CAMEROON PPFP STUDY ENDLINE REPORT

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The Added Value of Combining a Leadership Development Program with Clinical Training on Postpartum Family Planning Service Delivery

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The Added Value of Combining a Leadership Development Program with Clinical Training on Postpartum Family Planning Service Delivery

CAMEROON PPFP STUDY ENDLINE REPORT

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About the LMG Project

Funded by the USAID, the Leadership, Management and Governance (LMG) Project (2011–2017) is collaborating with health leaders, managers and policy-makers at all levels to show that investments in leadership, management and governance lead to stronger health systems and improved health. The LMG Project embraces the principles of country ownership, gender equity, and evidence-driven approaches. Emphasis is also placed on good governance in the health sector – the ultimate commitment to improving service delivery, and fostering sustainability through accountability, engagement, transparency, and stewardship. Led by Management Sciences for Health (MSH), the LMG consortium includes the Amref Health Africa; International Planned Parenthood Federation (IPPF); Johns Hopkins University Bloomberg School of Public Health (JHSPH); Medic Mobile; and Yale University Global Health Leadership Institute (GHLI).

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ABBREVIATIONS, ACRONYMS & DEFINITIONS

Abbreviations and acronyms

ANC	Antenatal care
CFIR	Consolidated Framework for the Advancement of Implementation Research
CNERSH	*Comité National D'Ethique de la Recherche pour La Santé Humaine*
CYP	Couple years of protection
DD	Difference-in-differences
DROS	Division of Operational Research for Health (MSP)
DSF	Division of Family Health (MSP)
E2A	Evidence to Action project
FGD	Focus group discussion
FP/RH	Family planning/reproductive health
GoC	Government of Cameroon
HTSP	Healthy timing and spacing of pregnancy
IRB	Institutional Review Board
IEC	Information, education, and communication materials
KII	Key informant interview
LDP	Leadership Development Program
LDP+	Leadership Development Program Plus
L+M+G	Leadership, management, and governance
M&E	Monitoring and evaluation
MNCH	Maternal, newborn, and child health
MSH	Management Sciences for Health
MSP	Ministry of Public Health/*Ministère de la Santé Publique*
PNC	Postnatal care
PPFP	Postpartum family planning
PSI-REB	Population Sciences International Research Ethics Board
SD	Standard deviation
SAM	Stakeholder alignment meeting
SRH	Sexual and reproductive health
SSI	Semi-structured interviews
USAID	US Agency for International Development
WRS	Work-related stress

Definition of key terms

Analysis of Variance (ANOVA): "A popular procedure for testing the equality of k (k>2) independent group means. " (Sullivan, 2012)

Chronbach's alpha: "A statistical procedure that provides a measure of internal consistency of a test or a scale. It can be expressed as a number between 0 and 1. It describes the extent to which the items in the test or scale measure the same concept." (Cronbach, 1951)

Comparison group: "A group in an experimental study that receives the usual treatment or a different treatment from the intervention group and whose results will be compared with those of the intervention group to determine the effect of the intervention on the dependent variables." It can also be called a control group. (Gliner, Morgan, & Leech, 2009)

Confidence interval: "A range of plausible values for a population parameter with a level of confidence attached." (Sullivan, 2012)

Difference-in-differences: is a methodology that helps draw a causal inference. In this methodology, outcomes are observed for two groups for two time periods, pre- and post-intervention. One group is exposed to an intervention while the other is not. The difference between post and pre-intervention in the control group is subtracted from the difference in the intervention group. It removes biases in the post period comparisons between the intervention and control group that could result from permanent differences between the groups, as well as biases from comparisons over time in the intervention group that could be the result of a time trend. (Imbens & Wooldridge, 2007)

Institutional Review Board (IRB): "A group that reviews proposals for studies with human subjects before the research can begin; the committee is mandated by US federal regulations to protect human subjects and to decide whether the research plan has adequately dealt with ethical issues related to the project." (Gliner et al., 2009)

Leading: Mobilizing others to envision and realize a better future including the practices of scanning, focusing, aligning/mobilizing,andinspiring.(Galer,Vriesendorp,& Ellis, 2005)

Managing: Planning and using resources efficiently to produce intended results including the practices of planning,organizing,implementing,andmonitoringand evaluating. (Galer et al., 2005)

Margin of error: "The product of the value that reflects the desired confidence level and the standard error of the point estimate." (Sullivan, 2012)

Multivariate analysis of covariance (MANCOVA): Multivariate analysis of variance (MANOVA) with one or more covariates. It evaluates statistical differences in two or more vectors of means by one or more independent grouping variables, while controlling for a third set of variables referred to as covariates. (Tabachnick & Fidell, 2007)

Multivariate analysis of variance (MANOVA): A statistical test for the difference in two or more vectors of means between two or more groups. (Tabachnick & Fidell, 2007)

Governance: Governance is the process of decision making, the process by which decisions are implemented (or not implemented). (UNESCO, 2009)

One way t-test: "A test of hypothesis in which the alternative or research hypothesis has investigators reject H0 (null hypothesis) if the test statistic is extreme in a particular direction." (Sullivan, 2012)

P-value: "The exact significant of the data, the likelihood of observing the sample data if the null hypothesis is true, or the smallest level of significance where we still reject H0 (null hypothesis). " (Sullivan, 2012)

Paired t-test: "A test for the equality of means in two matched or paired samples, based on analysis or difference scores." (Sullivan, 2012)

Postpartum family planning: The initiation of family planning services during the 12 month period following delivery. (Gaffield & Egan, 2014)

Secular trend: Changes over a long period of time, generally years or decades. ("Glossary of Epidemiology," n.d.)

Standard deviation: "The most commonly used measure of variability, computed as the square root of the variance. " (Sullivan, 2012)

EXECUTIVE SUMMARY

Postpartum family planning (PPFP) refers to the initiation of family planning services during the 12-month period following delivery. It has the potential to reach large numbers of women with life-saving information and services, thus preventing unintended pregnancies, and, in turn, avoiding potentially adverse health outcomes. The integration of family planning (FP) service delivery across the continuum of care could help to mitigate this unmet need by providing postpartum women with multiple opportunities for family planning counseling and services (Gaffield & Egan, 2014). For service-delivery integration to be successful, solid leadership, management, and governance (L+M+G) is required.

This report summarizes the endline findings from a quasi-experimental research study that aimed to evaluate the added value of a leadership, management, and governance capacity-building intervention (Leadership Development Program Plus [LDP+]) on a PPFP service-delivery improvement project within maternal, neonatal, and child health (MNCH) departments of tertiary-care hospitals. The LDP+, implemented by Management Sciences for Health (MSH) through the USAID-funded Leadership, Management, and Governance project (LMG), complements an existing PPFP service-delivery intervention implemented by the USAID-funded Evidence to Action project (E2A), which aimed to improve clinical and counseling skills of MNCH staff in tertiary hospitals in Yaoundé, Cameroon.

The study involved purposively sampled non-equivalent intervention and comparison site hospitals. The study had three arms with two hospitals in each:

1. **Arm #1: Leadership Development Program plus (LDP+), FP clinical-capacity building, and FP commodities**
2. **Arm #2: FP clinical training and FP commodities**
3. **Arm #3: FP commodities**

Data were collected at baseline and endline. Quantitative data included PPFP service-delivery outcomes and LDP+ participants' L+M behavioral self-assessments. Focus group discussions and interviews provided data about the barriers to and facilitators of PPFP provision in MNCH departments, as well as the effect of L+M capacity building on health providers' ability to improve PPFP services.

Results show that the LDP+ intervention led to a statistically significant increase in the number of women who received counseling during antenatal care (0% to 57%) and postnatal care (17% to 80%) compared to the clinical training intervention alone. Our results suggest that when the LDP+ combined with clinical training is implemented in a hospital, the percentage of expectant and new mothers who receive FP/SRH counseling increases; on average, the LDP+ intervention increased antenatal care (ANC) rates by 49% and postnatal care (PNC) rates by 59%. LDP+ facilities had statistically significant increases in couple years of protection with an average increase of 10 couple years per facility. Additionally, when comparing the change in PPFP counseling across the study arms, there was a significant difference in the number of ANC and PP women who received counseling between Arm #1 versus Arm #2 and also Arm #1 versus Arm #3, indicating that the LDP+ in combination with the clinical training intervention contributed to a greater increase in the number of postpartum women and women attending ANC who received FP/SRH as compared to the clinical training alone. However, there was no statistically significant effect of Arm #1 on the range of contraceptive

methods made available by the hospital (study arms were not equivalent at baseline) nor on the number of service-delivery points with FP/PPFP Information, education, and communication materials (IEC) materials for clients or job aids for staff.

LDP+ participants scored higher on the behavioral assessment scale after going through the LDP+ intervention (58.6 ± 16.8) as opposed to before the intervention (39.1 ± 27.8), which is a statistically significant increase of 19.5 points. The effect size, which measures the magnitude of the LDP+'s effect, was found to be large and clinically significant (Cohen's d = 0.85). Individual practices were also assessed for both the leadership aggregate score and management aggregate score. Hospital staff trained in L+M reported statistically significant improvements in inspiring, planning, organizing, and monitoring change processes. Interviewees reported they were better able to address barriers to PPFP care because of improved staff attitudes, teamwork, and innovative participatory problem solving.

To understand potential links between changes in leadership and management behaviors to improvements in service delivery, we used the constructs of the Consolidated Framework for the Advancement of Implementation Research (CFIR), which includes the external and internal context of the intervention, intervention characteristics, and intervention processes. We found, that in the external context, national-level FP commodities issues had an effect on the availability of contraceptives as well as social-cultural community and patient norms around FP/SRH. Implementation outcomes were also influenced by internal context issues such as available staff, resources, and support and staff workloads, as well as hospital size, implementation climate, and provider attitudes towards FP/PPFP.

For the intervention characteristics, we found that the adaptability and experiential nature of the LDP+ process allowed participants to address specific needs within their own context. Participants thought that the combination of clinical and leadership development of the intervention facilitated the improvement process. Because the focus of improvement efforts was determined and developed by the team participants expressed feelings of ownership of the program and its results. Finally, LDP+ participants felt that the LDP's straightforward, low-complexity approach would make it more likely that it could be replicated without external expertise and high cost.

Participants also mentioned they were assisted in achieving their objectives by intervention processes such as: communication and feedback about the intervention; education and training for staff to acquire the skills necessary to implement the PPFP intervention; leadership of the PPFP intervention; efforts to integrate PPFP tasks into current units/ procedures; and involving appropriate individuals in the intervention as well as the team's process of documenting, reflecting, and evaluating results for themselves and with upper management.

Limitations of the study included: the small sample size (two hospitals per arm and 11 LDP+ participants); limited quantitative measures of the links between leadership and management development and improved service delivery; lack of random assignment; and the short duration of the intervention. Further research with a larger sample, random selection, and a longer follow-up period is needed to provide more generalizable results and information on sustainability.

Our findings suggest that leadership and management play an important role in service-delivery improvement in the following ways: by providing strategic direction; by assuring adequate resources; by monitoring and evaluating the results of improvement initiatives; by providing oversight; and by helping to create a learning culture. Study participants consistently mentioned the ability of leaders and managers to facilitate or hinder FP/PPFP improvement initiatives in various ways, including: the level of staffing; resources; training; task integration; communication; supportive feedback; workload; motivation; and the culture and climate of the facility.

The question of just how leadership and management strengthening adds value to clinical-capacity building in service-delivery improvement projects is particularly complex and is only partially addressed by the results of this study. Upstream interventions such as the LDP+ are difficult to quantify and to connect directly to service-delivery results, while more proximal interventions — such as clinical training and resource provision — are perhaps more easily quantifiable. However, qualitative data from this study suggest that leadership and management capacity building may contribute to removing barriers in the internal context and facilitate intervention processes in that the resulting outcomes are greater than with clinical capacity building alone.

The implications of this study's findings suggest that improving health workers' capacity to lead and manage may facilitate their ability to address barriers to service-delivery improvements. Clinical training, resources, and supportive supervision can lead to measurable improvements in PPFP service delivery; however, especially important in helping to improve service delivery are less tangible and quantifiable skills such as teamwork, collaboration, effective communication, problem-solving abilities, human resource management, oversight, and influencing institutional culture and climate. The study results indicate that a focus on the clinical training of a cadre of health workers is necessary, but that it alone may not be sufficient for them to apply the skills in the context of real-life workplace challenges, and that leadership and management training could help to bridge this gap.

BACKGROUND

Postpartum family planning (PPFP) refers to the initiation of family planning services during the 12-month period following delivery (Gaffield & Egan, 2014). PPFP has the potential to reach large numbers of women with life-saving information and services, thus preventing unintended pregnancies, and, in turn, avoiding potentially adverse health outcomes. Studies show during their first year postpartum, more than 95% of women want to delay or avoid pregnancy, yet 70% of them are not using contraception. The unmet need for family planning services is particularly high in low- and middle-income countries (Changole et al., 2010; Ross & Winfrey, 2001).

Integrating family planning (FP) service delivery across the continuum of antenatal care (ANC), labor and delivery, postnatal care (PNC), and well-child visits could help to mitigate this unmet need by providing postpartum women with multiple opportunities for family planning counseling and services (Gaffield & Egan, 2014).

For service-delivery integration to be successful, solid leadership, management, and governance (L+M+G) is required to address complex contextual and institutional barriers and challenges inherent in the improvement process (Peters, El-saharty, Siadat, Janovsky, & Vujicic, 2009). Leadership and governance is the least understood health system building block, as it encompasses a wide range of approaches without global consensus on best practices (Brinkerhoff & Bossert, 2013). Furthermore, attributing service-delivery improvements to changes brought about by leadership interventions is challenging, because leadership is a distal input to service-delivery outcomes. This study aims to evaluate the effects of strengthening hospital leadership, management, and governance (L+M+G) via the Leadership Development Program Plus (LDP+). The LDP+ implemented by Management Sciences for Health (MSH) complemented an existing PPFP service-delivery intervention by the USAID-funded Evidence to Action project (E2A), which sought to improve the clinical and counseling skills of MNCH staff in tertiary hospitals in Yaoundé, Cameroon.

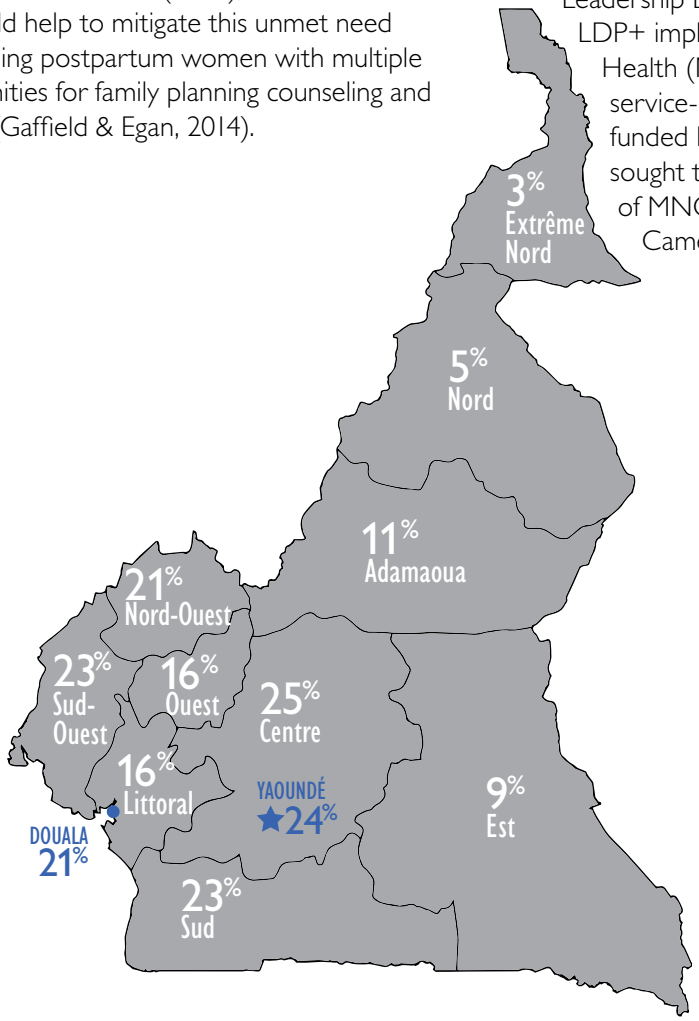


Figure 1. Utilization of modern contraceptives by region (percentage of married women 15–49 using a modern contraceptive method)
Source: DHS 2011

Cameroon Family Planning Context

In Cameroon, modern contraceptive prevalence for all women remains low at 16.1% (INS & ICF, 2012). The National Health Development Plan 2011-2015 cites limited contraceptive access for youth and adolescents as a cause of low modern contraceptive use and high rates of unsafe abortion, and therefore prioritizes FP counseling and service-delivery training for health-care workers. Contraceptive prevalence varies significantly by age. DHS data shows that women 15–29 use the male condom (a short-term method) more than other methods. Modern contraceptive prevalence rates also vary between urban (20.8%) and rural (8.7%) areas, as well as by region, with prevalence as high as 25% in the Centre region, and as low as 3% in the northern regions (INS & ICF, 2012). Overall, the total fertility rate in Cameroon has slightly increased, from 5.0 in 2004 to 5.1 in 2011 (INS & ICF, 2012).

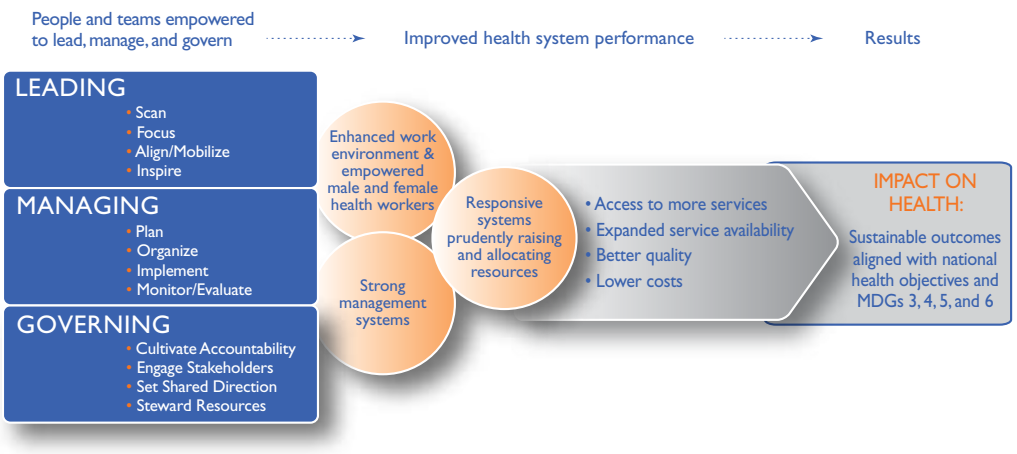
The Government of Cameroon (GoC) and other development partners consider sexual and reproductive health and family planning (SRH/FP) for women and girls a priority (MSP Republic of Cameroon, 2010). This family planning service-delivery intervention responds to the Cameroon Ministry of Public Health's (MSP) request for technical assistance to address this SRH/FP priority, especially in the postpartum period.

