A Comparative Study: Onsite LDHF Training (with Mobile Mentoring) Versus Traditional Offsite Group-Based Training for Maternal and Newborn Health Care Workers in Ebonyi and Kogi States, Nigeria

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Summary

The Maternal and Child Survival Program (MSCP) is a global U.S. Agency for International Development (USAID) cooperative agreement to introduce and support high-impact health interventions in priority countries with the ultimate goal of preventing child and maternal deaths. The aim of this study was to compare the effectiveness and cost of a facility-based, onsite, low-dose high frequency (LDHF) with mobile mentoring (m-mentoring) training approach versus a traditional offsite group-based training (TRAD) approach to improve the knowledge and skills of maternal and newborn care health workers.[1] Trainee experiences, barriers, and facilities of a LDHF/m-mentoring arm were also assessed.

Between September and November 2016, MCSP Nigeria, in collaboration with the Kogi and Ebonyi State Ministries of Health (MoH), trained 127 frontline providers (nurses/midwives, doctors, and community health extension workers) through the TRAD approach and 310 providers through LDHF across the two states. In both study arms, providers were trained on essential maternal and newborn high-impact interventions, including routine care (assisting normal birth, prevention of postpartum hemorrhage [PPH]) neonatal resuscitation, and initial management of PPH and pre-eclampsia/eclampsia (PE/E).

After 12 months of implementation, both study arms showed improvement in proportions of providers who achieved a score of 80% or more in clinical skills competency from baseline to endline, TRAD arm (from 27.4% to 74.8%), and LDHF/m-mentoring arm (from 30.1% to 81.1%), P=0.05, which represents a two-fold increase. The incremental cost of -$919.59 divided by the incremental skills score of 6.3% corresponds to an incremental cost effectiveness ratio of -$487.10. Providers are also satisfied with the onsite LDHF/m-mentoring approach, especially the mentor support. However, they were not satisfied with missing out on monetary incentives associated with offsite training.

[1] Gomez PP, Nelson AR, Asiedu A, et al. Accelerating newborn survival in Ghana through a low-dose, high-frequency health worker training approach: a cluster randomized trial. BMC Pregnancy Childbirth. 2018;18(1):72. Published 2018 Mar 22. doi:10.1186/s12884-018-1705-5.

Switching to an onsite LDHF approach with in-service learning updates and mobile mentoring may decrease health worker absenteeism that results from frequent offsite trainings. The study findings support the recommendation that the MoH should consider shifting from TRAD offsite to onsite in-service training using the LDHF/m-mentoring approach to improve clinical competency and skills retention of providers. This shift would reduce the time health workers spend away from their work stations to attend clinical update trainings and would improve the overall cost-effectiveness of investments in health worker capacity development.

Background and Rationale

The Maternal, Newborn, and Child Health (MNCH) program in Nigeria (August 2014-December 2018) supported the Government of Nigeria (GoN) to improve the quality and utilization of MNCH services in public, private, and faith-based facilities, as well as in selected communities in Kogi and Ebonyi States.

The program implemented numerous activities to improve the quality of MNCH services, including promoting and strengthening routine integrated MNH care on the day of birth (DOB) by supporting clinical skills and Quality Improvement (QI) efforts at State Ministries of Health (SMOH), Local Government Areas (LGA), and supported facilities. Currently, Nigeria has insufficient numbers of skilled birth attendants. These health workers need continuous in-service training to improve knowledge and skills competencies in MNCH for better service delivery outcome.[2]

Textbox 1: LDHF approach principles

1. Competency-focused learning activities concentrate on what providers "need to know"—eliminating what is "nice to know."
2. Simulation- and case-based learning focuses on skills practice, problem-solving, role-play, and other interactive exercises. Dosing and frequency depend on topic, extent of the learning gap, and learner characteristics.
3. Appropriately spaced, brief periods of learning deliver targeted information in one day or over several days.
4. Team-focused training ensures that all providers have updated clinical practice and can work together to implement improvements in care.
5. Facility-based training decreases absenteeism, improves teamwork, addresses onsite barriers, and promotes changes to provider performance.
6. Ongoing practice and quality improvement activities reinforce learning and transfer to clinical practice.
7. Facility-based peer staff coach others as they practice or engage in interactive exercises after learning to increase compliance and improve performance and outcomes.

