers made up of experienced reproductive health trainers selected across districts in Sierra Leone. These master trainers worked with the Marie Stopes Sierra Leone Medical Development Team to adapt training materials from existing government family planning and post-abortion care manuals, ensuring cascade training aligned with national standards and implementation needs.

In January 2019, Marie Stopes Sierra Leone and the Ministry of Health and Sanitation conducted a national master trainers' meeting in Bo District [5]. Master trainers from the Ministry of Health and Sanitation and Marie Stopes Sierra Leone received refresher training and competency assessment using standardised competency assessment checklists. They reviewed and adapted training materials and presentations for the national cascade. The Ministry of Health and Sanitation approved the training strategy, which separated implant and post-abortion care training from intrauterine contraceptive device training.

Training was delivered simultaneously across multiple districts using a low trainer-to-trainee ratio of approximately one trainer to four or five trainees [5]. Each training unit included approximately 8–12 trainees and 2–3 trainers. Training methods included presentations, group work, practical sessions, plenary discussions, experience sharing, feedback sessions, pre-tests, post-tests, and action planning.

Demand creation and community mobilisation around supported facilities were undertaken through a combined effort involving Marie Stopes Sierra Leone community-based mobilisers and consortium-supported community mobilisation structures, including Restless Development where applicable. These activities helped prepare communities and supported facilities ahead of

mentorship, supportive supervision, competency assessment, and service-delivery follow-up visits by informing communities, mobilising eligible clients, and facilitating client flow around supported sites. This mobilisation component was important because newly trained providers required supervised opportunities to apply their skills in real service-delivery settings before being assessed as competent to provide services independently.

The programme also included practical service-readiness support to enable providers to translate classroom learning into supervised clinical practice. Participating facilities received family planning manuals, family planning and post-abortion care flipcharts, and other job aids to support counselling, clinical decision-making, documentation, and service delivery. Essential equipment and commodities were also supplied to supported facilities to enable newly trained providers to begin applying their skills after training. Providers practised under mentorship and supportive supervision until they were assessed as Level 1 competent, after which they could provide services independently, subject to periodic reassessment and ongoing quality monitoring [5].

Post-training mentorship and supportive supervision reinforced learning, assessed competency, monitored facility action plans, and addressed implementation barriers such as equipment, consumables, documentation, and stock-management gaps. This combined approach reflected a training-to-practice model that linked classroom instruction to national training capacity, standardised training materials, service readiness, supervised practice, competency assessment, facility action planning, and continuous quality improvement. This is consistent with guidance that quality family planning and post-abortion care require not only trained providers, but also appropriate commodities, equipment, method-specific counselling tools, supervision, referral

readiness, and client-centred service delivery [4, 9].

Participants, Facilities, and Sampling

The programme targeted public-sector providers selected from supported public-sector health facilities in Sierra Leone. In 2019, Marie Stopes Sierra Leone, in collaboration with the Ministry of Health and Sanitation, trained more than 180 public-sector providers from 90 public-sector sites [5]. Participant selection involved consultation with national and District Health Management Teams to identify eligible public-sector providers from supported facilities.

The sampling approach was purposive and programme-based rather than probability-based. Providers and facilities were selected because they were part of the Saving Lives Phase 2 public-sector capacity-building programme, not because they represented all public-sector providers or facilities in Sierra Leone. Inclusion criteria for providers included selection by relevant programme and government structures, participation in the training or mentorship process, and availability of programme records. Facilities were included if they were supported public-sector sites with relevant programme data. We excluded facilities when required programme data were unavailable or not included in the final evaluation dataset.

A formal sample size calculation was not conducted because the evaluation used routinely collected programme data from all available eligible training and implementation records. The sample size was therefore determined by programme reach and data availability rather than by statistical power calculation. This limits generalisability but is appropriate for a retrospective operations research evaluation focused on programme learning.

Evaluation Framework and Conceptual Model

The evaluation used Kirkpatrick's four-level model of training evaluation, which assesses training outcomes across reaction, learning, behaviour, and results [6, 7]. Level 1 assessed trainee reaction to the training, including satisfaction with objectives, content, materials, facilitation, timeframe, participation opportunities, and opportunities to practise and apply learning. Level 2 assessed learning through pre-test and post-test scores. Level 3 assessed behaviour change through workplace observation, competency assessment, mentorship records, and supportive supervision findings. Level 4 assessed programme-level results using quality-of-care indicators, competency progression, service delivery outputs, and exploratory financial and modelled impact estimates.