L+M+G Strengthening for Improved PPFP Service Delivery

In order to increase access to key health services such as PPFP, it is apparent that strong, functioning health systems are required (Murray & Frenk, 2000). While limited resources are a significant barrier to optimal FP service delivery, poor leadership and management at the systemic and individual-facility level are often an underlying contributing factor in low-functioning facilities (Eichler, Levine, & Performance Based Incentives Working Group, 2009).

Strengthening leading, managing, and governing practices is a cross-cutting approach that addresses challenges at all levels and across all building blocks of the health system (See Figure 2). MSH's Leadership Development Program (LDP) is a participatory, team-based learning approach used in over 40 countries that has contributed to health system improvements, such as reducing maternal mortality in Egypt (Mansour, Mansour, Hasan, & Swesy, 2010), and increasing service delivery at the district level in Kenya (Seims et al., 2012) and in Mozambique (Perry, 2008). The Leadership Development Program Plus (LDP+), an updated version of the LDP, is grounded in three methodologies: experiential learning; the challenge/feedback/support triangle; and the Challenge Model. Working in Improvement Teams, participants learn to face challenges and achieve measurable results by applying leading and managing practices and using the Challenge Model, action plans, and monitoring and evaluation (M&E) plans. Improvement Teams bring what they learn back to their departments, where they teach coworkers to apply these practices to the challenge of increasing PPFP service delivery. (Additional information about the LDP and LDP+ programs can be found in Appendix 1.)

Figure 2. Conceptual Model: Leading, Managing, and Governing for Results



PURPOSE OF THE STUDY

The primary aim of this study was to evaluate the added value of a leadership, management, and governance capacity-building intervention on a PPFP service-delivery improvement project within maternal, neonatal, and child health (MNCH) departments of tertiary hospitals. The study hypothesis was that strengthening leadership, management, and governance capacity at the hospital level would add value to the intervention — such that the difference in baseline and endline PPFP service delivery would be larger than in those hospitals receiving clinical capacity building alone.

The following overarching question — which is broken down into four components — was examined in this study:

Compared to FP clinical capacity building alone, how does leadership, management, and governance strengthening — in combination with clinical training — influence the process and outcomes of a PPFP service-delivery intervention within MNCH departments of a tertiary care hospital?

1. **What are the content, contextual, and process barriers and facilitators to PPFP service delivery within MNCH services?**
2. **How does LDP+ training influence hospital leaders'/managers' attitude and practice towards PPFP provision within MNCH services?**
3. **How does leadership, management, and governance capacity building influence hospital personnel's work-related stress in the context of PPFP integrated service delivery as compared to clinical capacity building alone?**
4. **What influence does leadership, management, and governance capacity building in combination with clinical training have on PPFP service delivery outcomes as compared to clinical capacity building alone?**

Study Conceptual Framework

Successfully integrating and increasing FP service delivery requires that leaders and managers address multiple barriers and manage the change process with clear and transparent communication. Addressing the content, context, and process factors of a service-delivery improvement intervention often requires not only clinical personnel, but also the involvement of hospital personnel at multiple levels. Strengthening the capacity of hospital leaders and managers to better manage a quality improvement change process allows them to be more systematic in planning for change, more responsive to personnel concerns about the change, and to proactively provide the resources and materials needed to bring about improvements in service-delivery processes and outcomes.

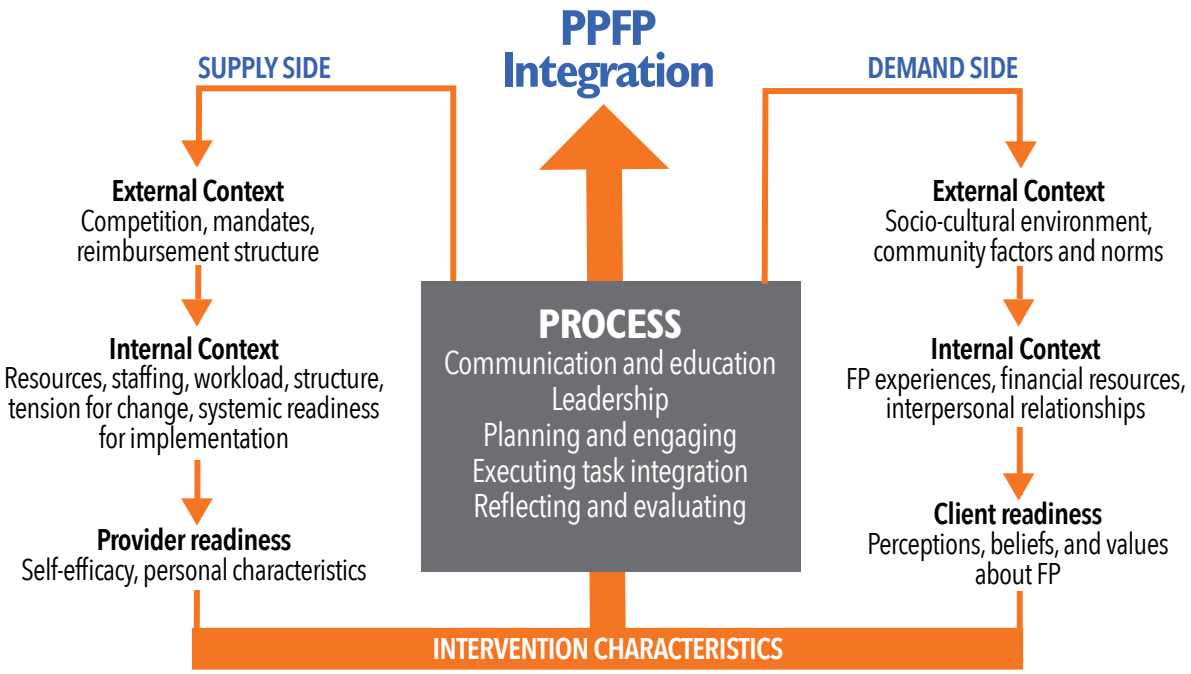
An initial review of the literature on PPFP integration yielded no conceptual framework addressing the systemic nature of the FP service delivery improvement process. Several available models/frameworks conceptualize the integration of FP and MNCH services, but they present almost exclusively the clinical aspects of integration, such as entry points, integration points, technical training requirements, and demand for various FP services. These frameworks do not address the systemic human resource management, financial resource allocation, and strategic planning required for successful integration of services.

While there are no frameworks that model the systemic nature of the service delivery improvement process for family planning services, the Consolidated Framework for the Advancement of Implementation Research (CFIR) attempts to consolidate multiple constructs and provide a clear implementation science model that defines key systemic elements important to the success of service delivery change initiatives (Damschroder et al., 2009). In a systematic review, Alexander and Hearld (Alexander & Hearld, 2011) further tested and modified the CFIR model based on the results of 107 service-delivery improvement

studies, reducing the five domains and 37 constructs of the CFIR model to three domains and 14 constructs that were significantly associated with positive results.

The Alexander and Hearld framework, as well as additional constructs from the CFIR, were used to inform this study (Figure 3). The study assessed the relationship between leading and managing practices and the key constructs of the Alexander and Hearld framework as a way of further understanding linkages to service-delivery improvements. (A full table, including definitions of each of the key constructs, can be found in Appendix 2.)

Figure 3: Factors influencing implementation of PPFP integration

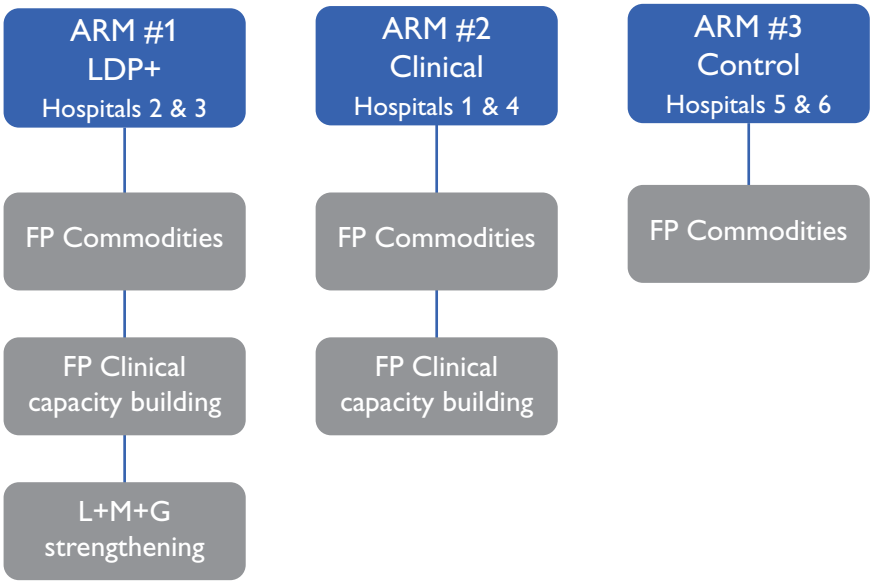


METHODS

Study Design

The study was conducted using a quasi-experimental design with purposively sampled non-equivalent intervention and comparison sites. The study has three arms, as follows:

Figure 4: Study design and study arms



Since only Arm #1 benefited from L+M+G strengthening, this study design allows us to examine the added value of the LDP+ in the context of a FP clinical capacity-building project. It also allows us to compare both the L+M+G/FP clinical capacity-building combination approach — as well as FP clinical capacity building alone — to standard practice in the control arm of the study.

Study Arm #1 — L+M+G Strengthening and FP Clinical Capacity-Building Interventions

Study Arm #1 hospitals used MSH's LDP+ curriculum to strengthen the capacity of hospital stakeholders, managers, and clinical teams to effectively lead, manage, and govern the PPFP improvement process. The LDP+ is conducted by a trained facilitator and includes a series of key activities. Each engaged facility participates in a stakeholder meeting, which is known as a Stakeholder Alignment Meeting (SAM), to kick off the LDP+ process. There are four subsequent workshops during which LDP+ participants undertake an improvement project as they learn to apply leading and managing concepts and behaviors. Participants use various tools to identify a challenge, examine root causes, prepare an action plan to address the challenge, and develop indicators to monitor and evaluate progress. Virtual and in-country coaching is done regularly between workshops, which are spread out over a period of 6 months. Teams also hold team meetings in the interim period between LDP+ workshops to practice what they have learned and keep progress on their improvement projects moving forward. The LDP+ culminates in a results presentation where the teams present their work and progress to key stakeholders, key leadership, and peers.

The E2A clinical capacity-building intervention developed a comprehensive postpartum family planning training program that offered a full range of contraceptive options. This program reinforced capacity to offer voluntary FP counseling and provision

of contraceptive methods, with a focus on immediate (48 hours after delivery) and extended-interval postpartum (through the 12 month period after birth) care. E2A project activities included assistance to improve PPFP services and clinical guidelines by developing job aids, reinforcing PPFP service delivery record-keeping and HMIS capacity, and providing clinical training for a full range of FP options. (Please see the Implementation Report for more information on the LDP+ and E2A implementation [Baba Djara, Morgan, Cho, Conlin, and Trasi, 2015]).

Study Arm #2 — FP Clinical Capacity Training Intervention

Study Arm #2 hospitals received the full E2A program mentioned above. Activities were the same as in Study Arm #1, except Intervention #2 sites did not participate in the LDP+ trainings and did not receive any leadership, management, and governance capacity building at the administrative level of the hospital. (Again, for more information on the E2A implementation, please see the Implementation Report (Baba Djara, Morgan, et al., 2015b).

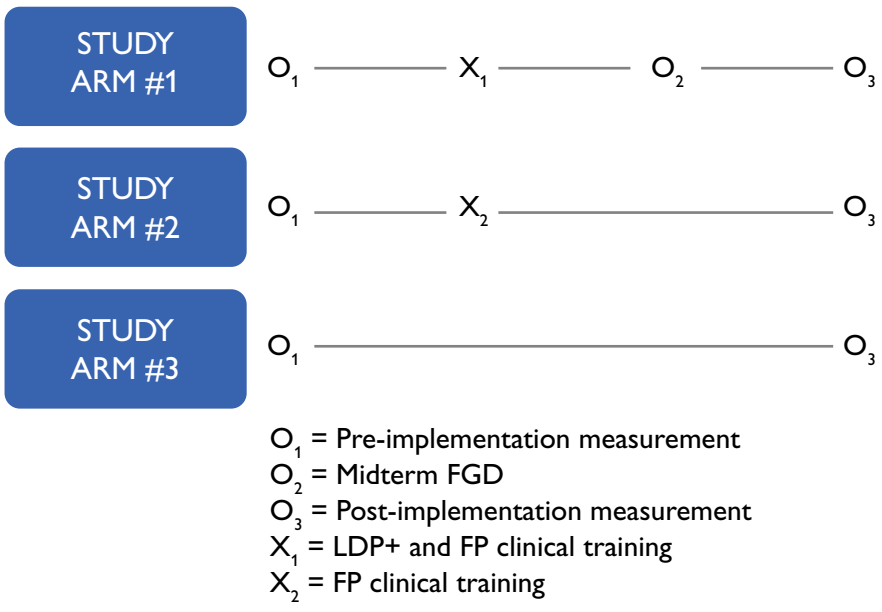
Study Arm #3 — Control Hospitals

Study Arm #3 hospitals had access to FP commodities through the MOH central supply chain and received MOH trainings similar to Arm #1 and #2 hospitals. However, the study sites in Arm #3 did not receive any E2A FP clinical training or leadership, management, and governance capacity-building activities.

Process and outcome measures were assessed at baseline and post implementation to determine the added value of the leadership, management, and governance intervention on PPFP integration service-delivery outcomes. The study design is depicted in Figure 5.

In the initial study design, all three arms of the study were to benefit from a community-demand-generation intervention, but due to factors outside the control of the project, this did not take place during the course of the study. (For more information on implementation, please see the Implementation Report [Baba Djara, Morgan, et al., 2015]).

Figure 5: PPFP integration study design



Ethical Considerations

Prior to implementation, a study protocol was submitted and approved both by the Comité National d'Ethique de la Recherche pour la Santé Humaine (CNERSH) in Cameroon — in collaboration with the Division of Operational Research for Health of the Ministry of Public Health (DROS/MSP) — and by Population Services International Research Ethics Board (PSI-REB) in the U.S. The protocol included informed consent forms, interview guides, and survey questions.

Study Sites

Study sites were purposively sampled in collaboration with the Department of Family Services (DSF) of the Ministry of Public Health (MSP) of Cameroon. All public reference (n=5) and district hospitals (n=4) in Yaoundé were considered. The following criteria, which were developed by E2A and the DSF, were used to guide the selection of study sites in all arms:

- **Adequate volume of ANC/Delivery/PP clients**
- **Tertiary public hospital in Yaoundé**
- **Participation in the E2A intervention for Arm #1 and Arm #2 sites**
- **Agreement to participate in LDP+ for Arm #1**

Data Collection

The study took place from October 2014 to September 2015. Study data was collected at baseline, midline, and endline using both qualitative and quantitative methods. Qualitative methods (key informant interviews [KII], semi-structured interviews [SSI], focus group discussions [FGD], and observation) were used to gather data on the barriers and facilitators to FP/PPFP service delivery as well as health-care personnel's attitudes towards FP/PPFP. Qualitative interviews and focus groups data were collected with the same participants at baseline and endline. Quantitative methods included: a work-related stress (WRS) survey with hospital staff to examine perceived workload and levels of risk factors for stress that may affect the ability of health-care personnel to deliver increased services; a facility FP/PPFP capacity survey to assess the hospitals' resources for delivering FP/PPFP services; and a behavioral self-assessment survey with LDP+ participants to assess leading and management behaviors pre- and post-LDP+ intervention. Multiple levels of data allow us to triangulate information from various sources to establish the baseline context of the intervention and measure change at endline. (For a summary of research questions, data collection methods, sampling, inclusion criteria, and data collection frequency, please see Appendix 3; and for more information on the study design, please see the Baseline Study Report (Baba Djara, Morgan, Cho, Conlin, & Trasi, 2015a).

Table 1. Data collection method by study question

STUDY SUB-QUESTIONS	METHOD	SAMPLING	INCLUSION CRITERIA	FREQUENCY
What are the content, contextual, and process barriers and facilitators to PPFP service delivery within MNCH services?	KIIs	■ Purposive ■ Hospital upper-level administration	■ Male or female, over 21 ■ Willing to participate ■ Current hospital upper-level administration	Pre and post (Arms #1 & #2)
	SSI	■ Purposive ■ Hospital mid-level administration	■ Male or female, over 21 ■ Willing to participate ■ Current mid-level manager or leader	Pre and post (Arms #1 & #2)
How does LDP+ training influence hospital leaders'/ managers' attitude and practice towards PPFP provision within MNCH services?	L+M Behavioral Self-Assessment	■ All LDP+ participants	■ Male or female, over 21 ■ Willing to participate ■ LDP+ participant	Pre and post (Arm #1)
	FGDs	■ Purposive ■ LDP+ participants	■ Male or female, over 21 ■ Willing to participate ■ LDP+ participant	Pre, mid and post (Arm #1)
How does L+M+G capacity building influence hospital personnel's work-related stress in the context of PPFP-integrated service delivery as compared to clinical capacity building alone?	WRS survey	■ Personnel in MNCH unit ■ Random selection after multistage cluster ■ 80% power to detect a 10% difference	■ Male or female, over 21 ■ Willing to participate ■ At enrolment, employee of a study site hospital ■ Clinical or support staff in the MNCH units	Pre and post (Arms #1 & #2)
What influence does L+M+G capacity building have on PPFP service delivery outcomes as compared to clinical capacity building alone?	Document review	■ Administrative SD records ■ FP supply chain records ■ FP service delivery register	■ Study site hospital	Pre and post (Arms #1, #2, & #3)
	Observation	■ Availability of FP/PPFP IEC/job aids at service delivery points	■ Study site hospital	Pre and post (Arms #1, #2, & #3)

ANALYSIS

Qualitative Data Analysis

Each transcript at baseline (n=27; 17 interviews and 1 focus group/10 participants), midline (n=11; 2 focus groups/11 participants) and endline (n=27; 16 interviews and 2 focus groups/11 participants) from the KII, SSI, and FGDs was transcribed in French, translated to English, checked against the audio files for quality control, and then assigned to two researchers. A modified deductive coding structure was collectively established based on the constructs of the CFIR and Alexander and Hearld frameworks, then modified as necessary during subsequent rounds of coding. Inductive coding was used to capture key demand-side factors affecting PPFP service delivery and uptake not included in the CFIR in the baseline data. Each researcher coded independently and then reconciled coding assignments, resolving discrepancies first in small group, then in plenary with the entire research team. Once the code assignments were finalized, the typed interview transcripts were imported into NVivo8 for analysis of broad themes from the codebook, and stratified by LDP+ versus non-LDP+ hospitals. Further analysis examined associations between framework constructs, leading and managing practices, and PPFP service-delivery outcome references in the qualitative data.

Quantitative Statistical Analysis

The statistician analyzed the results from three quantitative surveys: (1) a work related stress (WRS) survey; (2) a leadership and management (L+M) behavioral self-assessment; and (3) study outcome indicators. Two stages of data analyses were conducted at baseline and endline. First, descriptive analyses were performed to provide background on the sample. Second, bivariate comparisons using t-tests were conducted between study arms for the WRS survey, the outcome indicators, and between the two hospital sites of study Arm #1 for the L+M behavioral assessment responses. Pearson correlation was used to examine the bivariate relationships between the independent variable (participation in the LDP+) and the control and dependent variables (Appendix 3). For the WRS survey and L+M behavioral assessment, summated scales were created by grouping questions according to desired content domains. Internal consistency reliability was determined using Cronbach's alpha coefficient (α). (See Appendix 4 for WRS Cronbach alpha results.)