Currently in Nigeria, the ministries of health across states conduct in-service training primarily through TRAD lecture-based, offsite, or classroom approach that targets a few service providers per site at a time. This training approach can be costly because of associated costs required for providers to attend the training, such as travel, accommodation, meals, and incidentals. The opportunity cost of this approach is removing providers from clinical practice for extended periods of time. A systematic review of interventions to improve health care provider performance in low- and middle-income countries (LMICs) found that isolated, one-time training interventions result in low effect size.[3] Additionally, the TRAD training approach focuses on lectures and reading rather than simulation, practice, and feedback techniques that are more effective in acquisition and retention of skills.[4] However, quality evidence from LMICs is limited on the effectiveness and other implementation outcomes of this capacity-building approach. This study therefore aims to add to the evidence base on the knowledge, skills, learning outcomes, and cost-effectiveness of the LDHF approach in LMICs. Through the LDHF approach, information is delivered, and skills updates are done based on local needs through short, structured, onsite, interactive learning activities that involve the entire team and are spaced over time to optimize learning. These include ongoing activities such as skills practice sessions, team drills, games, and feedback sessions. The seven principles of LDHF are summarized in Textbox 1.

[2] Fulton BD, Scheffler RM, Sparkes SP, Auh EY, Vujicic M, Soucat A. 2011. Health workforce skill mix and task shifting in low income countries: a review of recent evidence. Human Resources for Health, 9:1-11.

[3] Rowe AK, Rowe SY, Vujicic M, et al. 2009. Review of Strategies to Improve Health Care Provider Performance. In: Peters DH, El-Saharty S, Siadat B, et al. eds. Improving Health Service Delivery in Developing Countries: From Evidence to Action. Washington, D.C.: The World Bank; 101-126.

[4] Bluestone J, Johnson P, Fullerton J, Carr C, Alderman J, BonTempo J. 2013. Effective in-service training design and delivery: evidence from an integrated literature review. *Human Resources for Health*, 11:51

[iii] Ugwa E, et al. "Simulation-based low-dose, high-frequency plus mobile mentoring versus traditional group-based training approaches on day of birth care among maternal and newborn health care providers in Ebonyi and Kogi States, Nigeria; a randomized controlled trial" BMC health services research vol. 18,1 630. 13 Aug. 2018, doi:10.1186/s12913-018-3405-2.

[iv] Willcox M, LeFevre A, Mwebaza E, Nabukeera J, Conecker G, Johnson P. Cost analysis and provider preferences of low-dose, high-frequency approach to in-service training programs in Uganda. J Glob Health. 2019;9(1):010416. doi:10.7189/jogh.09.010416

Methodology

Study Design, and Ethical Approval

This is a prospective cluster randomized control trial. Sixty health facilities were randomly assigned to receive training through either LDHF plus mobile mentoring (intervention arm) or TRAD (control arm). The details of the study methodology have been published.[iii] Briefly, 60 health facilities were selected from a sampling frame of the 120 MCSP-supported facilities in the two states across all three senatorial geopolitical zones per state and included all three levels of health care delivery, namely primary (PHCs/private), secondary (general/missions), and tertiary. Half were randomized to the LDHF arm; the other half to TRAD arm. Service providers received training and were assessed as per the protocol for each study arm (see Table 1). Ethical approval was obtained from Johns Hopkins School of Public Health institutional review board and Kogi and Ebonyi state health research ethics committees. Written informed consent was obtained from study participants.

Sample Size and Data Collection

Quantitative:

Two hundred and ninety-nine health workers were recruited in both arms for training and assessments (LDHF=172; TRAD=127). Multiple choice questionnaires (MCQs), objective structured clinical examinations (OSCEs), and cost and satisfaction surveys were administered before and after the trainings, at baseline, three months, and 12 months post-intervention. Consistent with the LDHF approach, all providers in the MNCH service delivery areas in the selected LDHF study arm facilities were trained, thus an additional 138 participants were trained on LDHF, but not included in the assessment. However, they were included in the cost-effectiveness analysis. Knowledge and skills composite scores were computed separately for selected variables to determine areas where service providers were or were not able to demonstrate clinical competency (defined as score of ≥80%) to compare skills and knowledge outcomes between the two groups at 0.05 level of statistical significance.