The programme theory assumed that training would improve knowledge; mentorship, supervised practice, and workplace observation would support translation of knowledge into clinical competency; supportive supervision and action planning would address facility-level barriers; and improved competency, service readiness, and client mobilisation would be reflected in quality-of-care indicators and service-delivery outputs. Because this pathway may be influenced by contextual factors such as commodity availability, equipment readiness, job aids, supervision intensity, reporting quality, provider motivation, demand creation, client flow, and facility-level implementation capacity, the evaluation did not assume a simple causal sequence.

Data Sources

The evaluation used routinely collected programme data from multiple sources. These included trainee reaction evaluation forms, pre-test and post-test scores, training reports, competency and training database records, workplace observation and supportive

supervision records, quality-of-care assessment results, facility action plan trackers, service delivery statistics, programme budget data, and modelled programme impact estimates.

Training reports were reviewed to provide additional insight into implementation processes, participant feedback, contextual barriers, and factors that may have influenced changes in knowledge, skills, competency, and service delivery. Action plan trackers from regional teams and facility action plan booklets were reviewed to assess whether identified post-training actions were implemented. Modelled health and economic impact estimates were generated using MSI Impact 2 version 5, a reproductive health programme impact estimation tool [8].

Measurement Tools and Validation Considerations

Trainee reaction was measured using structured training evaluation forms used routinely by the programme. Knowledge was measured using programme pre-test and post-test tools administered before and after training. Clinical competency was assessed using standardised competency assessment checklists used by master trainers, mentors, and supervisors. Quality-of-care status was assessed using the programme's quality-monitoring framework, including model-site and model-area classifications documented in the programme report [5].

The measurement tools were programme-standard instruments used for training, mentorship, competency assessment, supportive supervision, and quality assurance, rather than research instruments developed specifically for this manuscript. Therefore, formal psychometric validation, reliability testing, pilot testing, and Cronbach's alpha values were not available in the summary dataset. This is acknowledged as a measurement limitation. However, the use of standardised programme tools, competency assessment checklists, supervision records, and

routine quality-assurance processes supported consistency in implementation monitoring within the programme context.

Outcome Measures

The primary outcome measures were provider knowledge, clinical competency, quality-of-care status, and post-abortion care service delivery. Provider knowledge was measured using average pre-test and post-test scores. Clinical competency was assessed using competency assessment records and expressed as the proportion of providers attaining Level 1 competency over time. In the programme competency framework, Level 1 competency referred to providers who had been assessed as competent to provide the relevant family planning or post-abortion care service independently according to programme-standard competency assessment checklists, while remaining subject to routine mentorship, supervision, and periodic reassessment. Competency assessment focused on observed ability to apply knowledge and skills safely in service-delivery settings, rather than training attendance alone.

Quality-of-care outcomes were assessed using the proportion of facilities attaining model-area and model-site status. In the programme quality-assurance framework, a model area referred to a specific technical section, domain, or service-readiness area in which a facility achieved a score of 90% or above during quality monitoring. For example, where 22 technical areas were assessed, a facility could achieve model-area status in some, most, or all of the assessed areas. Model-site status referred to a facility-level classification achieved when the facility attained model-area status across all assessed technical areas or domains. These categories were programme-standard quality-assurance indicators used to monitor facility-level and service-area performance, guide supportive supervision, and track progress in service

readiness and quality improvement within the implementation context.

Post-abortion care service delivery was assessed using routine monthly service statistics for 2019 and 2020. Secondary outcome measures included trainee satisfaction, implementation of post-training action plans, exploratory return on training investment, and modelled health and economic impact estimates. Trainee satisfaction was assessed using structured reaction evaluation forms. Return on training investment was treated as an exploratory programme-value indicator rather than a formal economic evaluation because it was based on routine programme financial data and modelled benefit estimates.