Table 2. Summary of study data analyses

DATA SOURCE	ANALYSIS
L&M Behavioral Self-Assessment *Pre- and post-assessments*	■ Cronbach's α, factor analysis ■ Paired t-test ■ One sample t-test
WRS Survey *Pre- and post-assessments*	■ Cronbach's α, factor analysis ■ Paired t-test ■ Difference-in-differences test
Service Delivery & Health System Outcomes *3-month pre- and 3-month post-data collection*	■ Pearson's correlation ■ One-way ANOVA, MANOVA, MANCOVA ■ Difference-in-differences test

STUDY LIMITATIONS AND THREATS TO VALIDITY

Methodological Limitations

In order to synchronize the LDP+ intervention and study with the E2A intervention, the sites included in the study were not randomly selected. Therefore, the results may not be generalizable. Analyses showed that hospital capacity and PPFP service delivery were dissimilar at baseline. To account for this, a district and a reference hospital were included in each arm. Analysis also included a differences-in-differences model to account for dissimilar PPFP service delivery at baseline. However, the difference-in-differences method has several shortcomings. First, its relatively strong identifying assumption is that whatever happened to the control group over time is what would have happened to the treated group in the absence of the program. However, this identifying assumption attributes any differences in trends between the treatment and control groups that occur at the same time as the intervention to that intervention, without considering other possible differences between the groups that could have led to the observed outcomes. Thus, if there are other factors that affect the difference in trends between the two groups, the estimation becomes biased.

To mitigate this limitation of the methodology, we might have attempted to demonstrate a broadly parallel trend during the pre-intervention period, but this was not possible because no data were available for the period prior to the intervention.

Another limitation of the study was its short duration. Six months may not be enough time for leadership development or the clinical intervention to overcome all PPFP service-delivery barriers and produce significant results.

Additionally, the size of the sample (two hospitals per arm) was small, and fewer LDP+ participants were recruited than expected; there were only 11 individuals enrolled in the LDP+. In order to address this limitation and provide greater power to detect an actual difference between arms, multiple pre- and post- measures were taken at each site for outcome measures.

Loss to Follow-up

Loss to follow-up was another important limitation. For the L+M behavioral self-assessment, the study had a 100% response rate, and all outcomes data points were collected at baseline and endline.

The WRS instrument, however, had a higher rate of attrition, with a larger proportion of staff transferring to other facilities or retiring. There was also a significant differential loss to follow-up between those who completed the survey in Arm #1 and Arm #2. In Arm #1, the loss was 8.2% (6 out of 73), whereas in Arm #2, it was 19% (12 out of 63) — i.e., more than double that of Arm #1. One way to determine if loss to follow-up can seriously affect results is to compare at baseline those who were lost to follow-up in the intervention arm with those not in the intervention arm in terms of their total stress score and domain-level stress scores.

Independent group t-test by intervention to assess if the two groups had similar total risk factors for stress scores at baseline was performed on 18 participants (6 in Arm #1 and 12 in Arm #2) who were eventually lost to follow-up at the 0.05 level of significance. There was no statistically significant difference in the total stress scores of these two groups. Moreover, there was no statistically significant difference in the two groups at baseline in their domain level stress scores at the 0.05 level of significance.

In addition, the study subjects in the Arm #2 who were lost to follow-up were not statistically different at baseline from those in Arm #1 in terms of age, length of service, and overall risk factors for stress score and domain-level risk factors.

Social Desirability

For the behavioral self-assessment, a potential bias is to respond with the most socially desirable responses. To account for this, survey respondents were assured that their responses were confidential and were encouraged to report actual practices rather than ideal leading and managing behaviors.

Documentation Limitations

In most sites, FP service delivery data was inconsistently recorded and reported at baseline. This made it difficult to accurately establish a baseline. It also had implications for study outcomes, because the increases seen in women attending ANC and PNC counseling as well as CYP may be in part due to better documentation. Further, the quality of documentation of services provided and client uptake of services impacts improvement initiatives, because missing and inaccurate information hinders the ability to determine whether or not program efforts are effective. Because of documentation limitations we were also unable to collect accurate data neither on stock outs of FP commodities nor on levels of available contraceptives. Availability or unavailability of FP commodities could affect study outcome results among arms, especially uptake of contraceptive methods (CYP).

Pathways Linking L+M+G and Service Delivery

Finally, pathways of influence of L+M+G on PPFP service delivery outcomes were largely documented through qualitative data. This is in part due to the lack of previously published studies to inform appropriate measures. The qualitative data of this study can inform future studies as to potential indicators for measuring L+M+G's influence on service-delivery outcomes.

RESULTS

Sample Characteristics

Outcome data collected at each of the six hospitals included: hospital characteristics; availability of job aids and Information, education, and communication materials (IEC) materials; and service delivery and health system statistics. Each arm contained a district and reference MOH hospital. Four of the six hospitals were governed by the MOH, and the remaining two hospitals had autonomous governance structures. At the facility level, the number of staff (MNCH nurses and OB/GYNs) and the number of maternity beds varied (See Table 3). Not surprisingly, the hospitals with more maternity beds also reported more OB/GYNs and MNCH nurses. Using one-way ANOVA modeling, significant mean differences were found between Arms in the number of OB/GYNs ($p=0.029$) and the number of MNCH nurses ($p=0.031$).

Table 3. Hospital characteristics by study arm

	ARM 1		ARM 2		ARM 3	
	Hospital 2	Hospital 3	Hospital 4	Hospital 1	Hospital 5	Hospital 6
Hospital Classification	District	Reference	District	Reference	District	Reference
Governance Structure	MOH	Autonomous	MOH	MOH	MOH	Autonomous
# Maternity beds	6	22	11	70	12	52
# OB/GYNS	1	15	4	10	2	7
# MNCH nurses	15	24	18	40	14	44

Table 4 (below) presents the baseline and endline study participants. The number of KII and SSI participants was slightly less than anticipated due to the limited availability of higher-level hospital administration and the small number of administrative posts at district hospitals. Similarly, the sample size for the L+M behavioral assessment was smaller than anticipated because hospital management had limited time to participate in the leadership development exercises.

Table 4. Number of study participants, Arm 1 and Arm 2

QUALITATIVE	BASELINE SAMPLE Individuals	MIDLINE SAMPLE Individuals	ENDLINE SAMPLE Individuals
Key Informant Interviews	7	--	8
Semi-structured Interviews	10	--	8
Focus Groups	6 (1 FGD)	10 (2 FGDs)	11 (2 FGDs)
QUANTITATIVE			
Behavioral Assessment	11	--	11
WRS Survey	136	--	116

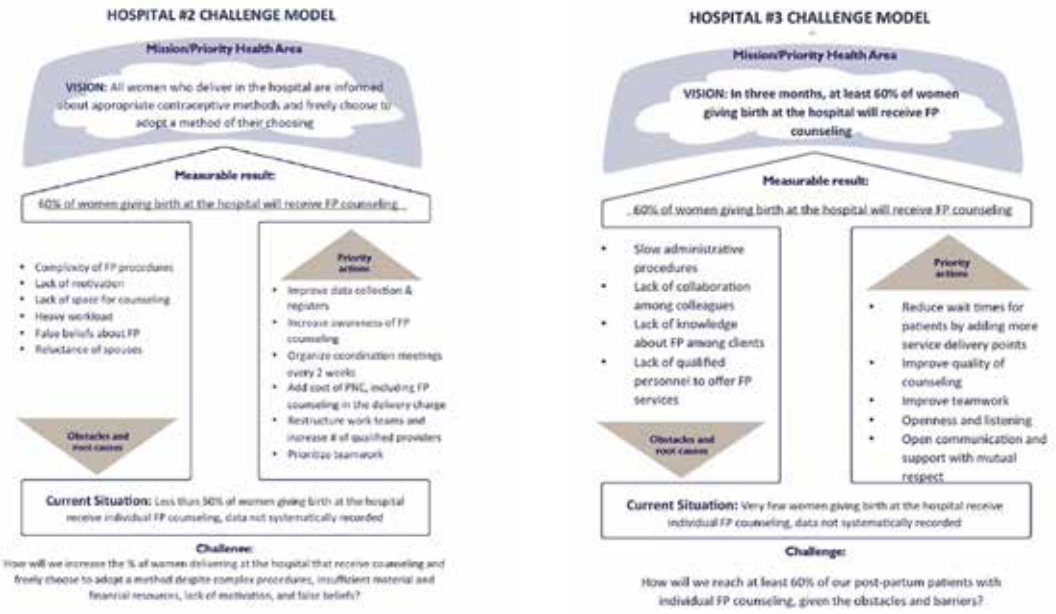
LDP+ Implementation

During the LDP+ implementation, Arm #1 LDP+ hospitals worked together on teams with the facilitator and coach to:

- **create an inspiring shared vision for addressing a priority health area**
- **apply leading and managing practices to improve teamwork and effectiveness**
- **use the Challenge Model process (Figure 6, below) to identify and achieve desired measurable results**
- **align stakeholders around a common challenge**

The LDP+ process allowed people at all levels of the hospitals to come together to address barriers to improved PPFP service delivery. Working in their work teams, the two hospital management teams participated in the LDP+ training and learned leading, managing, and governing practices (Appendix 1) that enabled them to face the challenges hindering PPFP service delivery, as well as to achieve measurable improvements in the quality and quantity of care offered to patients. Figure 6 depicts the teams' Challenge Models, identifying the barriers and root causes as well as targeted activities to address the issues.

Figure 6. Challenge models from LDP+ hospital teams



Working together with their colleagues, the teams were able to increase the percentage of women delivering in the hospital who received counseling from 47% to 66% in Hospital #2 and from 67% to 82% in Hospital #3 over the course of the LDP+ program. The percentage of women who delivered adopting a method also increased; adoption after counseling rose from 8% to 15% in Hospital #2, and from 19% to 35% in Hospital #3 during the LDP+ action-planning period. Teams cited increased cooperation, engagement of upper management, a change in the way they approached problems, and additional resources (infrastructure improvements, commodities) as contributing to the improved performance.

Study Results

The final study results are presented by research question below.

How did the clinical and L+M+G capacity building influence leaders' and managers' attitudes towards PPFP service delivery?

A key theme related to both the LDP+ and E2A trainings was that improving the hospitals' PPFP service delivery changed providers' attitudes towards PPFP by endline. At baseline, when asked about fellow providers' attitudes towards PPFP, most respondents from Arm #1 and Arm #2 hospitals indicated that they thought their coworkers were supportive of FP services for women who had just delivered. However, at endline, those who had participated in the LDP+ — perhaps because they served as the change agents for PPFP — mentioned that they quickly discovered some coworkers were not as open to PPFP as they had thought. LDP+ participants attributed the change in attitudes to both the clinical as well as the L+M+G capacity-building interventions. As focus group participants noted:

> *R2: Well there has nevertheless been a change, because many people, many staff first of all were trained. So this means that people were given the exact information that they needed to provide to patients… So now the staff has been…**we have had many trainings, which means that we now provide the correct information to the women**, ….*
>
> *R1: … And now the discussion is more accurate. Which means that we know now, my colleagues know now what to say to the women. And even colleagues who had some doubts on certain methods or on certain periods during which one had to adhere [to FP methods], because of those that were trained here, for them to go explain "listen, we were trained, and now we can do this even in the delivery room… (FGD 02 T3)*

As suggested below, hospital managers interviewed across all four hospitals who noted similar changes in staff attitudes linked these changes to awareness raising within their facilities.

> *With regards to the staff, you know that when we raise awareness, when we explain, when we train… even the staff, some staff were ignorant, so when we train when we create awareness even amongst the staff, it changes things. It is true that we cannot change everybody but there are still people who understand the necessity for FP services for women after delivery, or even before delivery, because we must choose the right time to have a child. (Hospital Manager, Hospital 4: 401)*

These attitudes towards PPFP also extended beyond middle managers, suggesting that hospital leadership, and even other senior providers, sometimes had misperceptions. As one FGD respondent from LDP+ Hospital #2 said:

> *Because before …even our bosses said: "why postpartum?" I heard gynecologists, certain gynecologists say it, "why after the delivery: the uterus is open, the infections and everything…will it come out? " (Respondent 4, FGD_02 T3)*

Similarly LDP+ Hospital #3 participants also discussed changes in other providers' attitudes about PPFP saying:

> *…before even gynecologists…certain gynecologists weren't interested. But at the moment the majority of the gynecologists, when the mothers return for their 6-week consultation appointment, before this woman comes in, even if she doesn't adopt a method, she will first go to the FP. So at the moment, the majority of our patients who come for a 6-week postpartum consultation appointment are sent first to the FP unit. So that has been the big change. (Respondent 4, FGD_03 T3)*

For additional qualitative excerpts, please see Appendix 10, Appendix 11, and Appendix 12.

How does the LDP+ influence leading and managing practices, and how do these practices influence service delivery?

In order to assess leading and managing practices in the LDP+ intervention hospitals, a L+M behavioral self-assessment was completed by all 11 participants involved in the LDP+ (Arm #1) at both baseline and endline as well as at focus group discussions (FGDs) at baseline, midline, and endline. Both the behavioral self-assessment and the FGDs helped to identify key changes in LDP+ participants' leading and managing behaviors that contributed to improved access to PPFP services. In addition, interviews conducted with hospital leadership also helped to tease out how these practices were translated into solutions that contributed to improved PPFP service delivery.

Table 5. Baseline behavioral assessment participant characteristics

	LDP+ ARM #1	
	Hospital #2 District	Hospital 3 Reference
Gender		
Male	1	1
Female	4	5
Age		
30-34	1	0
35-39	1	0
40-44	1	2
45-49	1	1
50-54	1	3
Years in management post		
None	0	2
1-4	3	0
5-10	2	3
> 10	0	1
Years of service at the hospital		
0-9	3	0
10-20	1	6
20+	1	0
Total	5	6

The L+M behavioral self-assessment has 21 questions aimed at capturing the eight key leading and managing practices taught in the LDP+ method. Among them, leading involves (1) scanning, (2) focusing, (3) aligning/mobilizing, and (4) inspiring; and managing involves (5) planning, (6) organizing, (7) implementing, and (8) monitoring and evaluation. (See Appendix 1 for more information). At baseline, bivariate analysis was completed to determine statistical significance by site and gender variables (see Baba Djara, Trasi, et al., 2015).

The LDP+ participants were mostly female (82%; n=9), with one male from each of the two participating hospitals. Participants ranged in age from 34-54 and seven (64%) had 10 to 20 years of service at their current hospitals. Two participants — both at Hospital #3 — had no management experience, but the majority (n=8; 73%) had less than 10 years of experience in a management position. (Detailed information of participant characteristics at baseline can be found in Table 5.)

A total score for each behavioral assessment scale was obtained. A paired t-test was conducted on the assessments of 11 LDP+ participants, meaning that pre- and post-assessment scores were linked for each of the LDP+ participants. The t-test was done to determine whether there was a statistically significant mean difference between the aggregate post-LDP+ behavioral assessment scores compared to pre-LDP+ scores. Out of the total score of 105, **the LDP+ participants scored higher on the behavioral assessment scale after going through the LDP+ intervention** (58.6 ± 16.8) as opposed to before the intervention (39.1 ± 27.8), which is a statistically significant increase of 19.5 points ([95% CI, 3.6 to 35.4], t[10] = 2.7358, p = 0.02). The effect size, which measures the magnitude of the LDP+'s effect, was found to be large and clinically significant (Cohen's d = 0.85).

The behavioral assessment scale has 11 items in the leadership domain (See Appendix 9, Q1- Q11) and 10 items in the management domain (Q12-Q21). Similar analysis was performed on both the leadership and management domains. For the leadership domain, the paired t-test (again, comparing the pre and post data) revealed that the post-LDP+ score was not statistically significantly different from the pre-LDP+ score (statistically insignificant increase of 8.8 [95% CI, -2.6 to 20.3], t[10] = 1.7134, p = 0.1174), whereas the post-LDP+ **score was statistically significantly higher than the pre-LDP+ score in the management**

Figure 7. Overall pre- and post-behavioral self-assessment scores

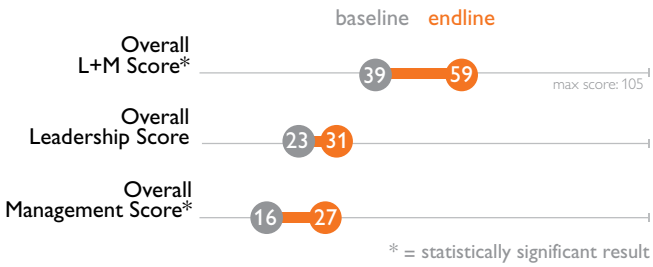
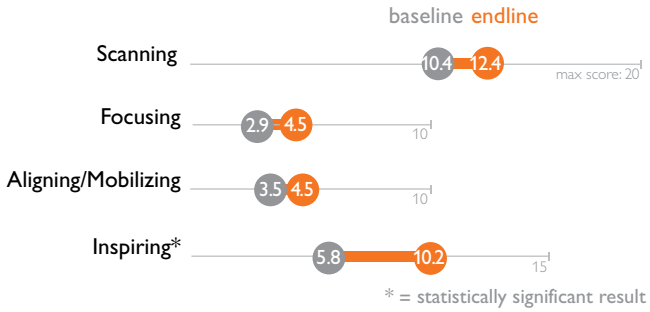


Figure 8. Overall pre- and post-leadership domain scores



domain (statistically significant increase of 10.7 [95% CI, 2.2 to 19.2], t[10] = 2.8090, p = 0.0093).

Power analysis was performed in STATA data analysis and statistical software using its sampsi command. Power analyses are conducted to ensure that the sample size — in this case, 11 participants each with a pre and post assessment — is sufficiently large enough to detect the change in outcomes found in the study results at a particular degree of confidence. The results of the power analysis[1] for the paired t-test yielded an estimated sample size of 12, meaning that our sample size was inadequate to detect the results obtained.

Leading Practices and Influence on Service Delivery

Individual practices were also assessed for both the leadership aggregate score and the management aggregate score. The leadership domain consisted of **scanning, focusing, aligning/mobilizing, and inspiring practices** (Figure 8). Post-LDP+ scores were not statistically significantly different from baseline LDP+ scores for focusing and aligning/mobilizing practices (p = 0.4200, p = 0. 2859, and p = 0. 3694, respectively). However there was a significant 4.4 point increase in inspiring practices from baseline to endline (95% CI, 0.5 to 8.3), t(10) = 2.4947, p = 0.0159).(Please see Appendix 9 for detailed information of behavioral assessment question responses.)