Table 1: Key Features of the Two Training Methodologies by Study Arm

TRAD Arm	LDHF Arm
• Offsite, hotel based • Typically, 2-3 weeks in duration • Primarily didactic, with limited skills practice or simulations • Typically attended by 1-2 staff per facility who are expected to "step down" their newly acquired skills to coworkers when they return to their facilities post-training • No structured system for ongoing clinical mentorship or sustained skills-maintenance **Associated costs:** • Venue/classroom rental • Per diem for learners • Transportation costs for learners • Payments to trainers	• Onsite/On the job training • Brief learning sessions, spread out over time • Ongoing, structured follow-up led by Peer Practice Coordinators (PPCs) and supported by mobile mentors. The PPCs are resident service providers selected based on demonstrated interest and motivation to lead the training process. They receive structured, monthly half-hour mentoring calls from a trainer/master mentor-remote support. • Emphasizes use of skills drills and simulated practice • "Team-based" training reaches a greater number of staff per facility **Associated costs:** • Payments to trainers • Transportation of trainers to facilities • Airtime for mentors

Qualitative:

MCSP also collected qualitative, cross-sectional, descriptive data using focus group discussions (FGD) and in-depth interviews (IDIs) at 12 months post-training. Six FGDs were conducted, with eight purposively selected trainees participating in each group. FGDs explored experiences of trainees with the LDHF/m-mentoring approach, what worked well and what didn't, and opinions about changes in clinical practice and outcomes in the wards after the LDHF training. Additionally, IDIs were conducted with Peer Practice Coordinators (PPCs) and trainers at 12 months post-training by study staff. The IDIs for PPCs aimed to elicit their thoughts and experience managing simulator practice sessions for their facility, interacting and working with the trainers/master mentors, mobile mentoring, changes in clinical practice and outcomes, success and challenges, and overall impressions about the LDHF/m-mentoring approach.

Key Findings

Two-thirds of the participants were from Ebonyi State, about 80% of study participants in each study arm were women, and nearly half were nurses/midwives (LDHF arm=56%; TRAD arm=47%). Average (interquartile range) years of service among the providers was similar across the study arms (LDHF: 12[6-23]; TRAD; 14[8-21]). Both study arms demonstrated increased knowledge scores post-training from baseline to endline. Primary outcome and cost analysis were based on acquisition and retention of skills after 12 months.

- After 12 months of implementation, both study arms showed improvement in overall pass rate in clinical skills competency from baseline to endline, TRAD arm (from 27.4% to 74.8%), and LDHF/m-mentoring arm (from 30.1% to 81.1%), P=0.05, which represents a two-fold increase (see Figure 1).

- Overall, the LDHF/m-mentoring arm had better post-training assessment scores for assisting normal birth, active management of third stage of labor (AMSTL), manual removal of placenta, bimanual compression of the uterus, abdominal aortic compression, pre-eclampsia/eclampsia management, which was marked during the 12-month post-training assessment, P=0.05 (see Figure 2).

- Though the total program cost of $388,185 in the LDHF arm exceeded that observed in the TRAD arm of $367,768 by $20,417, when considering the number (310) of persons trained, the LDHF arm was associated with a savings of more than $3,232 per provider trained. Similarly, the LDHF arm was associated with a 6.33% higher mean skills competency assessment score than that observed in the comparison arm. The incremental cost per person trained divided by the incremental change in skills performance corresponds to an incremental cost effectiveness ratio of -$487.10 (standard deviation of -$919.59; Table 2).

- Providers are also satisfied with the onsite LDHF/m-mentoring approach especially the mentor support. However, they were not satisfied with missing out on monetary incentives associated with offsite training.

Figure 1: Improvement and retention of BEmONC skills was higher among LDHF study arm (N=172) compared with TRAD arm (N=127) participants at 12 months post-training.