Data Analysis

Data were analysed descriptively using frequencies, percentages, mean scores, absolute changes, and relative percentage changes. Trainee reaction data were summarised across satisfaction domains. Pre-test and post-test scores were compared using mean percentage scores, and knowledge gain was calculated as the difference between average pre-test and post-test scores. Competency progression was assessed by comparing the proportion of providers attaining Level 1 competency across implementation quarters from Q3 2019 to Q4 2020. Quality-of-care improvement was assessed by comparing model-site and model-area status between 2019 and 2020.

Post-abortion care service trends were summarised using monthly and annual service totals for 2019 and 2020. Annual percentage change was calculated by comparing total post-abortion care services provided in 2020 with those provided in 2019. Financial and modelled impact findings were summarised descriptively and interpreted cautiously because the evaluation did not include a formal cost-effectiveness design, a control group, or a counterfactual comparison.

No inferential hypothesis testing was performed because the available dataset was

derived from routine programme summary records and was not structured for statistical comparison with a control group. Therefore, assumptions for parametric testing, regression modelling, or adjusted confounder analysis were not applied. Missing data were handled using complete-case inclusion within the available programme summary tables. Where denominator information was unavailable or inconsistent across programme records, we presented findings descriptively and interpreted them cautiously. The analysis was conducted using programme summary records and Microsoft Excel-based tabulations.

Bias and Confounding

Potential sources of bias were considered in interpretation. Selection bias may have occurred because facilities and providers were selected through programme processes rather than probability sampling. Measurement bias may have occurred because programme tools were used for routine monitoring rather than independent research measurement. Observer bias may have affected competency and quality assessments where assessors were programme staff or mentors. Confounding is possible because changes in service delivery may have been influenced by commodities, equipment, demand-generation activities, reporting completeness, referral systems, programme maturity, or broader health-system factors. Recall bias was considered less relevant for routine records but may have affected qualitative or narrative training-report information. These limitations informed the cautious interpretation of findings as programme-associated changes.

Ethical Considerations

This evaluation used routinely collected programme data generated during implementation of the Saving Lives Phase 2 project. The evaluation was conducted as an internal programme and operations research activity within Marie Stopes Sierra Leone, with

technical leadership from the Medical Development Team and collaboration from relevant quality assurance, programme, monitoring and evaluation, and finance functions. The report was submitted to the Reproductive Health Department of the Ministry of Health and Sanitation in Sierra Leone as part of programme accountability, learning, and performance review.

No individual client-identifiable information is reported in this manuscript. Provider and facility-level findings are presented in aggregate form. As the work involved retrospective analysis of routine programme implementation and quality-improvement data, it was treated as a programme evaluation rather than an interventional human-subjects research study. Institutional permission to publish the findings was obtained from the relevant data-owning and implementing bodies.

Results

Programme Reach and Evaluation Pathway

The Saving Lives Phase 2 intervention trained more than 180 public-sector providers from 90 selected public-sector sites in Sierra

Leone [5]. The intervention combined competency-based classroom training with post-training mentorship, workplace observation, supportive supervision, action planning, and quality-of-care monitoring. Results are presented across the evaluation pathway, moving from trainee reaction and learning outcomes to competency progression, quality-of-care performance, post-abortion care service delivery, and exploratory programme-value indicators.

Trainee Reaction to Training

Trainee reaction to the training was highly positive across all assessed domains, as shown in Table 1. Most participants rated the training objectives, achievement of training objectives, content, materials, facilitation, timeframe, opportunities for participation, and opportunities to practise and apply learning as either excellent or good. No participant rated any assessed domain as unsatisfactory or poor.

The highest excellent ratings were observed for facilitation of the training course, achievement of training objectives, and content of the training. These findings indicate high acceptability of the training approach among participating providers.

Table 1. Trainee Reaction to the Family Planning and Post-Abortion Care Training

Training evaluation domain	Excellent	Good	Satisfactory	Unsatisfactory	Poor
Training objectives	146	40	6	0	0
Achievement of training objectives	154	34	7	0	0
Contents of the training	154	36	6	0	0
Materials provided	132	54	10	0	0
Facilitation of training course	156	37	4	0	0
Timeframe allocated for training	148	40	2	0	0
Opportunities for sharing and participation	136	56	2	0	0
Opportunities to practise and apply learning	130	62	6	0	0

Source: Programme evaluation report [5].