Inspiring and Motivating

From the perspective of both the LDP+ focus group participants as well as the hospital managers who were interviewed, the LDP+ teams were seen as catalysts, inspiring changes and improvements in PPFP services. A LDP+ team member from Hospital #2 noted:

> *I think that participating in this training here, this has been like* ***a renewed motivation*** *for those working in the FP unit. Because it has often been like a small abandoned unit in many health facilities…So I think nevertheless that it is first of all the motivation that we had, that brought…that pushed forwards many of the positive changes. Because had we not been motivated, I don't believe that we would have had the results that we had. (FGD 02_T3)*

Hospital #3's LDP+ team also described motivating and inspiring their colleagues to improve PPFP services. (See Appendix 10, Appendix 11, and Appendix 12 for additional selected excerpts from the qualitative data).

LDP+ participants detailed some strategies they used to motivate their coworkers and noted that their role as project leaders was to keep PPFP on the radar within their units and provide encouragement to coworkers to keep PPFP a priority. Hospital management and LDP+ participants mentioned that friendly competition was another key factor that helped motivate staff to continue to prioritize PPFP. At Hospital #2, a manager made the following comment:

> *Already the team trained locally,* ***the fact that they were in competition*** *with other teams [which has] encouraged the team to take it as a* ***challenge for itself, and that was already a motivation, to be the best team, so that alone meant that the services have improved.*** *(Hospital Management, Hospital 2: 202)*

1 The power was set at the .80 level. In the paired t test, LDP+ participants had increased their score by 19.54 ±

LDP+ team members stated that another key strategy to inspire their coworkers was to lead by example. For example, the LDP+ teams understood the purpose of documenting their work and the importance of incorporating FP across the continuum of care within their facilities. Managers at the LDP+ hospitals noticed changes in their facilities based on the LDP+ teams' work:

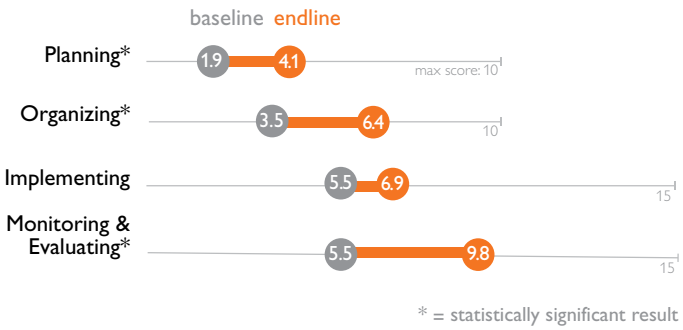
> *Q: And how about the staff, how do they perceive FP service delivery for women who are pregnant or who have just delivered?*
>
> *R: Before even the staff used to think that it was someone else's issue, but when we started the counseling, little by little, we included them in the counseling, which led to their understanding that* ***PPFP is also their role, even [to document in] the register,*** *it is also their role, thus they are less resistant than before. (Hospital Management, Hospital 3: 304)*

Hospital managers described how FP/PPFP became standard practice as the LDP+ teams' took on their role as leaders:

> *Q: What changes have you noticed in FP service delivery since our last encounter?*
>
> *R: What we do is that once a client is ready, we do not wait. We do not wait since there are many trained providers, so immediately we can discuss, either...It depends on the client's case, either she goes to the FP unit, or the team goes to her, to where she is…*
>
> *Q: And what in your opinion has contributed to that change?*
>
> *R: Our attitude, first of all we are ourselves, since we appreciate the approach, we adopted it as a lifestyle.*
>
> *Q: What contributed to the change in your attitude?*
>
> *R: The leadership training! The training on leadership, the quality of the evidence on the effectiveness of PPFP. (Hospital Management, Hospital 3: 304)*

See Appendix 10 for additional qualitative excerpts related to leading practices from the intervention hospitals from both focus groups and interviews.

Figure 9. Overall pre- and post-management domain scores



Managing Practices and Influence on Service Delivery

Management practices included **planning, organizing, implementing, and monitoring**. Contrary to what was found for leadership practices, post-LDP+ scores were statistically significantly higher than pre-LDP+ intervention scores for three management practices: (1) planning; (2) organizing; and (3) monitoring ($p = 0.0090$, $p = 0.0228$, and $p = 0.0077$, respectively), as shown in Figure 9. The largest shift was seen in the M&E domain, where there was a 4.3-point increase across the participants. Planning and organizing also saw significant positive increases in scores at the post-assessment, with a 2.2-point increase in planning-related behaviors and a 2.9-point increase in organizing behavioral responses. While not significant, implementing scores also increased by 1.4 points (Figure 9).

Planning and Organizing: Effectively Managing Human Resources

LDP+ and their managers discussed that, while the clinical training gave them the clinical skills, the leadership training gave participants the competencies to negotiate with other units to utilize staff with FP skills more effectively and to incorporate FP counseling across the continuum of care, including in ANC, delivery, PNC, and vaccinations. FP was no longer seen as solely the responsibility of FP providers, allowing Hospitals #2 and #3 to reach a larger number of women with FP services. Since the clinical intervention trained a critical mass of staff, LDP+ Hospital #2 reported that now each team across the continuum of care was able to have at least one service provider trained. In addition, interview and focus group participants noted that the leadership training gave participants the skills to assess client volume and coworkers' workload, and the flexibility to problem solve across units. Both interview and

focus group participants mention "pinch-hitting" in other departments, as necessary. The leadership training helped the staff to collaborate, problem-solve, and find a relevant solution, which in this case meant reorganizing teams to improve quality of care.

> *Yes, it is precisely what I wanted to say. That is what I wanted to add…it allowed us to reorganize the teams. The leadership allowed us to* ***reorganize the teams, to share the knowledge that we received with the others.*** *Because before we thought that when we are the boss it meant that…but then we understood that one can gain a bit more from the person who, who works with you…to be able to share what we received with the others to allow our work to progress. (LDP+ Respondent 5, Hospital 2)*

In addition, LDP+ participants at both Arm #1 hospitals mentioned that the leadership training helped them to better receive patients in a more welcoming manner, as expressed by three Hospital #3 participants.

> *R1: Yes I would say firstly this training that we had here has very much contributed. Because it allowed us to change our behavior with regards to the women, the patients that we had in front of us. We had to take them…I mean to try to get them to understand what PPFP means…why we want every woman, before leaving the hospital after her delivery, to accept to adopt a method, and the way to approach them. It contributed a lot. And all of that thanks to the trainings that we received. So the first point is the training.*
>
> *Q: So when you are talking about the training, are you talking about the leadership training or the clinical training?*
>
> *R1: The leadership training*
>
> *R6: The training of the leaders.*
>
> *R2: The presence of leaders in the hospital, that really increased…and it allowed for things to change … Yes, it contributed to a change in behavior.*

Implementing: Better Collaboration and Integration of FP into MNCH Services

Collaboration across management levels and between units was considered to be a success of the LDP+ team's work. Improved teamwork led to departments' coordinating patient care for FP and integrating FP across the continuum of care. LDP+ participants and hospital managers discussed that the projects were only as successful as the degree of collaboration between hospital administration, the LDP+ team, and their coworkers. LDP+ Hospital #3 noted the importance of engaging appropriate people with influence in the process so that key lessons could actually be implemented and sustained at the facility.

> *Certainly in the beginning, I believe there was a small issue related to… to the staff trained on leadership; that they should come back and disseminate what they had learned and maybe train the other staff… we were confronted with a small challenge with the personnel* ***who did not have enough authority to disseminate the training****, to train other staff. We had a few concerns because the staff that was trained had limited authority to make changes (Hospital Management, Hospital 3: 305)*

On the other hand, LDP+ Hospital #2's leadership was supportive from the start of the LDP+ and helped to select appropriate participants in the training. The LDP+ team at Hospital #2 reported that one of the major successes of the training was getting practitioners and administrators to collaborate to address PPFP, which, in turn, gave the LDP+ team credibility among their peers to effectively implement and sustain the change.

> *…But I think that, if we are talking about leadership, the leadership…I think that if there was something objective in this training, in this project…it was the fact that there was an active* ***participation both from the staff that is in the field, which means those who are in the unit in question, AND from the administration.*** *Because you see, the day that we came here with the Director and all the others, you heard the…the words of [Hospital #3's] Director: for him, it was something which at the beginning was like… there was really no consideration for these types of things and all that, but as time passed,* ***with the exchanges that we had here, it convinced them.*** *They [the administration] understood that they could also invest in this…in these services, and make them profitable. So there I think that if we talk about the training in leadership, there was this integration that was much more active both from the practitioners and the administration that changed to give…to establish…how should I say, a "roadmap" for the health facility, and I think that this has been an asset. An asset, because sometimes we go to trainings where we don't even get to see the managers to be able to give them feedback or anything, but the fact that they themselves came directly here, to tangibly experience it, even when you were at the dissemination meeting you saw that it convinced them a bit more, it is more convincing for them. (LDP+ Participant 1, Hospital 2)*

LDP+ participants translated this collaborative spirit into concrete action within their units. LDP+ participants and their managers interviewed noted that the leadership training increased their ability to communicate and collaborate across unit in multiple ways. They were able to better coordinate staffing needs across units — in keeping with the idea of "pinch hitting" mentioned above — in order to ensure that FP/PPFP services were available as needed.

> *The inter-unit communication, because when, for example if you are in the maternity and you have a problem in the postnatal unit or the maternal unit, the other person could call on their colleague from the other unit, maybe from the FP unit, to help reinforce them. We tried to do that a bit, that is sort of what we are doing. We collaborate more, and we help one another. Because sometimes we find ourselves going to help the other who is overloaded with work… (LDP+ Participant 2, Hospital 2)*

The LDP+ participants and the hospital managers noted that this collaborative spirit across units resulted in improved integration in maternal, neonatal, and pediatric services. The number of service-delivery points offering FP (discussed in greater detail in subsequent sections of the report) indicates that integration of FP occurred across both Arm #1 and Arm #2. In the qualitative data, however, the reference to explicit changes in task integration was much more pronounced in Hospital #2 than the other hospitals.

Comments from LDP+ participants from Hospital #3 show a recognition that any point of contact with a patient is an opportunity to provide FP information and counseling.

> *R5: The change… more on that because when we would do the delivery we did not talk about FP and everything, we just talked about the vaccination program…*
>
> *R6: We didn't talk about FP*
>
> *R5: And now we talk about FP at the delivery, to the mothers who return after 6 weeks, so they already know"*
>
> *R1: The fact is that…the patients are not separated. When we go and see a patient, if it is to give them maybe an injection, while we are doing that, we will talk…we talk…we talk about breastfeeding, we talk about FP, we talk about infant feeding and her own nutrition, we talk about the use of mosquito nets…we talk about a lot of things, which means that it cannot be separated…When we are finished there we take her contact information and we ask her if…as she has already heard us talk about FP, what are her opinions, what are the methods that she may want to adopt. When she tells us, we record it and we continue. We can't separate or detach FP care.*

Monitoring and Evaluating: Reflection, Evaluation, and Documentation

One of the shifts seen in the qualitative data at endline was the internal prioritization of monitoring and evaluation to inform efforts and to document services being offered, which was seen primarily in the LDP+ hospitals. LDP+ participants in the focus group discussions mentioned using data to identify bottlenecks within their units and services, as well as to monitor improvements. Those discussing Hospital #4 (Arm #2) also mentioned the importance of monitoring, but all Hospital #4 references referred to external requests for data and information, rather than internal decision making, as reflected in the question response below:

> *Q: And what do you hope could improve the leadership in your hospital with regards to the FP services?*
>
> *R: Us, ourselves, we could do the supervision. Supervision, coordination of the activities every month before the external monitoring is done, at our level we should first evaluate and we do so already because we have a medical health meeting where every unit reviews their problems on a monthly basis and how to resolve them. (Hospital Manager, Hospital #4)*

In both Hospital #2 and Hospital #3, participants discussed the importance of quarterly meetings and reporting as systematic opportunities to use and reflect on data being collected.

> *…. So we do it [reporting] quarterly.* ***That's when we have the time to discuss with them, where we can know what is going well, where it is going less well, so because it is already at that level where we can take a direct action*** *... It is an opportunities for the Direction to look it over and say, look we have a problem in this place ... or it is going well in a particular sector, and service providers themselves have relatively easy access either to the Medical Director, either at the human resources level, either at the general affairs level, financial so here it is not very compartmentalized, and collaborators most of the time have the possibility to meet the hierarchy and submit their problems. (Hospital Manager, Hospital 3: 302)*

Hospital managers also noted that they have seen improved documentation within the units they

oversee, which helps to better capture the FP work being done:

> *Before even the staff used to think that it was someone else's issue but when we started the counseling, little by little, we included them in the counseling, which* ***led to their understanding that PPFP is also their role, even to document in the register,*** *it is also their role, thus they are less resistant than before. (Hospital manager, Hospital #3: 304)*

LDP+ participants agreed, as reflected in this LDP+ participant's comments:

> *If I have something to add it is that as a leader, to ensure that there aren't any barriers or for it to continue moving in a positive direction… we have to share. … And on top of that…the monitoring of our work, both at the unit level and the Management. We have to monitor, we cannot just stop at our level and say: "ok that is enough" when there are problems that the management may not even know about or could even be useful in resolving but won't help us because we stayed…we stayed in our area and weren't able to go beyond that. We have to make efforts. There is the service delivery, which we must share, and we must do the reports with the hierarchy, because those reports are important. If we have problems with the commodities and the hierarchy isn't informed…it is the hierarchy that provides us with the commodities so for our units to be good, it is necessary to have an open and honest collaboration between the leaders and…the hierarchy. Yes. (LDP+ Participant, Hospital 3)*

Planning and Organizing: Finding Alternative Solutions

The LDP+ teams also spoke of the importance of scanning their environments, identifying critical challenges, and brainstorming solutions together as a team, which are tenets of the LDP+ curriculum. The LDP+ teams detailed the solutions they had brainstormed to improve PPFP service delivery in their respective facilities, as well as the problem-solving 'mind-shift' they learned from the LDP+ process. At Hospital #2, a barrier to increasing PPFP counseling was that women frequently did not return for their 6-week postpartum appointment. The team identified an adjustment to the fee schedule as a potential solution. As a result, they worked with the hospital administration to institute a policy where women would pay for their postnatal consultation at the same time as the delivery. This solution was based on the hypothesis that those women who had already paid for the PPFP service would be more likely to return for the postpartum visit, giving the providers an opportunity to discuss family planning. An LDP+ participant expanded on the payment structure changes undertaken in Hospital #2 as part of the LDP+ action planning process:

> *Because when we would tell them "you gave birth today, come back in 6 weeks, and in 1 week and a half for the FP consultation and postnatal consultation…" and it was through the postnatal consultation that we then had to bring them to the FP, so that resulted in a lot of procedures. And sometimes,* ***the line at the payment desk became an obstacle.*** *Because when they would come for the FP, they would tell themselves "OK I will quickly go there and then I will do this…" but as soon as they saw all the people over there at the payment desk, so many people, she would leave… So it is through these barriers, these different barriers there that we suggested that the payments be made directly in postnatal consultations during the billing, after the delivery. That way, because she had already paid, she would not easily accept to let her money…her 1000F [US$1.75] go like that! So, systematically, she would come back to use her 1000F [US$1.75], and we would take advantage of that to orient her…and it avoided her having to wait in line at the payment desk. And that too made it easier for us…for us it was a bit of a juggle, but it made it easier for us to ensure that she had access to the FP. (LDP+ Participant 1, Hospital 2)*

The policy change resulted in an increase in women returning for the 6-week postpartum visit:

> *I would add that, in addition to what they said, that the project has made some other units more open [to FP]. For example, at our hospital there is the C-PON unit [postnatal consultations], which wasn't set up. With the FP we found strategies, with the leadership,* ***these strategies resulted in women coming more and more within the 6-week period [after birth]*** *and we took advantage of this to do these post-natal FP consultations also. (LDP+ participant 4, Hospital #2)*

The LDP+ team from Hospital #3 described using leadership skills to work with a colleague who had differing opinions about FP/PPFP services to find alternative solutions to barriers so that FP counseling could be done in the maternity unit.

Both LDP+ teams reported improving FP/PPFP services by addressing barriers that kept women from easily accessing care. At LDP+ Hospital #2, some interview participants noted that they had streamlined availability of family planning commodities so that clients did not have to travel to the pharmacy to

obtain their contraceptive method.

In conjunction with the key FP/PPFP skills provided by the clinical intervention, LDP+ participants felt that the leadership and management development program gave them leadership and management practices they were able to translate into concrete solutions to improved PPFP service delivery in several ways (Appendix 10 and Box 1). As presented above, the LDP+ teams provided examples of strategies they used to reduce barriers to PPFP services. They were able to use these strategies to overcome barriers that would have kept them from fully utilizing the clinical knowledge to its fullest potential. As a result, they were able to: improve collaboration and teamwork to achieve better integration of services and better utilization of human resources; take a more proactive approach to identifying challenges and finding solutions to problems; and learn how to advocate for and inspire change by setting aside time to reflect and document services delivered.

BOX 1. A discussion of applying skills

R1: So I think that it has been, it was really complementary. ***I think that that is where we really saw the power of complementarity between the leadership training and the training received from E2A****.*

R1: Yes, it was very logical.

R5: Yes, it is precisely what I wanted to say. That is what I wanted to add…it allowed us to reorganize the teams. The leadership allowed us to reorganize the teams, to share the knowledge that we received with the others. Because before we thought that when we are the boss, it meant that…but then we understood that one can gain a bit more from the person who works with you…to be able to share what we received with the others to allow our work to progress.

Q: OK. Can you give me a concrete example?

R4: Well, a concrete example…We were trained with E2A in service delivery, among other things. Now after the training, we were separated in the training. We needed leadership… so that, thanks to leadership, we were able to learn other strategies. It was thanks to leadership, we learned that it was important to limit the wait times for the woman to return …that we needed, before she left, to introduce the fees for the next consultation into the delivery fees so that when the woman would arrive we would take her directly into the room. So it is thanks to the leadership that we were able to find this solution.

R1: And in the counseling as well. Many people, staff, did not know how to approach the woman. What they needed to tell her specifically in order to bring her, to convince her. But the fact that everyone benefitted from the training, as a result, we speak the same language, and now we know what to say to the woman and it is easy now to recruit a larger number of women because now we know the methods, the strategies to use to convince these women. And now, as everyone is more collaborative, more cooperative, if it is out of my depth I can easily say to my colleague "no seriously, come here and try" so it is a bit…there has also been the development of a spirit of teamwork, which has also been beneficial. I think that that's most of it… (FGD 02_T3)

What influence does L+M+G capacity building have on PPFP service delivery outcomes as compared to clinical capacity building alone?

Improving PPFP services requires both health system strengthening as well as service-delivery capacity building. Health system outcomes for PPFP services include the infrastructure, commodities, and materials required for offering services, while service delivery outcomes refer to PPFP services provided to clients. For this reason, both service delivery and intermediate health systems outcomes were included in the study as presented in Table 6 below.