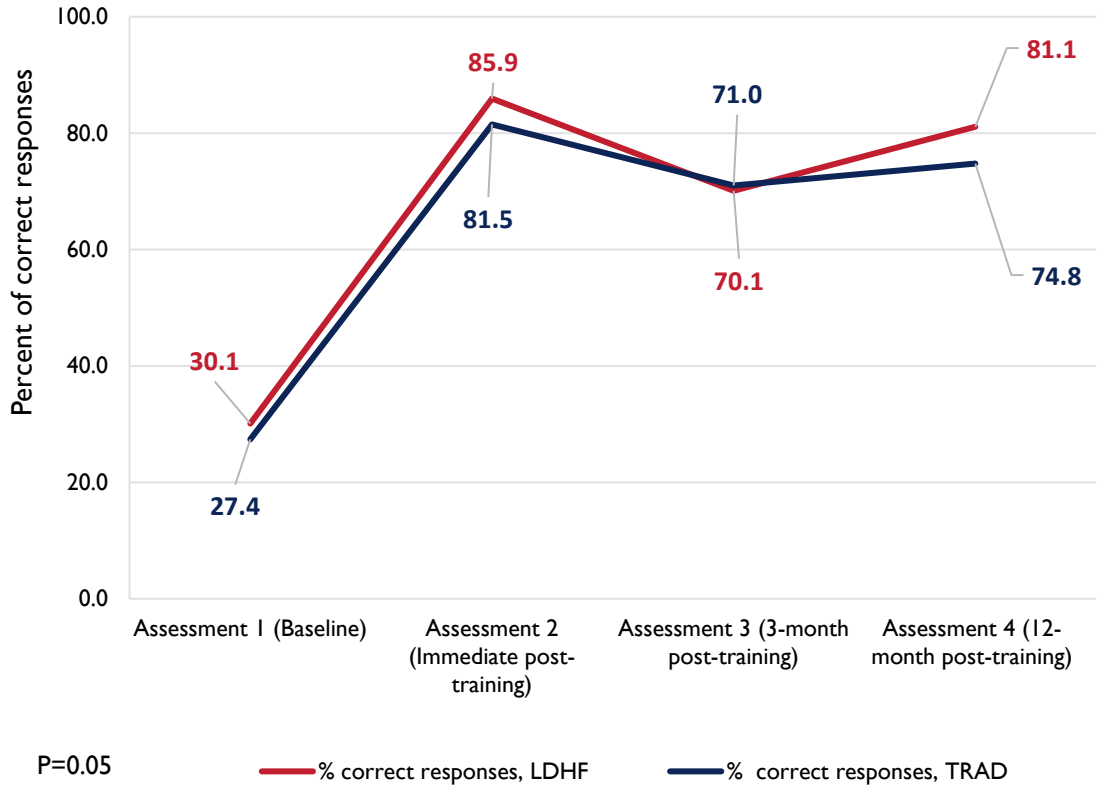

Figure 2: LDHF/m-mentoring training approach in improved skills retention after 12 months across eight components of the day-of-birth simulated assessment in Kogi and Ebonyi States, Nigeria