Knowledge Gain Following Training

Mean knowledge scores increased from 28% at pre-test to 81% at post-test, as shown in

Table 2, representing a 53-percentage-point gain following the classroom-based training component.

Table 2. Pre-Test and Post-Test Knowledge Scores

Indicator	Score (%)
Mean pre-test score	28
Mean post-test score	81
Absolute knowledge gain	53 percentage points

Source: Programme evaluation report [5].

The increase in post-test scores indicates substantial immediate learning following the training. This result shows improved knowledge acquisition but should be interpreted as an immediate post-training outcome rather than evidence of long-term knowledge retention.

Provider Competency Progression

Provider competency improved over the implementation period, although the trend was not linear, as shown in Table 3. The proportion of providers attaining Level 1 competency was 58.96% in Q3 2019, declined to 48.53% in Q4 2019, increased to 71.01% in Q2 2020, remained relatively stable at 70.17% in Q3 2020, and reached 96.70% by Q4 2020.

Table 3. Provider Level 1 Competency by Quarter

Period	Providers attaining Level 1 competency (%)
Q3 2019	58.96
Q4 2019	48.53
Q2 2020	71.01
Q3 2020	70.17
Q4 2020	96.70

Source: Programme evaluation report [5].

Note: Level 1 competency refers to providers assessed as competent to provide the relevant service independently, subject to regular re-assessment according to programme-standard competency assessment checklists.

The decline between Q3 and Q4 2019 coincided with early implementation challenges documented in the programme report, including inadequate equipment and consumables for service provision and practice. The subsequent improvement through 2020 suggests progressive translation of training into workplace competence, supported by mentorship, supervision, action planning, and problem-solving support.

Quality-of-Care Outcomes

Quality-of-care indicators improved between 2019 and 2020, as shown in Table 4. Model-site status increased from 3% in 2019 to 33% in 2020, representing a 30-percentage-point increase. Model-area status increased from 8% to 22%, representing a 14-percentage-point increase.

Table 4. Quality-of-Care Status, 2019–2020

Quality-of-care indicator	2019 (%)	2020 (%)	Absolute change
Model-site status	3	33	+30 percentage points
Model-area status	8	22	+14 percentage points

Source: Programme evaluation report [5].

Note: A model area refers to an assessed technical section or domain in which a facility scored 90% or above. Model-site status refers to achievement of model-area status across all assessed technical areas or domains.

These findings indicate improvement in facility-level and service-area quality indicators during the implementation period. The larger increase in model-site status suggests broader improvement in overall facility quality performance, while the increase in model-area status indicates progress in specific quality domains.

Post-Abortion Care Service Delivery

Post-abortion care service delivery increased substantially between 2019 and 2020, as shown in Table 5. A total of 442 post-abortion care services were reported in 2019 compared with 1,950 in 2020, representing an absolute increase of 1,508 services and a relative increase of approximately 341%.

Table 5. Monthly Post-Abortion Care Service Volume, 2019–2020

Month	2019	2020
January	1	52
February	0	112
March	2	153
April	0	126
May	2	156
June	3	107
July	14	156
August	40	131
September	62	289
October	83	294
November	67	207
December	168	167
Total	442	1950

Source: Programme evaluation report [5].

Monthly service data showed higher post-abortion care service volumes in 2020 than in 2019 across nearly all months. The largest monthly service volumes in 2020 were recorded in September and October, while service volumes in 2019 increased mainly in the final quarter. The overall pattern suggests improved service availability, readiness, reporting, demand, or a combination of these factors during the implementation period.

Exploratory Programme-Value and Modelled Impact Estimates

Exploratory return on training investment was estimated at 163%. This suggests that, under the programme's internal value-estimation approach, the estimated benefits of the training and post-training support package exceeded the documented investment cost. However, interpret this estimate cautiously. It

was derived from routine programme financial data and modelled benefit estimates, rather than from a formal cost-effectiveness analysis, cost-benefit study, or controlled economic evaluation. The estimate should therefore be understood as an indicative programme-value measure, useful for internal learning and decision-making, rather than as definitive evidence of economic return attributable solely to the training intervention.