Table 6. Service Delivery and Health System Indicators — Arm #1, Arm #2, and Arm #3

HEALTH SERVICE DELIVERY OUTCOMES	HEALTH SYSTEM OUTCOMES
% of antenatal care clients receiving FP/SRH counseling (ANC)	■ # of service delivery points with IEC materials available for patients
% of women who deliver in the hospital receiving FP/SRH counseling (PNC)	■ # of service delivery points with Postpartum Family Planning (PPFP) job aids for providers
Couple Years of Protection (CYP)[2] for the previous 3 months	■ # of contraceptive methods made available by the hospital ■ # of service delivery points offering PPFP

Health Service Delivery Outcomes

Three PPFP service delivery outcomes were included in the study: percentage of antenatal care clients receiving FP/SRH counseling (ANC), percentage of women who delivered at the hospital receiving FP/SRH counseling (PNC), and couple years of protection (CYP) dispensed by the hospital in the previous 3 months. All three service delivery outcome indicators are continuous variables.[3] Both baseline and endline consisted of 3-month pre and 3-month post data collected for each indicator that was then aggregated. A summary of baseline and endline descriptive statistics (mean, standard deviation, and 95% confidence interval) are presented in Table 7 below.

Table 7. Descriptive statistics for health service delivery outcomes

	ARM #1				ARM #2				ARM #3			
	Before Intervention		After Intervention		Before Intervention		After Intervention		Before Intervention		After Intervention	
	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI
ANC counseled (%)	0 (0)	0,0	56.8 (13.7)	42.4, 71.2	0 (0)	0,0	13.4 (5.2)	8.0, 18.9	0 (0)	0,0	2.3 (3.9)	-18.9, 6.4
PNC counseled (%)	17.3 (4.9)	12.2, 22.4	79.5 (15.0)	63. 8, 95.2	12.0 (3.3)	8.6, 15.6	15.8 (17.7)	-2.8, 34.4	12.1 (3.0334)	8.6, 15.6	4.6 (1.3)	-1.3, 7.8
CYP (#)	23.81 (0.80)	22.97, 24.65	33.14 (2.29)	30.74, 35.55	20.87 (10.27)	10.09, 31.65	35.04 (24.29)	9.54, 60.53	20.87 (10.27)	10.09, 31.65	13.49 (14.78)	-2.0, 29.00

2 CYP is the estimated protection provided by contraceptive methods during a given period, based upon the volume of all contraceptives distributed to clients during that period.

3 Note these three indicators were analyzed as continuous variables because the statistician took a practical approach since there was sufficient spread in the data and, in addition, percentage in our data could take on any value along the continuum from 0 to 100%.

At baseline across all three arms, no data was being collected on FP/SRH counseling for ANC clients; however, at endline, all six facilities were collecting these data. All hospitals were offering only group FP/SRH counseling sessions at baseline rather than individual counseling for ANC clients. The largest change in FP/SRH counseling in ANC was seen in Arm #1 — i.e., LDP+ hospitals — where there was a 57% improvement from 3 months pre-intervention to 3 months post-intervention (Figure 10) Arm #2 saw a 13% increase, while the control arm remained similar to baseline, with a 2% increase.

Figure 10. LDP+ hospitals had greater increases in the percentage of ANC clients receiving FP/SRH counseling

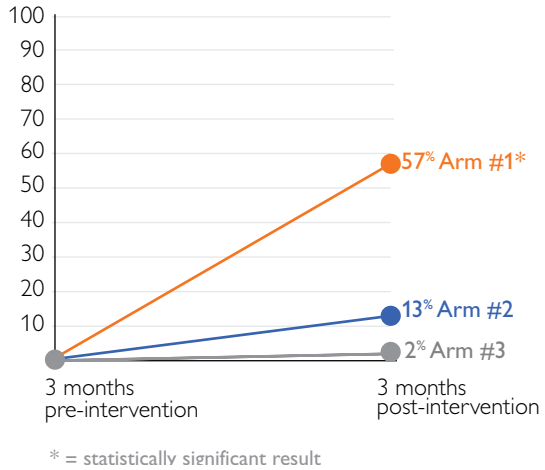
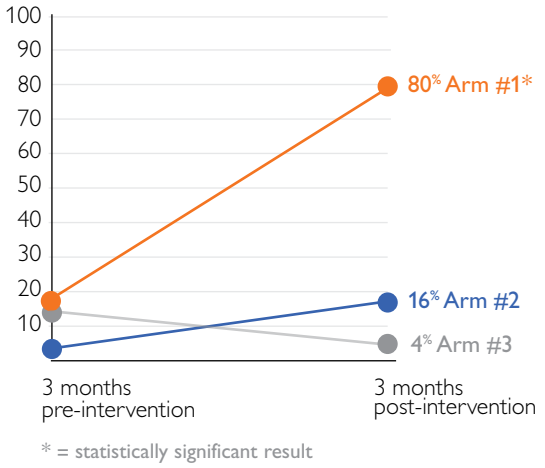


Figure 11. LDP+ hospitals had greater increases in the % of PP clients receiving FP/SRH counseling



There was a statistically significant difference between arm means as determined by one-way ANOVA ($F[2, 15] = 64.78$, $p = .0000$, $\eta 2 = .90$) at $p<0.05$ level.[4] There were statistically significant differences between Arm #1 and Arm #2 as well as Arm #1 versus Arm #3; however, there was no statistically significant difference between Arms #2 and #3 (Table 8). These results suggest that the **LDP+ in combination with the clinical training contributed to a greater increase in the number of ANC women receiving FP/SRH counseling compared to the clinical training alone**.

Similarly, for FP/SRH counseling of postpartum women, Arm #1 saw the largest increase in women counseled between the 3 months pre-intervention and post-intervention. At baseline in Arm #1 facilities, 17% of postpartum women were counseled on FP/SRH, compared with 80% at endline — a 3.7-fold increase in women counseled (Figure 11). Arm #2 saw a 1.6-fold increase in the number of postpartum women counseled, while Arm #3 actually had a decrease in the number of postpartum women counseled.

Table 8. Women counseled attending ANC (ANOVA)

	ARM MEANS		DIFFERENCE IN MEANS	HSD-TEST
Arm 1 v. Arm 2	0.5681	0.1343	0.4338	12.1113*
Arm 1 v. Arm 3	0.5681	0.0223	0.5457	15.2384*
Arm 2 v. Arm 3	0.1343	0.0223	0.1120	3.1271

4 Post-hoc pairwise comparison was performed using Tukey's HSD based upon the Studentized Range distribution.

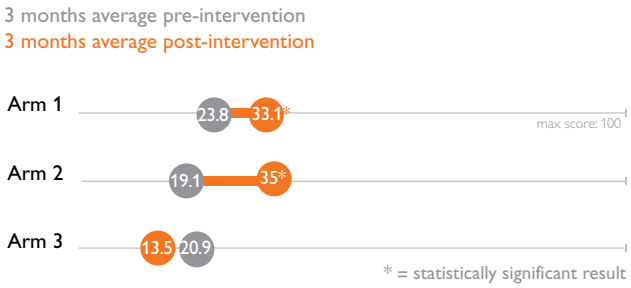
For PNC, there was also a statistically significant difference between arms as determined by one-way ANOVA (F (2, 12) = 37.04, p = .0000, η2 = .86) at p<.05 level. Once again, the differences were significant between Arm #1 versus Arm #2 and Arm #1 versus Arm #3 (Table 9). This indicates that the **LDP+ along with the clinical training contributed to a greater increase in the number of postpartum women receiving FP/SRH as compared to the clinical training alone**.

The third health service delivery outcome indicator collected was CYP.[5] Both Arm #1 and Arm #2 saw increases in CYP coverage from the 3 months pre- and post-intervention. Unlike, ANC, and PNC counseling rates however, both Arm #1 and Arm #2 saw significant changes.

Table 9. Postpartum women counseled (ANOVA)

	ARM MEANS		DIFFERENCE IN MEANS	HSD-TEST
Arm 1 v. Arm 2	0.7951	0.1583	0.6368	9.0168*
Arm 1 v. Arm 3	0.7951	0.0456	0.7495	10.6132*
Arm 2 v. Arm 3	0.1583	0.0456	0.1127	1.5964

Figure 12. Change in CYP coverage before and after intervention



The statistically significant difference was at a 90% confidence level between arms, as determined by one-way ANOVA (F [2, 15] = 3.15, p = .0722).[6]

A one-way three-level multivariate analysis of variance (MANOVA) was conducted to test the hypothesis that there would be one or more differences in the averages across the three arms. There was a statistically significant difference in FP/SRH counseling to new mothers and couple years of protection provided by a hospital across the three arms (F (2, 12) = 11.87, p < .0000). The overall multivariate test was significant, which means that differences between the arms exist. We found that Arm #1 is statistically significantly different from the average of Arm #2 and that of Arm #3, (F (1, 12) = 40.54, p < .0000).

Table 10. Postpartum women counseled (ANOVA)

DEPENDENT VARIABLE	df	F	η2	p
% of ANC women receiving FP/SRH counseling	(2, 15)	64.78	0.90	.0000
% of women who deliver in the hospital receiving FP/SRH counseling	(2, 12)	37.04	0.86	.0000
Couple Years of Protection	(2, 15)	3.15	0.30	0.0722

5 Couple Years of Protection is a metric.

6 Post-hoc pairwise comparison was performed using sidak, bonferroni and scheffe options in STATA.

Then we compared Arm #2 to Arm #3. The results indicate that Arm #2 is not statistically significantly different from Arm #3 ($F(1, 12) = 40.54$, $p = 0.3956$).

In addition, data from qualitative interviews concurs with the quantitative data, as hospital management and focus group discussions with LDP+ participants also pointed to changes in PPFP service delivery over the course of the program. Increased utilization of FP/PPFP services as well as PNC services were noted by both interviewees and focus group participants. Both Arm #1 and Arm #2 hospitals reported greater integration of PPFP counseling and services along the continuum of care for SRH services than at baseline. About the LDP+ Arm #1 Hospital, a FGD participant made the comments below.

> *There has nevertheless been a change, because before the women were not fully informed about the FP unit. Only a few women would come…it has come to the point where there is a lot of…a bit more traffic…* ***That means that the frequency…the attendance rate in the FP unit has increased a bit in comparison to 6 months ago.*** *There are more visitors these days. And even the pregnant women are interested, come to get counseling, and also to choose their method that they will use after delivery. And we take note of it for after they give birth. And the women…the women who have delivered, who were not informed beforehand, are now informed. (FGD_02 T3)*

Similarly, respondents from LDP+ Arm #1 Hospital #3 also noted an increase in prenatal and postnatal clients, as well as more requests for FP information.

In addition, a MANCOVA was conducted to test the hypothesis that there would be one or more mean differences across three arms controlling for covariates. All four multivariate tests[7] remained significant when controlled for hospital type (referral or district), governance structure (autonomous or ministry governed), number of FP/RH trainings at the hospital, and existence of PPFP clinical protocol – with one covariate at a time. The multivariate outcome is much stronger after applying covariates; it would appear that a covariate reduces some of the error variance. There is a highly significant multivariate effect across arms for the combined dependent variables of the postnatal counseling rate and couple years of protection. We conclude that the effects of LDP+ intervention, along with the clinical training on the two health service outcomes, is still significant, even after controlling for the effects of covariates on the two outcomes. (For more information on the multivariate analysis conducted, please see Appendix 5.)

A difference-in-differences analysis was also conducted. For the difference-in-difference model, we used a simple set-up, one where outcomes are observed for two groups for two time periods. One of the groups is exposed to a treatment in the second period but not in the first period. The second group is not exposed to the treatment during either period. Since we observe the same hospitals within a group in each time period, the average gain in the second group is subtracted from the average gain in the first group. This removes biases in second-period comparisons between the two groups that could be the result from permanent differences between those groups, as well as biases from comparisons over time in the treatment group that could be the result of trends.

We made three comparisons using the difference-in-differences set up described above: Arm #1 (LDP+ intervention combined with clinical intervention) versus Arm #2 (clinical intervention alone), Arm #1 (LDP+ intervention combined with clinical intervention) versus Arm #3 (no intervention), and Arm #2 (clinical intervention alone) versus Arm #3 (no intervention). Our findings on these three sets of difference-in-differences analyses are summarized in Table 11.

7 Wilks' lambda, Pillai's trace, Lawley-Hotelling trace, and Roy's largest root

Table 11. Difference-in-difference models by service delivery outcome

MEASURE	ARM 1 vs. ARM 2	ARM 1 vs. ARM 3	ARM 2 vs. ARM 3
% of ANC women receiving FP/SRH counseling	Increase in hospital's antenatal counseling rate by 36%	Increase in hospital's antenatal counseling rate by 54%	Increase in hospital's antenatal counseling rate by 12%
% of women who deliver in the hospital receiving FP/SRH counseling	Increase in hospital's postnatal counseling rate by 32%	Increase in hospital's postnatal counseling rate by 69%	No impact on postnatal counseling rate
Couple Years of Protection	Decrease in couple years of protection offered by a hospital by 13 couple years	Decrease in couple years of protection offered by a hospital by 17 couple years	Increase in couple years of protection offered by a hospital by 23 couple years

In summary, this analysis found that the LDP+ intervention combined with the clinical training increased a hospital's antenatal counseling rate by 54% and its postnatal counseling rate by 69%, controlling for covariates when compared with no intervention. Whereas clinical training alone when compared with no intervention, increased a hospital's antenatal counseling rate by 12% and had no impact on postnatal counseling rate. Thus, the added value of LDP+ intervention on average is an increase in a hospital's antenatal counseling rate by 42 percentage points and its postnatal counseling rate by 69 percentage points – when the combined or clinical intervention alone are introduced in a setting where there is an ongoing intervention.

When the LDP+ intervention is added on the top of the ongoing clinical training, on average the added value of LDP+ intervention is an increase in a hospital's antenatal counseling rate by 36 percentage points and its postnatal counseling rate by 32 percentage points.

For couple years of protection as an outcome variable, the LDP+ intervention combined with the clinical training on average is associated with decrease in couple years of protection offered by a hospital by 13-17 couple years. While the overall results for the study shows an increase in both Arm #1 and Arm #2 in CYP, the difference-in-differences analysis ascribes all change to the intervention itself rather than other events. This identifying assumption of difference-in-differences is relatively strong and tends to overlook any other possible changes between the groups that could have led to observed outcomes. The difference-in-differences method attributes any differences in trends between the treatment and control groups to the intervention as long as those differences occur at the same time as the intervention. The estimation becomes biased if there are other factors that affect the difference in trends between the two groups.

Several factors occurred during implementation that we suspect disproportionately affected CYP compared to other service delivery indicators in Arm 1 and Arm 2, and therefore would confound difference-in-difference findings. Across the four hospitals trained by E2A, there were varying rates of attrition for providers that received PPFP training. Hospital #4 (Arm #2) had the highest rate of attrition during the study period. Hospital #1 (also in Arm #2) abruptly opened a family planning unit, resulting in a large increase in CYP despite a baseline of zero. Lastly, the only provider able to provide long-acting methods at Hospital 2 (Arm #1) was out for four weeks in the final month of endline data collection due to a family emergency. Hospital 3 (Arm #1) experienced more stock-outs of FP commodities than other hospitals due to a change in the pharmacy management system.

More information on the hierarchal regression analysis, including the four models that were run, can be found in Appendix 6.

Power Analysis — Service Delivery Outcomes

We had six observations per arm in the post-intervention analysis sample. We tested the ability of our study to detect a meaningful effect size using f power macro. There are three arms. When we set alpha = 0.05 and the effect size, delta ([largest mean – smallest mean]/pooled within-group standard deviation or the square root of the mean square error] = 2), we estimate the sample size needed to achieve 0.80 power is six observations per arm. This means our study was powered to detect the effect size.

We tested the ability of our study to also detect the effect size we obtained using the power one-way command. Our study was adequately powered for the level of the effect we obtained. The estimated sample size to obtain the effect we obtained for the ANC and PNC counseling rates was two observations per arm, whereas we had six observations per arm.

We assessed the power of our difference-in-differences regression model to detect the effect size we detected at 0.05 level given our sample size of 24 observations using post-estimation powerreg command in Stata. The findings are summarized in the Table 12 below.

Table 12. Difference-in-difference regression models

MEASURE	ARM 1 vs. ARM 2	ARM 1 vs. ARM 3	ARM 2 vs. ARM 2
% of ANC women receiving FP/SRH counseling	0.40	0.58	0.25
% of women who deliver in the hospital receiving FP/ SRH counseling	0.67	0.20	0.33
Couple Years of Protection	1.00	1.00	1.00

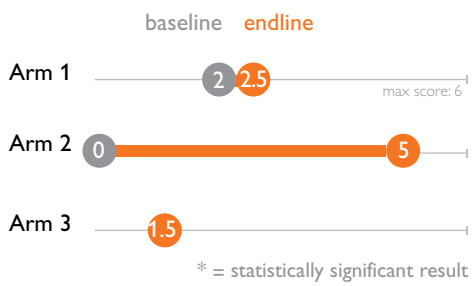
Health System Outcomes

Four health system outcome indicators were included in the study: (1) the number of service delivery points with IEC materials available for patients; (2) the number of service-delivery points with postpartum family planning (PPFP) job aids for providers; (3) the number of contraceptive methods made available by the hospital; and (4) the number of service-delivery points offering PPFP. All four health-service-delivery outcome indicators are continuous variables and were collected by observation or document review. A summary of baseline and endline descriptive statistics (mean, standard deviation, and 95% confidence interval) are presented in Table 13 below.

Table 13. Descriptive statistics for health system outcomes

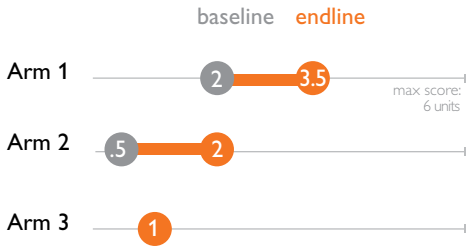
	ARM #1				ARM #2				ARM #3			
	Before Intervention		After Intervention		Before Intervention		After Intervention		Before Intervention		After Intervention	
	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI
# of Units with IEC	2.0 (0)	2,2	2.5 (1.64)	0.8, 4.2	0 (0)	0,0	5 (1.1)	3.9, 6.1	1.5 (0.5)	0.9, 2.1	1.5 (0.5)	0.9, 2.1
# of Units with Job aids	2.0 (1.1)	0.9, 3.1	3.5 (1.64)	1.8, 5.2	0.5(.5)	-0.07, 1.07	2.0 (0)	2.0, 2.0	1 (0)	1, 1	1 (0)	1, 1
# Methods Offered	5.0 (0)	5, 5	5 (0)	5.0, 5.0	2.5 (2.7)	-0.37, 5.37	5.0 (0)	5.0, 5.0	3 (2.2)	0.7, 5.3	3.5 (1.6)	1.8, 5.2
# of Units offering FP	2.0 (1.1)	0.9, 3.1	5 (0)	5.0, 5.0	1.5 (0.5)	0.9, 2.1	5.0 (1.1)	3.9, 6.1	2 (1.1)	[0.9, 3.1]	4 (1.1)	2.9, 5.1

Figure 13. Number of service delivery points with IEC materials at baseline and endline



Arm 3 maintained the same pre- and post- score

Figure 14. Number of service delivery points with job aid materials at baseline and endline



Arm 3 maintained same pre- and post- score

Six units — ANC, maternity, PNC, vaccination, FP, and pediatrics — were assessed at baseline and endline for availability of IEC materials (Figure 13). Arm #1 saw a slight increase, from an average of two units with IEC materials at baseline to an average of 2.5 at endline. The largest change was seen in Arm #2, which, at baseline, had no facilities with IEC materials, compared to an average score of five units at endline. IEC availability remained exactly the same in Arm #3 at endline. It was determined that there were no statistically significant differences at the baseline between the Arm #1 and Arm #2 or Arm #3, making them equivalent at baseline. However, at endline there was a statistically significant secular trend of increase in the number of service-delivery points with IEC materials for both Arm #1 and Arm #2. (See Appendix 7 for more information on these results, as well as additional difference-in-differences analyses.)