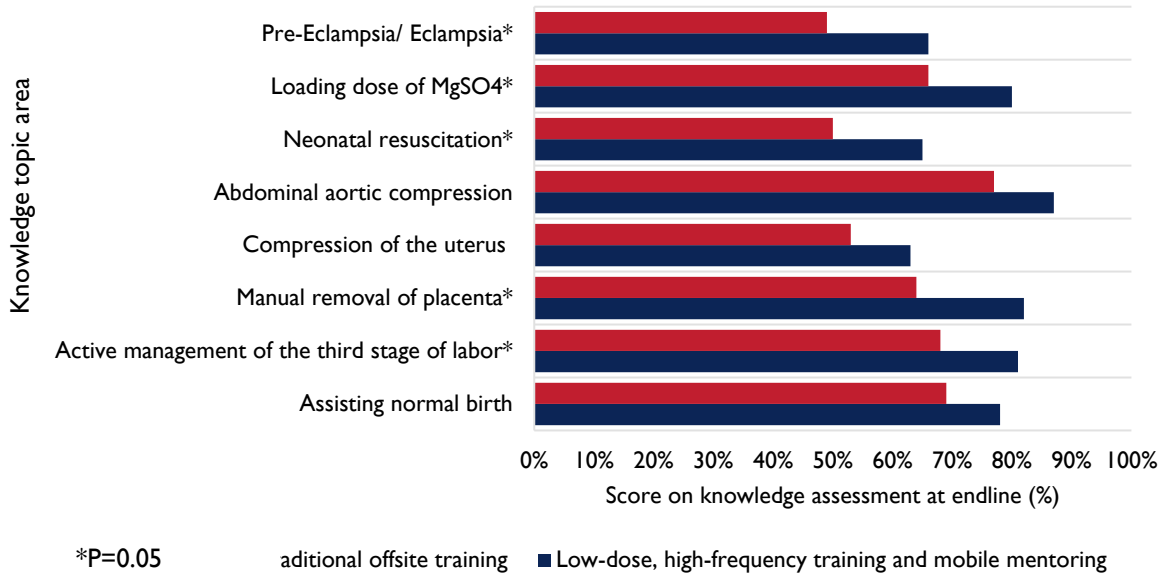

Table 2: Incremental cost effectiveness ratio

	Total costs	Costs per person trained	Mean Competency Score (12-months post-training)	Incremental cost per unit increase in skills competency	
				Deterministic	Probabilistic (SD)
12 months					
LDHF	$388,184.98	$2,446.95	86.77		
Comparison	$367,768.05	$5,679.37	80.00		
LDHF vs. Comparison	$20,416.93	-$3,232.42	6.33	-$510.65	-$487.10 (-$919.59)

Program Implications - Lessons Learned and Recommendations

Key Challenges in the LDHF/m-mentoring arm

- Mobile mentoring was at times difficult because of unreliable mobile network connections in some areas and unavailability of air-time.
- Frequent transfers of health care workers from one post to another interrupted the structured process of peer practice, ongoing mentorship, and skills assessments. Consideration of postponing staff transfers until staff have served for at least two years in a particular facility would benefit their training and service delivery.
- Whereas overall, LDHF/m-mentoring was the more cost-effective approach, the cost of implementing the mobile-mentoring approach is one of the biggest barriers that was identified.
- Service providers were dissatisfied with low financial incentives because of loss of per diem and transportation, which are standard in the TRAD arm, and proposed alternative incentives such as continuous professional development points or other non-monetary reward mechanisms. A similar observation has been reported in another LDHF study done in Uganda.[iv]
- Though the total program cost of the LDHF/m-mentoring approach is noted as one of the biggest barriers, when considered per provider trained and juxtaposed against the TRAD approach, considerable cost savings were observed.

Recommendations

- Shifting to an onsite approach is a practical solution for a system with significant turnover, especially if it can be integrated into formal orientation or induction processes. The MoH should consider making policy changes based on study findings, specifically, policy on improving logistics such as: arranging suitable shifts to enable trainees to focus on trainings, timely dissemination of information on dates and venues of trainings, deployment of staff to areas where they are needed, efficient time management during training, proper planning of trainings to accommodate more trainees, and seeking the right permissions for training.
- With limited resources available in Nigeria and other LMICs, the prospect for improved efficiency of the health workforce should be weighed against BEmONC training cost. Program costs demonstrate a significant savings in the LDHF/m-mentoring approach as compared with the TRAD approach. Costs were driven by differences in the numbers of personnel trained across study arms and changes in provider competency across arms and over time (Figure 1). Therefore, comparative cost of developing and implementing any training methodology needs to be closely studied to justify the costs if it results in better learning and health outcomes. For example, the dose of lectures may be shortened for the LDHF/m-mentoring arm, especially for community health extension workers, who are being trained to be skilled birth attendants at the community level.

- Incentivizing the LDHF/m-mentoring approach through awarding continuous professional development (CPD) points may improve satisfaction with LDHF approach, which has less immediate financial benefit compared with the TRAD training approach. Using this as CPD activity would need to be discussed further with local professional associations to establish a certification process to validate participation in this training approach.

Conclusions

- This study shows promising results that will address the current absenteeism because of frequent offsite trainings.
- LDHF is a more cost-effective training approach compared with the TRAD method that is the current practice.
- The study also validates the view that on-site LDHF with mobile-mentoring is as effective as or more effective than the traditional off-site group-based trainings in improving health care workers' knowledge and skills.

- By evaluating the LDHF with mobile-mentoring approach in Nigeria, MCSP found evidence that LDHF/m-mentoring training techniques result in the greatest return on investment and should encourage a shift from the TRAD approach to a better LDHF/m-mentoring approach. The cost-effectiveness for varying thresholds of willingness to pay per unit increase in skills competency. This suggests that LDHF/m-mentoring approach is more cost-effective than the TRAD approach, and thus should be considered as the preferred approach for in-service training in settings.

- The value for money of developing and implementing alternative approaches to training should be assessed. Where possible, the long- and short-term costs and effects should be considered, as these are likely to change over time.

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