The programme report also included modelled impact estimates generated using

MSI Impact 2 version 5, as shown in Table 6. These estimates suggested increases in reproductive health and economic benefits between 2019 and 2020, including unintended pregnancies averted, unsafe abortions averted, maternal deaths averted, DALYs averted, direct healthcare costs saved, and couple-years of protection. These indicators are presented as modelled programme-impact estimates rather than directly observed clinical outcomes.

Table 6. Modelled Programme Impact Estimates, 2019–2020

Indicator	2019	2020
Unintended pregnancies averted	51,923	56,959
Live births averted	23,540	25,823
Abortions averted	21,505	23,591
Maternal deaths averted	374	397
Child deaths averted	1,164	1,277
Unsafe abortions averted	18,664	21,722
Maternal DALYs averted	21,727	23,042
Child DALYs averted	98,388	107,931
Total DALYs averted	120,115	130,973
Direct healthcare costs saved, 2018 GBP	2,061,920	2,278,754
Total CYPs, FP only	115,569	127,512

Source: Programme evaluation report [5].

Overall, the findings show improvement across the evaluation pathway. Trainee reaction was highly positive, knowledge scores improved substantially after training, provider competency increased over time, quality-of-care indicators improved, and post-abortion care service delivery increased markedly between 2019 and 2020. Because the evaluation did not include a comparison group, these findings should be interpreted as programme-associated changes rather than definitive causal effects.

Discussion

This operations research evaluation found improvements across the training-to-practice pathway: trainee reaction was highly positive, mean knowledge scores increased substantially

after training, provider Level 1 competency improved over time, quality-of-care indicators improved between 2019 and 2020, and post-abortion care service delivery increased markedly during the same period. These findings suggest that a competency-based training model, when combined with mentorship, workplace observation, supportive supervision, service-readiness support, and facility action planning, may contribute to improved provider readiness and service delivery in public-sector reproductive health programmes. However, because the evaluation was retrospective and did not include a comparison group, the findings should be interpreted as programme-associated improvements rather than definitive causal effects.

The increase in mean knowledge score from 28% at pre-test to 81% at post-test demonstrates substantial immediate learning following the classroom-based component of the intervention. This finding is consistent with the purpose of structured clinical training, which is to improve provider knowledge, confidence, and technical understanding before clinical practice. However, knowledge gain alone is insufficient evidence of service readiness. In family planning and post-abortion care, providers must translate knowledge into safe counselling, eligibility assessment, infection prevention, procedural competence, emergency preparedness, documentation, incident reporting, and follow-up care. The WHO Family Planning Global Handbook emphasises that family planning providers require practical, method-specific guidance to support informed choice, safe method provision, and management of client concerns [9]. The present findings reinforce this distinction by showing that immediate knowledge gain was followed by more gradual competency improvement that depended on post-training support.

The competency trend is one of the most important findings. Although knowledge improved immediately after training, Level 1 competency increased progressively over time, from 58.96% in Q3 2019 to 96.70% in Q4 2020. This pattern supports the central argument that competency development was not achieved through classroom training alone, but through an implementation model that included mentorship, supervision, workplace observation, supervised practice, facility-level problem solving, and service-readiness support. The temporary decline in competency between Q3 and Q4 2019 is also important because it shows that early post-training implementation was affected by practical constraints, including equipment and consumable gaps documented in the programme report [5]. These constraints may have limited providers' opportunities to practise, consolidate new skills, and

demonstrate competency immediately after training.

This finding is consistent with contemporary competency-based education approaches, which emphasise observable performance, real-world application of learning, problem-solving, decision-making, and iterative skill development rather than knowledge retention alone [10, 23, 24]. Evidence from low- and middle-income settings further suggests that health-worker performance improvement requires more than initial training and is strengthened by ongoing support, supervision, feedback, mentoring, and context-sensitive intervention design [11, 12, 20, 21]. In this study, the combination of competency assessment, mentorship, facility action planning, supportive supervision, job aids, equipment readiness, and commodities appears to have provided a mechanism through which training was translated into workplace performance. The contribution of this evaluation lies in documenting how these components were operationalised within a public-sector reproductive health programme in a resource-constrained setting.