The same six units—ANC, maternity, PNC, vaccination, FP, and pediatrics—were assessed for availability of job aids at baseline and endline (Figure 14). Scores were calculated similarly via observation. Arm #1 increased the number of job aides from an average of two units at baseline to 3.5 at endline. Arm #2 also saw an increase from an average of 0.5 units at baseline to an average of two units at endline. Again, Arm #3 saw no change in the number of units with job aids available to staff.

Similarly, we found that there was no statistically significant effect of Arm #1 on the number units with job aids readily available. Also, a statistically significant difference was found at the baseline between Arms; Arm #1 had more job aids at baseline, meaning the arms were not equivalent at baseline for this outcome measure. While the arms were nonequivalent at baseline, there was a statistically significant (at the 0.05 level) secular trend of an increase in the number of service delivery points with job aids for providers.

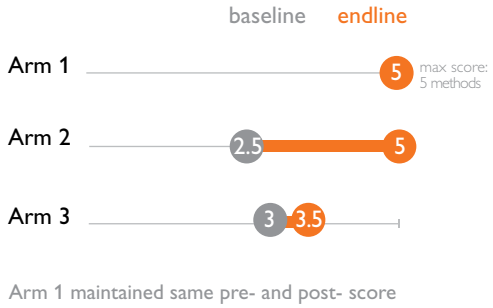
The number of contraceptive methods available at the facility in the pharmacy was also assessed. The five methods included in this outcome metric included the availability of:

1. **intrauterine devices (IUDs);**
2. **implants;**
3. **injectables;**
4. **pills; and**
5. **condoms.**

The average number of methods for the previous 3 months was aggregated for each arm at baseline and endline. At baseline, the hospitals in Arm #1 were already offering all five methods, which continued at the endline measurement point. Arm #2 had an average of 2.5 methods at baseline, which increased to five methods at endline. Arm #3 saw a slight increase from an average of three methods to 3.5 at endline.

Using a regression analysis, it was found that there was no statistically significant effect of LDP+ and clinical intervention (Arm 1) on the range of contraceptive methods made available by a hospital (Figure 15). There was a statistically significant difference at the baseline between arms. As with job aids, Arm #1 had more contraceptive methods

Figure 15. Contraceptive method availability by study arm (average number of methods available)



available at baseline, so the arms were **nonequivalent** at baseline. There was, however, a statistically significant (at the 0.05 level) secular trend of an increase in the range of contraceptive methods.

Lastly, the number of units offering PPFP services was collected via observation. There is no effect of the LDP+ and clinical intervention combination on the number of units that offer postpartum family planning in the hospital. There was no statistically significant difference at the baseline between the Arm #1 and Arm #2 or Arm #3. There was, however, a statistically significant (at the 0.05 level) secular trend of increase in the number of units offering postpartum family planning in a hospital in Arm #1 and Arm #2. (For further information on the health system outcomes analyses conducted, see Appendix 7.)

At baseline, one hospital in Arm #2 (Hospital #1) was not offering FP services; and while Hospital #3 in Arm 1 was technically offering FP services, the hospital did not have a designated room and was operating in the hallway. Additionally, it was well documented in the qualitative data at baseline that FP was not a priority service across the intervention hospitals because it was not seen as a profitable department due to low utilization of the services. However, with more trained providers (E2A) and better utilization of those trained (LMG), both Arm #1 hospitals noted an influx of patients and therefore more interest from hospital leadership, as observed by a respondent:

> *It is true that maybe before the administration could believe that it was a unit that wasn't profitable…due to the low rate of attendance. However,* ***now that a larger number of people have been trained, this has also brought many people to participate in an active way in the FP process.*** *Thus, there is an impact that is reflected in the increasing attendance rate, and even if the women will not be paying large sums, but the…. the administration can realize that, at the same time, that "ok, there is a larger number of people who are here, and even if we do not benefit, we don't have a high enough benefit ratio, but nevertheless the unit is beginning to be a bit more profitable than before." And so there as well,* ***they are nevertheless increasingly forced to have a much more positive outlook towards the unit in question.*** *(Respondent 1, FGD 02_T3)*

In summary, taken together, the analyses (ANOVA, MANOVA, MANCOVA) conducted on the health-service delivery and health-system outcomes results suggest that the LDP+ intervention combined with the clinical intervention has an effect on PPFP health service outcomes, but not on PPFP health system outcomes. Specifically, our results suggest that when the LDP+ and clinical interventions are implemented together in a hospital, the percentage of expectant and new mothers receiving FP/SRH counseling at the hospital increases, as does the couple years of protection provided by the hospital. On average, the LDP+ intervention combined with the clinical intervention (Arm #1) increased a hospital's antenatal counseling rate by 49%, its postnatal counseling rate by 59%, and the couple years of protection provided by the hospital by 10 couple years, controlling for hospital type (referral or district), governance structure (autonomous or ministry governed), number of maternity beds, number of FP/RH trainings, and existence of FP/RH training policy at the hospital. We consider the effect on all three health service outcome variables — counseling rates for expectant and new mothers and couple years of protection, to be significant.

We did not observe a similar effect of the LDP+ and clinical intervention on PPFP health system outcomes. Arm #1 had already higher levels of performance at baseline for two of the three variables, and there was a secular trend of increase in all three variables. We believe that the Arm #2 clinical intervention contributed to the secular trend in health system outcomes.

What are the content, context, and process barriers and facilitators to PPFP service delivery?

Interviewees and FGD participants identified several key facilitators that contributed to improved PPFP service delivery. Barriers and facilitators were methodically detailed in the baseline report for this study and addressed throughout the implementation report (Baba Djara, Morgan, et al., 2015a). Below are key barriers and facilitators that were new or more frequently discussed at endline.

Both Arm #1 and Arm #2 hospitals noted the contribution of the clinical training and supervision, donation of materials, and the ability to follow up on complications as key to improving the quality of services. In addition, Arm #1 hospitals stressed the importance of upper management involvement and collaboration as important facilitating factors to improving PPFP services.

Facilitators

Clinical Training contributed to improved quality of FP services

At endline, LDP+ participants attributed increased quality of family planning services in Hospital #2 and Hospital #3 to both the LDP+ and clinical training. The clinical training mentioned provided technical expertise to a critical mass of providers, which, in turn, improved FP counseling skills, so providers were then able to deliver more accurate information to clients.

> *…after the trainings, we put in practice many things that we had learned, such as the prevention of infections, the attention to sepsis, and also the fact that we put into practice the training we had received. That resulted in an improvement, even to side effects; the management of side effects, the people who would come back for this or that problem…it has reduced a lot of things. (LDP+ Participant, Hospital 2)*

Across the four hospitals that participated in the clinical capacity building, providers reported improved clinical skills; personnel felt that they were better able to translate their knowledge into effective counseling for patients and, as a result, observed that women are better informed and better able to make good decisions about FP:

> *Yes along those same lines, I think that with the trainings and the counseling, many of the women often came to understand that FP wasn't only possible starting from the 6th week after delivery.* ***They understood that even in the delivery room, after the delivery, we can already adopt a FP method,*** *and that was really positive for the women, because that 6-week wait, before, it wasn't always easy. Many women became pregnant during that period and didn't even think that they were pregnant. So I think that they accept this as positive. Yes, because really it is a good thing. That is what we have noticed. (LDP+ Participant 3, Hospital 2)*

The clinical training also gave providers the language to frame PPFP appropriately for their clients. As documented in the baseline report, low demand for FP/PPFP services and high demand for maternity and delivery services create challenges for improving FP coverage. Socio-cultural misconceptions about contraception — chiefly that FP is meant to limit births — often deterred women from adopting contraceptives. Providers discussed having new language to frame PPFP as an important option for birth spacing:

> *When they will come back we will explain to them that:* ***"when you take this, it isn't to stop you from giving birth; it is just so that you can rest. When you want to give birth again, come back and we will remove it."*** *They will come back…the process has just started…when they will come back it is then that they will also begin to talk about it and also to give the correct information in their neighborhoods. They can give the exact information, the correct information that can also be fruitful later on. When they will start to return, it will…now it is ok…it is ok (FGD 02_T3)*

The clinical training program also donated essential materials for PPFP that facilitated service delivery.

In addition, the clinical training strengthened the providers' knowledge and ability to provide follow-up for PPFP complications.

Upper Management's contribution to improved quality of FP/PPFP services

LDP+ hospitals also mentioned the involvement of upper management as an important factor in improving FP/PPFP services. One FGD participant from Hospital #2 expressed that the hospital director was available and supportive of the process:

> *… we have a boss that is there, who is young, who easily understands certain concerns…who has a high level of intellect. He is a leader, so when there are concerns…well at least for me he has never said…he always welcomes people in*

his office. When there is a problem in the unit, he resolves it. He has organized a monthly meeting of the heads of departments where we highlight all of the problems …(R5) He is a facilitator, he doesn't really create blockages. (Respondent 4, FGD 02_T3)

LDP+ Hospital #3 discussed how at the beginning, they did not have the support of upper management, but getting them on board was an important factor in their eventual success. The team attributed this change to the clinical supervision meetings (a result of the clinical intervention) that included upper management and involved honest conversations about the importance and utility of PPFP and to dispel misconceptions senior management had regarding family planning.

Both interviewees and FGD participants in Arms #1 and #2 hospitals felt that upper management of the hospital and MOH support was important for oversight to ensure continuity and resource availability, ensure scale-up, and provide incentives for improving PPFP services, as illustrated in the following quote:

*R3: **I think that the leader of our health facility must have an overview…he has to ensure the continuity or the…the dissemination of the project throughout the facility.** So I think that by motivating, yes by encouraging, and well from time to time answering our…how can I say…our needs yes, our needs, concerning the difficulties that we may face in advancing the project. Yes I believe that if that is done, things will move in the right direction. (FGD 02 T3)*

LDP+ participants from Hospital #3 also suggested that if upper management regularly engaged with middle management of the hospital, it would facilitate improvements in PPFP services.

Barriers

Similar to baseline, clinical and LDP+ participants mentioned several key barriers to further improving PPFP services. A summary of similar barriers mentioned at baseline and endline can be found in Appendix 13, but for a comprehensive analysis of barriers and facilitators to PPFP in the Cameroonian context, please see the baseline report.[8]

At endline, additional barriers emerged in the interviews with hospital managers and FGD with the LDP+ participants. Some participants talked about the need for more incentives for providers to prevent corruption and provide motivation, as well as the need to train more personnel and supervisors to provide coverage across the continuum of care.

Even though a good number of staff members were trained in the clinical program, shortages still existed in some departments.

I also wanted to say…concerning the barriers, I would also like to add that at my level, I have a barrier that bothers me. It is that I am alone. I have always talked about that. Given that we are supposed to recruit a lot of women [for FP], I find myself all alone, which means that when I am absent, when I am for example on vacation, that entire month, there is no one who can do the counseling. (Respondent 2, FGD_03 T3)

A LDP+ Hospital #3 participant also mentioned that there were not enough trained staff to provide coverage in all departments across the continuum of care.

…we need someone in the post-delivery room that can do the counseling during recovery. There is the post-delivery room, there is the neonatal unit… there is no one trained in counseling in neonatal. Because it has been maybe 2 weeks that we have been trying to recover the mothers with babies in Neonatal, and we saw a lot of mothers over there that did not even know the FP methods and everything, that were only interested in how their babies were doing in the incubators, and there are many of them, and we lose sight of those mothers. This proves that even in Neonatal, we must train, we must train people in Neonatal in counseling and so that mothers are informed. (Respondent 5, FGD_03 T3)

Again at endline, workload was another key barrier that remained a prominent theme across hospitals. All hospitals had participants that mentioned family planning was an additional task for already overworked providers, often working in understaffed units.

In addition to inadequate staff trained to deliver PPFP counseling and services, LDP+ Hospital #3 sometimes had difficulty providing FP due to the absence of a supervisor for those methods that required insertion, as described by two respondents.

R3: There are other barriers as Mme X was saying, there is also the absence of…of supervisors, with regards to the insertion of these methods. Sometimes you may have finished the counseling, you have the woman with you and as the person

8 See also (Baba Djara, Conlin, et al., 2015).

who does the supervision isn't there, the supervisor is not even on-site. … But they would arrive and be told that they couldn't if there was no supervisor. But if we can't, that is how we lose the women that way. Those are the different barriers. (Respondent 3, FGD_03 T3)

The barriers that we had is that first off in the delivery room, when we finished the counseling these past 3 months, or these past 6 months…the first 3 months of the year, there were no problems because every person was following doctors who were inserting and everything. And who were there. These past 3 months, it has been a bit difficult... Granted there are colleagues that are there. And when they finish their counseling, now the women chooses the Immediate PP IUD and they want to insert it, they say: "no, there is no supervisor". ..And we tried to talk about this yesterday during the supervisory meeting; they said that no we must call the supervisor he said that from now on he will be available. They said that if we have a problem we are to call the supervisor … (Respondent 5, FGD_03 T3)

FGD participants who had completed the LDP+ training felt that the burden of making sure that FP/PPFP services were documented rested entirely on them. In LDP+ Hospital #3, respondents 1 and 5 expressed their views (FGD_03 T3):

R1: The barrier that we also have with regards to that is that these service providers do the counseling but don't make the effort to put it in the register. The responsibility of the register rests on the head of the leaders. Which means that the work is done, but it isn't constant…we don't see it…how can we know what was done? It is always us who must come back to look at it, and that is when we realize that the register is empty. So we still have a problem at that level…

R5: The problem we have is that the service providers that are in the delivery room, as she was saying, when they finish, they keep the register in the delivery room and don't come back to FP to try and record these cases that they had in the delivery room.

Other participants also felt that there may be a tendency for those trained as leaders to become discouraged over time, which would affect their level of effort to continue improving PPFP services.

A hospital manager in Hospital #2 noted a similar point, linking the extreme workload of staff and the difficulties of prioritizing rigorous documentation:

So the little difficulty was with the data collection, since, for instance, in the vaccination service, to write down all of the information, to keep track of all the information of all the patients they see, it is not always easy, because there is an affluence of mothers coming all at once and there is not enough staff. If we had staff that was specifically assigned for that, if the staff was solely for that, it would be good. But since it is the staff that is already there that is doing all this, that is what makes it, that is what contributes to work overload. (Hospital Manager, Hospital 2: 205)

Finally some LDP+ participants felt that national PPFP guidelines where not yet well known and disseminated. This creates confusion for both staff and clients, since women may go to one facility for prenatal counseling and deliver at another facility. Women may receive conflicting information, which they may then pass on to friends and family.

By far, the largest concern in both Arm #1 and Arm #2 hospitals was the continued availability of FP commodities on a regular basis. Respondents expressed that this was the most significant thing that could hinder continued improvement of FP/PPFP services. This was identified as a key task of upper management, as many of the problems with commodities security at both the hospital and national level were beyond the control of middle managers, as noted in the following discussions.

Hospital 1 discussed the frustration that they were able to establish a PPFP unit, but were then not able to operate due to lack of commodities:

Q: And could you tell me about any efforts made towards improving FP or the PPFP services during the past 6 months in the hospital?

R: Yes, before we did not yet have FP services. Yes, 3 to 4 months ago, I was authorized to open the FP services at the principal maternity Within that service, there is one staff in charge. It is a midwife, she was trained in counseling... She was trained in FP services, but even as we speak we don't yet have commodities in the hospital." (Hospital Manager, Hospital 1: 101)

There also remains confusion regarding order and accountability for stock-outs throughout the supply chain system:

They just need to simplify the process of ordering stocks. Make it so that there are no stock-outs. Because last time, at our hospital, they told us there was a stock-out in the CENAME and they

couldn't obtain them, and we told them to go to the CAP…They told us that they weren't affiliated with the CAP. And there were some at the CAP but the CENAME had stock-outs…at least that is what they told us, because by digging a bit deeper we understood that it wasn't a problem of stock-outs but more an issue between the hospital and the CENAME that complicated the matter. So if they can help us obtain FP commodities… that could help us find a link that could help us to obtain the commodities without undertaking the procedures of going through this office to get this signed before it is dropped off here…it has been weeks, it takes weeks. (Respondent 5, FGD_03 T3)

In addition to commodities, participants stressed the importance of upper management taking an interest in PPFP.

If they are lacking an interest, if they don't take an interest, If they aren't interested in the project. As a result, let us take the example of the [hospital in arm #2], when you first began at [hospital in arm #2], you see the fact that the Director didn't see the purpose of FP…he had abandoned that unit. However, as soon as they were able to convince him, the unit came back. So I think that if they don't involve themselves, if they don't attribute a degree of importance to FP, the project will be useless. The project will be useless. (Respondent 1, FGD 02 T3)

Overall the structural barriers that were mentioned at baseline remained a concern at endline. Availability of commodities and adequate space to provide services would likely take longer to resolve than the 6 months of the LDP+ intervention. In addition to these structural issues, new issues related to increased integration of FP/PPFP services such as adequate numbers of trained personnel and supervisors will likely be ongoing challenges for hospital management that will need continued attention.

DISCUSSION

While strong leadership and management skills and practices are essential components of efforts to improve FP/PPFP services, it is often difficult to identify a direct connection between upstream interventions and service-delivery outputs (Peters et al., 2009). Our findings suggest that leadership and management plays an important role in service delivery improvement by providing strategic direction, assuring adequate resources, monitoring and evaluating the results of improvement initiatives, providing oversight, and helping to create a learning culture. Study participants consistently mentioned the ability of leaders and managers to facilitate or hinder FP/PPFP improvement initiatives at the level of staffing, resources, training, task integration, communication, supportive feedback, workload, motivation, and culture and climate of the facility.

Because of limited available literature on the connection between building the capacity of leaders and managers to carry out improvement initiatives and service-delivery outcomes, we turned to the constructs of the Consolidated Framework for Implementation Research (CFIR) (Damschroder et al., 2009) as well as Alexander and Hearld's subsequent review of service delivery improvement interventions (Alexander & Hearld, 2011) to further understand the potential links. The CFIR is a compilation of constructs from multiple theoretical implementation frameworks and consists of the following five major domains: (1) intervention characteristics; (2) inner setting; (3) outer setting: (4) characteristics of the individuals involved; and (5) process of the intervention. Alexander and Hearld, through a review of 107 intervention studies, further simplified the major domains as: content of the innovation, organizational processes, and external and internal contexts. The CFIR and the Alexander and Hearld frameworks provide a pragmatic approach for understanding the complex, multi-level systems required to delivery PPFP services. (A full list of the CFIR constructs with definitions can be found in Appendix 2.) **We have organized the subsequent discussion sections using the CFIR framework to discuss the qualitative and quantitative findings from study** (see Figure 3).

External Context

The CFIR defines the outer setting or external context as factors in the external environment that could affect delivery of services (Damschroder et al., 2009). For the purposes of this study, external context refers to anything in the hospitals' external environment that contributes to or impedes the implementation of the PPFP intervention. Specifically this includes external mandates to implement PPFP services, external reimbursement financing and/or incentives for providing PPFP services, and the social-cultural community and patient norms. We also found that national-level FP commodities issues had an effect on the availability of contraceptives and materials necessary for PPFP service-delivery outputs.