The improvement in quality-of-care indicators further supports this interpretation. Model-site status increased from 3% in 2019 to 33% in 2020, while model-area status increased from 8% to 22%. These improvements suggest that gains were not limited to individual provider knowledge but extended to broader service-readiness and quality-performance domains. This is consistent with the Bruce quality-of-care framework, which emphasises method choice, information provided to clients, technical competence, interpersonal relations, continuity, and appropriate service organisation [13]. More recent rights-based family planning frameworks further emphasise informed choice, voluntarism, respectful care, accountability, and client-centred counselling [14-16].

Reproductive health quality is multidimensional. WHO's abortion care

guideline defines quality abortion care as care that is safe, timely, affordable, non-discriminatory, respectful, effective, accessible, acceptable, equitable, and efficient [4]. WHO's broader quality-of-care vision also emphasises both evidence-based provision of care and the experience of care within health facilities [17], while respectful care guidance highlights dignity, privacy, confidentiality, informed choice, continuous support, and freedom from mistreatment [18]. Although this evaluation did not directly measure all dimensions of quality, the observed improvement in model-site and model-area status suggests progress in facility-level systems supporting quality family planning and post-abortion care. The findings also align with recent evidence that expanding family planning coverage requires attention not only to availability, but also to quality, equity, policy support, and health-system context [25].

The increase in post-abortion care service delivery from 442 services in 2019 to 1,950 in 2020 is notable. This increase may reflect improved provider competence, enhanced service readiness, better documentation, increased awareness, improved referral, increased demand, demand creation around supported facilities, commodity availability, or a combination of these factors. It should not be attributed to training alone. Nevertheless, the increase is programme-relevant because access to post-abortion care and post-abortion contraception is a recognised component of quality reproductive health service delivery [4, 19, 22]. The finding suggests that improvements in provider competency and facility quality systems may coincide with increased service utilisation when accompanied by mentorship, service-readiness support, community mobilisation, and public-sector collaboration.

Kirkpatrick's model provided a useful structure for interpreting the evaluation findings across reaction, learning, behaviour, and results [6]. In this study, Level 1 was reflected in positive trainee reaction; Level 2 in

knowledge gain; Level 3 in competency progression; and Level 4 in quality-of-care improvement, service-delivery trends, and exploratory programme-value indicators. However, the findings also illustrate one of the known limitations of Kirkpatrick's model: improvement at one level does not automatically prove improvement at the next level [7]. In this evaluation, the improvement observed across levels is best interpreted as a coherent programme pattern rather than proof of a linear causal chain.

The findings have several implications for public-sector family planning and post-abortion care capacity strengthening. First, they support moving beyond one-off training toward competency-based implementation models. Classroom training should be treated as the starting point of capacity building, not the endpoint. Second, mentorship and supportive supervision should be structured, documented, and linked to problem-solving, equipment readiness, documentation quality, commodity availability, provider confidence, and facility action plans. Supportive supervision is more likely to improve performance when it is collaborative, data-informed, and oriented toward service improvement rather than inspection alone [20, 21].

Third, the intervention demonstrated the value of government-partner collaboration. The programme was coordinated by Marie Stopes Sierra Leone, with regulatory oversight and national alignment from the Ministry of Health and Sanitation, support from national master trainers, district health structures, and participating public-sector facilities [5]. Such collaboration may improve legitimacy, alignment with national systems, and feasibility of implementation. This is relevant for sustainability because public-sector capacity strengthening requires ownership beyond a single implementing organisation and aligns with global health workforce priorities that emphasise competency, system integration, and sustained workforce investment [23, 26].

Fourth, the findings reinforce the importance of quality systems alongside service expansion. Increased service volume is valuable only if services are safe, respectful, technically competent, well documented, and client-centred. Recent evidence on family planning policy and coverage suggests that service expansion requires attention to quality, equity, health-system context, and the needs of vulnerable populations [25]. Future scale-up should therefore preserve the model's quality-assurance components, including competency assessment, incident reporting, consent documentation, infection prevention, supportive supervision, and facility action planning.

Incident reporting and management were also important components of the programme's quality-improvement pathway. Through training, mentorship, and district-level support, providers were introduced to structured incident reporting processes and supported in identifying, documenting, escalating, and learning from clinical incidents. Within the supported facilities, this represented an important step toward embedding incident reporting into routine public-sector family planning and post-abortion care service delivery. The programme's Medical Development Team also shared lessons learned from incidents, both locally and globally, with supported facilities. These lessons were reviewed with district mentors and used to strengthen local practice, improve provider awareness of preventable risks, and support a learning-oriented safety culture. This approach is consistent with global patient-safety guidance, which emphasises that incident reporting and learning systems should support structured analysis, non-punitive investigation, feedback, and system improvement to prevent recurrence [27, 28]. Therefore, the introduction of incident reporting within the capacity-building model should be viewed as a clinical governance intervention, not merely an administrative reporting requirement.

The exploratory return-on-training investment estimate of 163% suggests that, within the programme's internal value-estimation approach, the estimated benefits associated with the training and post-training support package exceeded the documented investment cost. However, interpret this estimate cautiously. It was derived from routine programme financial data and modelled benefit estimates rather than from a formal cost-effectiveness analysis, cost-benefit study, or controlled economic evaluation. Similarly, the Impact 2 estimates for unintended pregnancies averted, unsafe abortions averted, maternal deaths averted, disability-adjusted life years averted, healthcare costs saved, and couple-years of protection represent modelled programme-impact estimates rather than directly observed clinical outcomes [8]. These estimates are useful for programme learning and value-for-money discussion, but they should not be presented as independently measured health outcomes or as economic return attributable solely to the training intervention.

This evaluation has several strengths. It drew on real-world implementation data from a public-sector reproductive health programme, assessed multiple levels of the training-to-practice pathway, included provider-level and facility/service-level indicators, and used routine data commonly available to programme implementers and ministries of health. It also documented implementation barriers, including equipment and consumable constraints, which provide practical learning for future programme design. In addition, the evaluation examined a combined intervention package rather than classroom training alone, making the findings relevant to implementation contexts where service readiness, mentorship, quality assurance, and supervision influence whether providers can apply newly acquired skills.

The evaluation also has important limitations. The retrospective design and absence of a comparison group limit causal

inference. Improvements observed between 2019 and 2020 may have been influenced by factors other than the training and supportive supervision model, including demand-generation activities, changes in reporting, commodity availability, referral systems, programme maturity, provider motivation, or broader health-system dynamics. The analysis was primarily descriptive, and available summary data did not allow adjustment for provider cadre, facility type, district, service volume, baseline readiness, supervision intensity, or facility-level implementation capacity.

The knowledge-gain analysis used average pre-test and post-test scores and did not assess long-term knowledge retention. Competency improvement was assessed using programme competency records, but inter-assessor standardisation and consistency over time could not be independently verified from the summary dataset. Quality-of-care indicators were reported as model-site and model-area percentages; while these were programme-standard quality-assurance indicators, further evaluation would benefit from clearer documentation of denominators, component criteria, and facility-level trajectories. The post-abortion care service increase is significant but cannot be attributed solely to training because service output may be affected by demand, referrals, commodities, documentation, client mobilisation, and programme implementation factors.

Finally, the return-on-training investment and Impact 2 estimates were modelled programme-value indicators rather than formal economic or epidemiological outcome measures. Potential selection bias, measurement bias, observer bias, reporting bias, and confounding should therefore be considered when interpreting the findings. These limitations do not negate the programme-learning value of the evaluation, but they require cautious interpretation and avoidance of causal overstatement.

Future evaluations should use stronger designs where feasible, including quasi-experimental designs, comparison facilities, interrupted time-series analysis, or facility-level longitudinal analysis. Further research should examine whether competency gains are sustained beyond the initial supervision period and whether improvements vary by provider cadre, facility type, district, supervision intensity, service-delivery context, equipment readiness, commodity availability, and demand-generation support. Studies should also assess client-level outcomes, including satisfaction, informed choice, method continuation, complication management, referral completion, experience of respectful care, and whether improvements in incident reporting translate into safer practice.