As documented in the baseline report (Baba Djara, Conlin, et al., 2015), **low demand for FP/PPFP services** and high demand for maternity and delivery services create challenges for improving FP uptake. Socio-cultural norms for large families, partner opposition to FP, and misconceptions about the side effects of FP methods often deter women from adopting

contraceptives. These socio-cultural norms and lack of adequate information about FP likely contribute to low uptake of FP/PPFP services. While both Arms #1 and #2 saw a significant increase in uptake of services, further increases would likely require changes in socio-cultural norms, which could be fostered in part by more awareness-raising activities on a broader scale. Lack of information and incorrect beliefs about immediate postpartum contraceptive needs and methods contributed to an insufficient number of patients for health-care personnel to complete their clinical certification requirements in a timely manner. However, focus group and interview data at endline suggested that providers' felt that their improved ability to provide appropriate FP counseling — particularly framing FP in the context of healthy timing and spacing of pregnancy (HTSP) — has resulted in improved demand among clients and in the community. Demand for FP/PPFP in the context of healthy timing and spacing for pregnancy (HTSP) has been documented in other studies, especially among younger FP clients (ages 15-24) (Jansen, 2005; Norton, 2005).

Widespread challenges in the **FP commodities supply chain** at the national and local level continue despite donated stocks of key FP commodities and was a major theme of the qualitative results throughout the duration of the study. Even though supply chain problems exist, the availability of donated commodities greatly facilitated rollout of the immediate postpartum clinical training, especially the availability of IUDs provided by the E2A program and other donors; however, we recognize that, alone, this is not a sustainable way to increase contraceptive stock. More effective leadership for assuring adequate stocks of FP commodities, such as the "push" model adopted in Senegal (Daff, Seck, & Belkhayat, 2015) would likely improve FP service delivery.

Despite these external contextual challenges, strong engagement from the MPH/DSF facilitated the rollout. **The strong policy environment and a renewed focus and investment of the MPH in FP, with an emphasis on PPFP**, provided a favorable context to engage with partners. The DSF, although pulled in many directions, has set a vision for improving PPFP services as a key means for making progress in reducing Cameroon's high maternal and infant mortality. This clear vision and mandate provided invaluable support and direction for working with the hospitals and personnel. Greater dissemination and enforcement of PPFP policy at a national and regional level could facilitate service delivery and uptake. (Cleland et al., 2006)

While this was not observed during the course of the study, endline interview participants also emphasized the **potential of performance based financing (PBF) to increase motivation to providing FP/PPFP counseling**. Under the direction of the Ministry of Health, one of the Arm #1 hospitals was setting a PBF framework that was not yet operational by the study endline data collection period. FGD participants expressed the hope that including FP/PPFP indicators in the PBF framework would lead to increased motivation for all hospital units to prioritize FP/PPFP services. They noted, however, that there may be limitations on what targets could be set due to USG family planning compliance for PBF work funded by the United States government. Further follow-up would be necessary to determine if this leads to an increase in FP/PPFP service delivery outputs.

Internal Context

The CFIR defines the inner setting or internal context as factors in the internal environment that could affect delivery of services (Damschroder et al., 2009). For the purposes of this study, internal context refers to anything in the hospital's internal environment that contributes to or impedes work activities related to the PPFP intervention implementation. This includes available resources and support, HR structure/staffing practices, as well as staff workloads. We also found that implementation outcomes were also influenced by structural characteristics of the hospital (size), implementation climate (relative priority, incentives and rewards, and learning environment), as well as readiness for implementation (provider attitudes towards FP/PPFP).

The size of the hospital seemed to influence the capacity for change. **In larger hospitals with more complex and top-down management structures, it took longer for implementation to get started**. In both the Arm #1 and Arm #2 of the study, it took longer at larger hospitals to effectively engage upper management. In Hospital #3, upper management did not fully participate in the initial stakeholder meetings, which affected the number and capacity of LDP+ participants chosen. This led to challenges over the course of the intervention as LDP+ participants from

this hospital struggled with not having an appropriate mandate to carry out change initiatives because of their more junior status. In contrast, participants from the smaller district-level hospital (Hospital #2) in the LDP+ and clinical training arm reported that **the active engagement of the hospital management in the change process contributed to improvements in PPFP services during the intervention**. Respondents felt that upper management's accessibility and support was an important motivating factor in helping them to find solutions to barriers and challenges. This included changing the fee structure for PPFP counseling to simplify the consultation process for the client in one hospital.

In both Arm #1 and Arm #2 hospitals, leaders, managers, and LDP+ participants noted **positive changes in attitudes towards FP/PPFP** among their peers during the course of the intervention. They stated that when providers and staff members share community-level beliefs and misperceptions about FP/PPFP, it is more difficult to have a culture that prioritizes PPFP. Both Arm #1 and Arm #2 hospitals expressed that the clinical training contributed to counteracting misperceptions of staff about PPFP and improved the quality of information given in FP/PPFP counseling sessions. LDP+ participants (Arm #1) particularly stressed that changes in staff attitudes had contributed to a shared sense of responsibility for PPFP, including accountability for maintaining hospital records, flexibility among coworkers to reach patients across departments, and prioritization of PPFP despite busy workloads. LDP+ participants (Arm #1) also stressed the importance of actively advocating with their colleagues to change perceptions.

LDP+ participants in Arm #1 also reported that over the course of the intervention — due in part to the number of staff trained through the clinical program, as well as their improved ability to manage the trained staff — they were **better able to provide coverage for FP/PPFP counseling and services**, contributing to increased service provision. While coverage during the workweek improved, coverage during weekend shifts still remained a challenge.

Despite these positive gains, infrastructure and necessary inputs issues at the facility level — such as **lack of adequate space, equipment, and materials** — often limited the number of clients in both the maternity and FP services. Staff frequently cited inadequate space and beds in the maternity units as constraining factors to integrating FP counseling in post-delivery care. While one LDP+ hospital was able to create a physical space to offer FP services, the lack of space in the maternity unit was generally a barrier that remained at endline. Lack of quantity and quality equipment continues to be problematic. These types of structural problems may require a longer period to resolve than the 8 months of the study intervention.

Both the qualitative and quantitative data showed that IEC materials were lacking at baseline, with most hospitals having materials only in the FP unit. In some hospitals, the number of informative posters in the intervention hospitals (Arms #1 and #2) increased over the course of the intervention to an average of three units with educational materials, but **IEC materials for patients to take with them remained scarce at the facilities**. These types of materials, with information and pictures explaining each method, are important when a client — either a woman or adolescent — has not chosen a method and wants to go home with more information to discuss the options with her husband or other trusted individual. Participants in both Arms #1 and #2 stated that they considered this is be an issue that donors should help with, perhaps based on past experience where many donor-funded programs provide IEC materials to the hospitals.

As mentioned in the discussion of external challenges, **inconsistent application of the FP service fees** across facilities affected the internal context of the intervention as well. Not all health-care personnel were aware of the appropriate fee schedule and it was not consistently applied. This was repeatedly mentioned in the qualitative interviews. Pricing for FP commodities and services also has implications for prioritization of the service at the hospitals. Due to low demand and low pricing for FP commodities and services, study participants mentioned that they did not feel that the FP service was a priority because it did not bring significant receipts for the hospital. This was reflected in the limited space provided for the FP units and inadequately stocked units. While some improvement was made in the intervention hospitals in this area, challenges were not completely resolved over the course of the program.

Irregularities in the internal supply chain for FP commodities also affected FP/PPFP service provision. In addition to the country-level supply chain problems, many participants cited the inconsistent supply of contraceptives at their facility as a deterrent to FP services uptake. Most of the facilities participating in the project had no official stock of contraceptives in the pharmacy throughout the LDP+ intervention and study period. Donations of FP commodities often go directly to the FP unit or gynecology service, where

stock-control procedures are limited. Little or no documentation existed on how these commodities were dispensed. Anecdotal information collected prior to the start of the study suggests that these commodities may be provided to patients with payments outside the financial circuit, but it is difficult to determine without adequate documentation. Participants also frequently mentioned that women had to purchase contraceptives such as implants and injectables outside of the hospital, sometimes through informal channels. In order to have sufficient quantities for clinical training, E2A provided contraceptives to FP units with documentation requirements so that they would be available for providers to complete their certification requirements. Attempts to gather data on FP commodities availability and stock-outs were not successful due to poor and inconsistent record-keeping. In future studies it would be important to find a way to track FP commodities available in the hospital during the intervention as this may have an effect on study outcome measures.

Through the leadership training, participants at one hospital did advocate to include FP commodities in the pharmacy's stock, but internal administrative procedures and slow processing of orders at the national medicine stores did not allow the team to resolve the issue prior to the end of the intervention.

Intervention Content

The CFIR defines the intervention characteristics or content as attributes of the intervention itself that can affect its acceptability and uptake (Damschroder et al., 2009). For the purposes of this study, intervention content refers to any attribute of the PPFP intervention (both E2A and LMG activities) that hospital staff used to assess its appropriateness and usefulness in practice. This would include information on the intervention, staff awareness of the program, and whether the intervention is adaptable to current practices.

We found that the adaptability and experiential nature of the LDP+ process allowed participants to address specific needs within their own context. Participants thought that the **combination of clinical and leadership development** of the intervention facilitated the improvement process. Because the focus of improvement efforts was decided on and developed by the team rather than being developed externally, participants expressed ownership over the program and its results. Finally, LDP+ participants felt that the LDP's straightforward, low-complexity approach would make it more likely that it could be replicated without external expertise and high cost.

Participants in both Arm #1 and Arm #2 attributed increased awareness of the importance of PPFP services to the technical training provided by E2A. Hospital management and participants reported that the number of people trained during the clinical training as well as the leadership communication skills learned during the LDP+ facilitated the spread of information about FP/PPFP within the hospital, leading to more participation in improvement efforts from a larger group of personnel. Participants expressed that the more aware staff were about PPFP, **the more willing they were to participate**. On the other hand, the lack of adequate information about PPFP in one Arm #2 hospital was mentioned as contributing to staff resistance.

The **participatory, experiential nature of the clinical intervention** allowed caregivers to immediately apply what they learned and **contributed to confidence in their ability to improve the quality of care** (Wang, Li, Pang, Liang, & Su, 2016). LDP+ participants interviewed mentioned that the clinical quality and acceptability of care had increased as they were better able to manage side effects and provide a safe, welcoming space for FP/PPFP clients. In addition, the LDP+ participants mentioned that **the hands-on, team-based planning and implementation of the LDP+ contributed to a sense of ownership and responsibility** for improving FP/PPFP services.

Intervention Process

The CFIR defines the intervention process as characteristics of how the intervention was implemented (Damschroder et al., 2009). For the purposes of this study, intervention process refers to activities carried out in support of the implementation of the PPFP intervention. This would include communication and feedback about the intervention, education and training for staff to acquire skills necessary to implement the PPFP intervention, leadership of the PPFP intervention, as well as efforts

to integrate PPFP tasks into current units/procedures. In addition, we found that achieving objectives was facilitated by involving appropriate individuals in the intervention as well as the team's process of documenting, reflecting, and evaluating results for themselves as well as with upper management.

One of the major successes of the E2A and LMG collaboration was that **a critical mass of providers was trained in PPFP technical skills**. This, along with the **leadership and management training in Arm #1 hospitals**, provided the hospitals with the training and tools to better assess how to best utilize staff trained in PPFP and how to document and sustain the work being done. The number of providers trained in PPFP clinical skills was frequently cited as contributing to both improved quantity and quality of service delivery.

At baseline, there was limited documentation of FP service delivery. This was especially the case with FP counseling and services offered outside the FP unit, which likely resulted in under-reporting of services. Both LMG and E2A worked with facilities at the beginning of the projects to set up data collection forms and helped to explain new reporting formats to all facilities in Arm #1 and Arm #2 of the study. We also noted frequent inaccuracies in data collection registers and misunderstanding of indicator definitions. To address this, both the LMG and E2A projects provided training on records keeping and data collection and added extra effort to project activities to assure data quality for the program. A significant area of improvement for the LDP+ teams **was better systems for documenting FP work**. The behavioral self-assessments showed significant reported improvement in M&E-related behaviors, and the LDP+ participants spoke of improved systems to document FP statistics in order to show the volume of work they were undertaking as well as using data for informed decisions. The LDP+ team members were aware that good documentation would demonstrate the volume of need from clients and could help to prioritize family planning within their facilities.

Initially, the implementation of the E2A/LMG intervention was delayed because some administrators in one of the hospitals had closed the FP unit when appointed to the hospital, and they categorically refused to meet with project staff to discuss the project. The hospital has since begun to offer FP services, with advocacy from the director of the DSF (MSP). This has led to a large increase in the number of service-delivery units offering FP in this hospital, but this took some time to get started and is still not fully operational. For the most part though, **hospital leadership was supportive** of efforts to improve PPFP clinical and leadership capacity in their institutions. By the end of the LDP+ program, most hospital administrators in the participating hospitals were positive about the training and supportive of the teams. However, in the beginning, **a few administrators did not fully engage**, as previously mentioned.

Those leaders trained in the LDP+ also expressed at midline that their attitudes towards FP and their attitudes and behaviors towards problems had changed. As a result of this, they said they sometimes felt a separation from their health-care colleagues for reasons including that: they approached problems differently; they were more determined to improve services for their clients; they felt empowered to find solutions for problems; and they were less likely to give up in the face of challenges. However, at endline, this was no longer mentioned by participants. They noted that they were seen by management and coworkers as an **inspirational team** managing the change-management process. The team members reported that peers looked to them as resources for both PPFP and general problem solving. Other managers and leaders at LDP+ facilities had similar opinions of the teams' roles in changing the culture of PPFP. This aligns with the increase in inspiring behaviors reported by the LDP+ participants in their behavioral self-assessment at endline.

Leadership and Management's Contribution to PPFP Service Delivery Improvements

Building the capacity of leaders and managers to successfully negotiate improvement processes is an important, yet often neglected, part of service-delivery strengthening initiatives. The participatory, experiential approach of the LDP+, which emphasizes learning by doing, was particularly suited to addressing the challenges to improved FP/PPFP services. With theory-based leadership development, it is often not possible to measure if or how theory is translated into behavior. Since the LDP+ takes place over an average of a 6-month period with follow-up coaching and mentoring, **participants have a chance to try new**

behaviors and discuss results with team members and facilitators, providing the opportunity to regularly incorporate these new practices into their work.

The LDP+ has been used in a variety of developing country contexts focused on family planning and reproductive health, in addition to other key health-care challenges. Documentation of improvements in the Aswan Governorate in Egypt to increase family planning visits was scaled up locally after USAID funding ended, and LDP+ participants continued to identify and address challenges using this approach (Mansour, Mansour, and Swesy, 2010). In addition, the LDP+ has been implemented in many contexts around the world throughout the project lifespan of both the LMS and LMG projects funded by USAID. An evaluation of an MSH's leadership development program in 2005 found that the majority of health centers (10 of 11) participating in the program showed health-service delivery improvements over the year the program was implemented. Similarly, in Kenya, a quasi-experimental study looked at service-delivery outcomes for 67 teams implementing the LDP+ in district-level facilities. The 67 teams focused on a variety of service-delivery improvement projects. The study found that, at baseline, the average coverage rate for health-service delivery indicators was 38%, which increased to 48% percent at endline, indicating that most teams were able to improve their measurable results (Seims, et al., 2012). Across both studies, the authors found that integrating leadership strengthening into the day-to-day challenges within the facilities was a major strength of the program (Perry, 2008; Seims et al., 2012).

In this study, mid-level managers reported having greater confidence in their ability to lead the improvement process as change agents and having an improved capacity to provide high-quality FP counseling and clinical services. Similar to the findings by Perry, facility staff in Arm #1 mentioned that since the training, they no longer waited passively for others to solve problems, but that they proactively communicated their needs and used the Challenge Model approach to problem solve.

Providers in both Arm #1 and Arm #2 felt that they had made strides to improve FP counseling, particularly in offering more consistent one-on-one counseling across the continuum of care. This is reflected in both the quantitative and qualitative findings from the study, as both the ANC and PNC counseling rates were significantly improved in Arm #1 at 3 months post intervention. The LDP+ team focused their action-planning process on improving FP counseling with postpartum women, but the improvements in both PNC and ANC suggest that counseling improvements were seen across the continuum of care. Furthermore, the improvements in counseling rates was significantly greater in Arm #1 when compared to Arm #2, suggesting that the improvements were facilitated by the incorporation of leadership training in addition to the clinical training.

FUTURE RESEARCH PRIORITIES AND IMPLICATIONS FOR SERVICE DELIVERY

The question of just how leadership and management strengthening adds value to clinical-capacity building in service delivery improvement projects is particularly complex, and it is only partially addressed by the results of this study. As previously discussed, upstream interventions such as the LDP+ are difficult to quantify and connect directly to service delivery results, while more proximal interventions — such as clinical training and resource provision — are perhaps more easily quantifiable. As presented in the discussion above, qualitative data from this study suggests that leadership and management capacity building may contribute to removing barriers in the internal context and facilitate intervention processes, so resulting outcomes are greater than with clinical capacity building alone. However, it is clear from the qualitative data that without the large number of service providers trained in the clinical intervention, improvements in PPFP service delivery may not have been as robust.

The implications of this study's findings suggest that improving health workers' capacity to lead and manage may facilitate their ability to address barriers to service-delivery improvements. While clinical training, resources, and supportive supervision can lead to measurable improvements in PPFP service delivery, less tangible and quantifiable skills — such as teamwork, collaboration, effective communication, problem-solving abilities, human resource management, oversight, and influencing institutional culture and climate — may be especially important in helping to improve FP/PPFP services. This may be especially true of service delivery areas such as FP/PPFP, where cultural norms and practices can have a strong influence on service providers' personal views and may be reflected in practice. Clinical training alone may not be enough to counteract personal and institutional climate and culture in these settings.

The lack of agreement on how to define and measure leadership and management competencies and a lack of rigorous study of the pathways through which leadership and management might influence service delivery are challenges that should be the focus of future research. One of the challenges of this study was identifying validated quantitative measures of the interim links between building capacity in leadership and management and service-delivery outcomes. Due to the lack of previous prospective studies that clearly identify concrete links between changes in leadership and management behaviors and improvements in service delivery, we emphasized qualitative measures to help identify examples of potential links that can be further studied. While the leadership and management behavioral self-assessment identified perceived changes in behaviors, further study is needed to quantify how those behaviors translate into better collaboration, teamwork, and changes in practice, climate, and culture. Robust quantitative measures of these concepts need further development, and the behavioral self-assessment should continue to be applied in different context to further refine the questions associated with the LDP+ leadership and management practices.