More rigorous economic evaluation would also be valuable. Future studies should distinguish training costs, supervision costs, mentorship costs, equipment costs, commodity costs, demand-creation costs, and broader programme implementation costs. This would allow clearer assessment of cost-effectiveness, affordability, scalability, and sustainability. Overall, the evaluation provides practical evidence that competency-based training, when embedded within a structured supportive supervision and quality-improvement system, can strengthen public-sector family planning and post-abortion care service delivery in resource-constrained settings.

Conclusion

This operations research evaluation found that a competency-based family planning and post-abortion care training and supportive supervision model was associated with improvements in provider knowledge, clinical competency, quality-of-care indicators, and post-abortion care service delivery in selected public-sector facilities in Sierra Leone. Mean knowledge scores improved substantially after training, provider Level 1 competency increased over the implementation period,

quality-of-care indicators improved between 2019 and 2020, and post-abortion care service volume increased markedly during the same period.

The findings suggest that classroom-based training alone is unlikely to be sufficient for sustained clinical performance improvement. Instead, the observed pattern of results supports the value of combining training with competency assessment, mentorship, workplace observation, supervised practice, supportive supervision, action planning, service-readiness support, and facility-level problem solving. This model appears particularly relevant for reproductive health services that require both technical competence and system readiness support, including long-acting reversible contraception and post-abortion care.

The evaluation also highlights the importance of embedding quality-assurance and clinical-governance systems within capacity-building programmes. Incident reporting, consent documentation, infection prevention, emergency preparedness, mentorship, and facility action planning strengthened the training-to-practice pathway by helping providers apply new skills within safer and more accountable service-delivery systems.

However, interpret the findings with caution because the evaluation was retrospective, descriptive, and did not include a comparison group. Improvements observed during the implementation period may have been influenced by other programme or health-system factors. The return-on-training investment and health impact estimates should also be interpreted as exploratory and modelled programme-value indicators rather than definitive economic or clinical outcomes.

Future evaluations should use stronger comparative or longitudinal designs to assess causality, sustainability, scalability, and cost-effectiveness. They should also examine long-term competency retention, variation by

provider cadre and facility context, client-level outcomes, referral completion, experience of respectful care, and the contribution of incident reporting and quality-improvement systems to safer reproductive health service delivery.

Overall, this evaluation provides practical, context-specific evidence that competency-based training, when embedded within a structured supportive supervision and quality-improvement system, can strengthen public-sector family planning and post-abortion care service delivery in resource-constrained settings. The findings offer actionable insights for policymakers, programme implementers, and global health partners seeking to improve reproductive health outcomes through sustainable, system-integrated capacity-building approaches.

Conflict of Interest

The author declares no conflict of interest. The evaluation was conducted as part of routine programme accountability, learning, and performance review under the Saving Lives Phase 2 project. The findings and interpretations presented in this manuscript are the author's and do not necessarily represent the official position of any affiliated institution, funder, or implementing partner.

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Author Contributions

Felix Ikenna Onunkwor conceptualised the evaluation, led the programme's quality assurance and management components, contributed to programme implementation oversight, coordinated evaluation inputs, reviewed programme data, analysed and interpreted the findings, and drafted the manuscript. The author also reviewed and approved the final manuscript version for submission.

Ethical Approval

This study used routinely collected programme data generated during implementation of the Saving Lives Phase 2 project. The Quality Assurance and Management team at Marie Stopes Sierra Leone conducted this work as an internal programme evaluation and operations research activity, in collaboration with relevant programme, monitoring, evaluation, and finance functions.

This manuscript reports no individual client-identifiable information. Provider and facility-

level findings are presented in aggregate form. As the work involved retrospective analysis of routine programme implementation and quality-improvement data, it was treated as a programme evaluation rather than an interventional human-subjects research study. Institutional permission to publish the findings was obtained from the relevant data-owning and implementing bodies.

Data Availability

The data used for this study were derived from routine programme implementation records of the Saving Lives Phase 2 project and the internal programme evaluation report of Marie Stopes Sierra Leone. The data are not publicly available because they form part of internal programme records; however, the manuscript tables present aggregated data supporting the findings. Further information may be made available by the author upon reasonable request and subject to institutional permission from the relevant data-owning bodies.

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