Conclusion

It is clear from the findings of this study that complex FP/PPFP service delivery interventions could benefit from including leadership and management capacity building as a strategic part of improvement projects. To add value to service delivery projects over and above clinical capacity building alone, stakeholder engagement and alignment should be improved from the beginning. Further, change agents should be identified and provided with the necessary leadership and management skills to facilitate the improvement process and to find effective solutions to barriers. More study is needed to clearly identify and quantitatively measure causal links that contribute to these changes. ■

APPENDIX 1: LDP+ INTEGRATED PRACTICES FOR HIGH PERFORMING HEALTH SYSTEMS

LEADING

SCAN

- Identify client and stakeholder needs and priorities
- Recognize trends, opportunities, and risks that affect the organization
- Look for best practices
- Identify staff capacities and constraints
- Know yourself, your staff, and your organization—values, strengths, and weaknesses

ORGANIZATIONAL OUTCOME
Managers have up-to-date, valid knowledge of their clients, and the organization and its context; they know how their behavior affects others.

FOCUS

- Articulate the organization's mission and strategy
- Identify critical challenges
- Link goals with the overall organizational strategy
- Determine key priorities for action
- Create a common picture of desired results

ORGANIZATIONAL OUTCOME
The organization's work is directed by a well-defined mission and strategy, and priorities are clear.

ALIGN & MOBILIZE

- Ensure congruence of values, mission, strategy, structure, systems, and daily actions
- Facilitate teamwork
- Unite key stakeholders around an inspiring vision
- Link goals with rewards and recognition
- Enlist stakeholders to commit resources

ORGANIZATIONAL OUTCOME
Internal and external stakeholders understand and support the organization's goals and have mobilized resources to reach these goals.

INSPIRE

- Match deeds to words
- Demonstrate honesty in interactions
- Show trust and confidence in staff, acknowledge the contributions of others
- Provide staff with challenges, feedback, and support
- Be a model of creativity, innovation, and learning

ORGANIZATIONAL OUTCOME
The organization's climate is one of continuous learning, and staff show commitment, even when setbacks occur.

MANAGING

PLAN

- Set short-term organizational goals and performance objectives
- Develop multi-year and annual plans
- Allocate adequate resources (money, people, and materials)
- Anticipate and reduce risks

ORGANIZATIONAL OUTCOME
The organization has defined results, assigned resources, and developed an operational plan.

ORGANIZE

- Develop a structure that provides accountability and delineates authority
- Ensure that systems for human resource management, finance, logistics, quality assurance, operations, information, and marketing effectively support the plan
- Strengthen work processes to implement the plan
- Align staff capacities with planned activities

ORGANIZATIONAL OUTCOME
The organization has functional structures, systems, and processes for efficient operations; staff are organized and aware of job responsibilities and expectations.

IMPLEMENT

- Integrate systems and coordinate work flow
- Balance competing demands
- Routinely use data for decision-making
- Co-ordinate activities with other programs and sectors
- Adjust plans and resources as circumstances change

ORGANIZATIONAL OUTCOME
Activities are carried out efficiently, effectively, and responsively.

MONITOR & EVALUATE

- Monitor and reflect on progress against plans
- Provide feedback
- Identify needed changes
- Improve work processes, procedures, and tools

ORGANIZATIONAL OUTCOME
The organization continuously updates information about the status of achievements and results, and applies ongoing learning and knowledge.

GOVERNING

CULTIVATE ACCOUNTABILITY

- Sustain a culture of integrity and openness that serves the public interest
- Establish, practice and enforce codes of conduct upholding ethical and moral integrity
- Embed accountability into the institution
- Make all reports on finances activities, plans, and outcomes available to the public and the stakeholders
- Establish a formal consultation mechanism through which people may voice concerns and provide feedback

ORGANIZATIONAL OUTCOME
Those who govern are accountable to those who are governed. The decision making is open and transparent. The decisions serve public interest.

ENGAGE STAKEHOLDERS

- Identify and invite participation from all parties affected by the governing process
- Empower marginalized voices, including women, by giving them a voice in formal decision-making structures and processes
- Create and maintain a safe space for the sharing of ideas
- Provide an independent conflict resolution mechanism
- Elicit and respond to all forms of feedback in a timely manner
- Establish alliances for joint action at whole-of-government and whole-of-society levels

ORGANIZATIONAL OUTCOME
The jurisdiction/sector/organization has an inclusive and collaborative process for making decisions to achieve the shared goals.

SET SHARED DIRECTION

- Prepare, document and implement a shared action plan to achieve the mission and vision of the organization
- Set up accountability mechanisms for achieving the mission and vision using measurable indicators
- Advocate on behalf of stakeholders' needs and concerns
- Oversee the realization of the shared goals and the desired outcomes

ORGANIZATIONAL OUTCOME
The jurisdiction/sector/organization has a shared action plan capable of achieving objectives and outcomes jointly defined by those who govern and those who are governed.

STEWARD RESOURCES

- Ethically and efficiently raise and deploy the resources to accomplish the mission and the vision and to serve stakeholders and beneficiaries
- Collect, analyze, and use information and evidence for making decisions
- Align resources in the health system and it design with the shared goals
- Build capacity to use resources in a way that maximizes the health and well-being of the public
- Inform and allow the public opportunities to monitor the raising, allocation and use of resources, and realization of the outcomes

ORGANIZATIONAL OUTCOME
The institution has adequate resources for achieving the shared goals, and the resources are raised and used ethically and efficiently to achieve the desired objectives and outcomes.

APPENDIX 2: CONSOLIDATED FRAMEWORK FOR IMPLEMENTATION RESEARCH FRAMEWORK TABLES

CONSTRUCT	DEFINITION
CONTENT	Attributes of a QI intervention that organizational members use to assess its appropriateness and usefulness in practice
Information accessibility	Organizational practices that facilitate or impede a potential user's ability to acquire information about a QI intervention
Applicability	Organizational factors and intervention attributes that facilitate or impede the implementation of a QI intervention in routine practice
Awareness	Degree to which organizational members were aware of the QI intervention
CONTEXT	Aspects of an organization's environment, both internal and external, that influence implementation by imposing constraints, providing incentives, or shaping behavior of organizational members
External	An organization's external environment that contributes to or impedes work activities related to QI implementation
Competition	Aspects of an organization's external environment that affect its survival or ability to successfully counter the actions of other actors in its market
External mandates	Directives to implement a QI innovation or some aspect of a QI innovation by an external organization
Reimbursement	External financial resources/incentives used to initiate or sustain the implementation of a QI innovation, or external financial resources/incentives that may divert resources from these efforts
Internal	An organization's internal environment that contributes to or impedes work activities related to QI implementation
Culture/climate	Set of attitudes and beliefs general shared by members of an organization
Resources/support	Access to or the provision of financial, technical, and informational resources necessary to complete work activities, including the amount of money devoted to QI implementation
Structure/staffing	Aspects of the organization that shape work activities and the human resources that perform the work (ownership type, size, staff, turnover, staff qualifications, etc.)
Workload	Level of work activity expected of a person as well as her/her ability to manage this level of work
Structural characteristics	The social architecture, age, maturity, and size of an organization
Implementation climate	The absorptive capacity for change, receptivity to the intervention, extent to which the intervention will be rewarded, supported, expected within the organization
Tension for change	Degree to which SH perceive the current situation to be intolerable/needing change
Relative priority	Individual's shared perception of the importance of the implementation within the organization
Incentives & rewards	Extrinsic incentives such as goal-sharing awards, performance reviews, promotions, and raises in salary, increased stature or respect
Learning climate	Climate in which leaders are willing to admit failures, need for input, team members feel essential, valued in the change process, individuals feel safe to try new tasks, sufficient time and space for reflective thinking/evaluation
Readiness for implementation	Tangible and immediate indicators of organizational commitment to its decision to implement an intervention
Leadership engagement	Commitment, involvement, and accountability of leaders and managers with the implementation

CONSTRUCT	DEFINITION
Individual characteristics	Individuals KAB, self-efficacy, readiness to change, identification with the organization, personal attributes
Self-efficacy	Individual's belief in their own capacity to execute action to achieve implementation goals
Individual readiness to change	Characteristics of the individual's change process
Identification with the organization	How the individual perceives the organization and their relationship and degree of commitment to the organization
PROCESS	Activities undertaken as an organization in support of a given outcome or goal (implementation)
Communication/ feedback	Activities associated with informing organizational members of important events and changes occurring within the organization (goal setting/articulation of those goals, frequency of feedback regarding guideline adherence or deviation, use of regular meetings to update staff members about implementation progress)
Education	Distribution of educational materials and clinical recommendations to practitioners and patients, or practitioner participation in educational forums such as conferences and seminars
Leadership	Active involvement of formal and informal leaders in the implementation of QI including the use of physician champions and opinion leaders as well as top management support of and participation in QI activities
Task integration	Development of new work processes or the redesign of existing work processes through the consolidation or disaggregation of work activities and behaviors (introduction of new or additional documentation requirements, technology interface difficulties that impede data input, and changes in the physical design of the work space when introducing new technology or practice)
Planning	Degree to which a scheme or method for implementing the intervention is developed in advance
Engaging	Degree to which appropriate individuals are involved in the implementation
Executing	Degree to which the intervention was carried out as planned
Reflecting & Evaluating	Qualitative and quantitative feedback about the progress and quality of implementation accompanied with regular personal and team debriefing about progress and experience

APPENDIX 3: INDEPENDENT, CONTROL, AND DEPENDENT VARIABLES

INDEPENDENT VARIABLE	CONTROL VARIABLES	DEPENDENT VARIABLES
Participation in LDP+ intervention	Hospital level: ■ Type of Hospital: Reference/District ■ Governance structure: Autonomous/MOH ■ Hospital capacity: Beds/# OB/GYNS/ #MNCH Nurses/# personnel trained FP ■ Patient load; # of deliveries ■ Previous FP/PPFP training ■ PPFP service delivery protocol/policy ■ Individual Level ■ Gender (M/F) ■ Age ■ Post: Administrative/Non-administrative ■ # of years of service ■ # of years in an admin post ■ Previous L+M+G training	■ L & M practices ■ Perceived WRS ■ # FP service delivery points ■ # of contraceptive options available ■ # of service delivery points with IEC materials available for patients ■ # of service delivery points with PPFP job aids for providers ■ % of ANC women receiving FP/SRH counseling (previous 3 months) ■ % of women who delivery in the hospital receiving FP/SRH counseling (previous 3 months) ■ CYP by method type (previous 3 months)

APPENDIX 4: BEHAVIORAL SELF-ASSESSMENT CRONBACH'S ALPHA ANALYSIS

The leadership and management behavioral assessment scale consisted of 21 items. The scale was found to be highly reliable (21 items; a = 0.92). Specifically, the scale has high internal consistency i.e., items of the scale are very closely related as a group. A reliability coefficient of .70 or higher is considered "acceptable" in most social science research situations.

DOMAIN/PRACTICE SUB-SCALE	NUMBER OF ITEMS	ITEM NUMBERS	CRONBACH'S ALPHA
Leadership	11	Q1 to Q11	0.87
Management	10	Q12 to Q21	0.91

Cronbach's Alpha was also estimated for the sub-scales at domain and practice level. Leadership, denoted with an 'L' in the first column and management domain, denoted with an 'M', sub-scales were also found to be highly reliable; items of these two sub-scales are very closely related as a group. Internal consistency at practice level sub-scales is acceptable in case of one leadership practice (focusing) and all four management practices. See table, below.

DOMAIN/PRACTICE SUB-SCALE		NUMBER OF ITEMS	ITEM NUMBERS	CRONBACH'S ALPHA
L	Scan	4	Q1 to Q4	0.69
L	Focus	2	Q5 and Q6	0.83
L	Inspire	3	Q7 to Q9	0.67
L	Align and mobilize	2	Q10 to Q11	0.61
M	Plan	2	Q12 to Q13	0.78
M	Organize	2	Q14 to Q15	0.78
M	Implement	3	Q16 to Q18	0.81
M	Monitor and evaluate	3	Q19 to Q21	0.81

The 21 questions included are:

Question 1: Looked at any data for trends?

Question 2: Conducted any activity to better understand your team members or your organization?

Question 3: Conducted any activity to review your team or your organization's capacity?

Question 4: Conducted any activities to look for examples of opportunities or best practices outside of your organization?

Question 5: Carried out a prioritization activity?

Question 6: Used data and trends to identify any critical workplace challenges that could prevent the organization from achieving its objectives?

Question 7: Kept yourself and your staff motivated despite any hardships or obstacles that may get in the way of achieving your organization's goals?

Question 8: Publicly praised or acknowledged others for their work?

Question 9: Discussed challenges with your team and given them a voice in finding the solution?

Question 10: Been able to mobilize additional resources to carry out the organization's operational plan?

Question 11: Brought together multiple stakeholders to discuss or address a shared challenge?

Question 12: Met as a group to develop a team or organizational plan that defines activities, timelines, and responsibilities?

Question 13: Communicated team or organizational plans to relevant stakeholders?

Question 14: Met as a team to define and distribute accountability for achieving your operational plan objectives?

Question 15: Assessed and aligned staff capacity to carry out planned activities?

Question 16: Met regularly and used data for decision-making during program implementation?

Question 17: Used data to make necessary adjustments to resource allocation or operational plan to overcome obstacles to achieving your program's objectives?

Question 18: Coordinated with other programs or delegated responsibilities as necessary to help you achieve your program's objectives?

Question 19: Tracked and recorded data documenting your activities?

Question 20: Review progress against planned activities and deliverables?

Question 21: Reviewed data to determine whether or not activities are producing the intended results?

APPENDIX 5: MULTIVARIATE ANALYSIS- HEALTH SERVICE DELIVERY OUTCOMES

MANOVA: To avoid multicollinearity in MANOVA, the correlation between the dependent variables should be low to moderate. If the correlation were .60 (some argue .80) or above, one would consider either making a composite variable (in which the highly correlated variables were summed or averaged) or eliminating one of the dependent variables.

For this reason prior to conducting the MANOVA, Pearson correlations were performed between all of the dependent variables in order to test the MANOVA assumption that the dependent variables would be correlated with each other in the moderate range (Meyer, Gampst, & Guarino, 2006). The table below details the coefficients of correlation.

	ANC	PNC	CYP
ANC	1.0000	--	--
PNC	0.9247	1.0000	--
CYP	0.1106	0.3118	1.0000

Since ANC and PNC are highly correlated (the coefficient of correlation is 0.9247), we have dropped ANC. The remaining two outcome variables, PNC and CYP, have low to moderate correlation (the coefficient of correlation is 0.3118); we have used them as dependent variables in MANOVA and MANCOVA analysis.

A one-way three-level multivariate analysis of variance (MANOVA) was conducted to test the hypothesis that there would be one or more mean differences across three arms. There was a statistically significant difference in FP/SRH counseling to new mothers and couple years of protection provided by a hospital across three arms, $F(2, 12) = 11.87$, $p < .0000$; Wilk's $\Lambda = 0.1003$, $p < .0000$; Pillai's Trace = 1.0232, $p = .0013$.

The overall multivariate test was significant, which means that differences between the arms exist. To find where the differences lie, we followed up with post-hoc tests. We began with the multivariate test of arm 1 versus the average of arms 2 and 3. This tested the hypothesis that the mean of arms 2 and 3 is equal to the mean of arm 1. We found that arm 1 is statistically significantly different from the average of arms 2 and 3, $F(1, 12) = 40.54$, $p < .0000$; Wilk's $\Lambda = 0.$ 0.1195, $p < .0000$; Pillai's Trace = 0.8805, $p < .0000$. Then we compared arm 2 to arm 3. The results indicate that arm 2 is not statistically significantly different from arm 3, $F(1, 12) = 40.54$, $p = 0.3956$; Wilk's $\Lambda = 0.$ 0.8449, $p = .3956$; Pillai's Trace = 0.1551, $p = .3956$.

One-way two-level multivariate analysis of variance (MANOVA) yielded similar results. This analysis tested the hypothesis that there would be a mean difference between LDP+ intervention arm on one hand and the remaining two arms on the other hand. There was a statistically significant difference in mean FP/SRH counseling to the new mothers and couple years of protection provided based on whether the arm had hospitals that had implemented LDP+ intervention, $F(2, 12) = 44.54$, $p < .0000$; Wilk's $\Lambda = 0.1187$ and $p < .0000$; Pillai's Trace = .8813, $p < .0000$. Thus, there was a statistically significant difference in outcomes based on whether or not the LDP+ intervention was implemented in the hospital.

MANCOVA: One-way three-level multivariate analysis of variance (MANCOVA) was conducted to test the hypothesis that there would be one or more mean differences across three arms controlling for covariates. All four multivariate tests (Wilks' lambda, Pillai's trace, Lawley-Hotelling trace, and Roy's largest root) remained significant when controlled for hospital type (referral or district), governance structure (autonomous or ministry governed), number of FP/RH trainings at the hospital, and existence of FP/RH training policy –with one covariate at a time. The multivariate outcome is much stronger after applying covariates; it would appear that covariate reduces some of the error variance. There is a highly significant multivariate effect across arms for the combined dependent variables of postnatal FP counseling rate and couple years of protection. We conclude that the effects of LDP+ intervention on the two health service outcomes is still significant, even after controlling for the effects of covariates on the two outcomes.

APPENDIX 6: DIFFERENCE-IN-DIFFERENCES ANALYSIS—HEALTH SERVICE DELIVERY OUTCOMES

Summary result

Overall, the impact of LDP+ and clinical intervention is summarized in the following table.

MEASURE		LDP+ VS. CLINICAL INTERVENTION (ARM 1 vs. ARM 2)	LDP+ VS. NO INTERVENTION (ARM 1 vs. ARM 3)	CLINICAL VS. NO INTERVENTION (ARM 2 vs. ARM 3)
1	% of ANC women receiving FP/SRH counseling	LDP+ intervention increased a hospital's antenatal counseling rate by 36% (Power 0.40)	LDP+ intervention increased a hospital's antenatal counseling rate by 54% (Power 0.58)	Clinical intervention increased a hospital's antenatal counseling rate by 12% (Power 0.25)
2	% of women who deliver in the hospital receiving FP/SRH counseling	LDP+ intervention increased a hospital's postnatal counseling rate by 32% (Power 0.67)	LDP+ intervention increased a hospital's postnatal counseling rate by 69% (Power 0.29)	Clinical intervention did not have impact on postnatal counseling rate (Power 0.33)
3	Couple Years of Protection	LDP+ intervention was associated with decrease in couple years of protection offered by a hospital by 13 couple years (Power 1.00)	LDP+ intervention was associated with decrease in couple years of protection offered by a hospital by 17 couple years (Power 1.00)	Clinical intervention increased couple years of protection offered by a hospital by 23 couple years (Power 1.00)

Arm #1 vs. Arm #2

Arm #1 is exposed to a treatment (LDP+ intervention) in the second period but not in the first period. Arm #2 is not exposed to the treatment during either period. The average gain in the second group is subtracted from the average gain in the first group.

Model 1 has three key variables typical of difference-in-differences. Next we added two covariates, hospital type (referral or district) and governance structure (autonomous or ministry governed), in Model 2. In model 3, we further added the number of maternity beds in the hospital. Finally in the full model or Model 4, we added number of FP/RH trainings conducted and existence of FP/RH training policy at the hospital.

The coefficient on treat X post (DD) variable is statistically significant for antenatal counseling rate as dependent variables at 0.01 level in all the four models. It is statistically significant for postnatal counseling rate at 0.05 level in the final model. There were no statistically significant difference in terms of antenatal counseling rate at the baseline between the treatment arm (Arm #1) and E2A intervention arm (Arm #2) but postnatal counseling rate was higher at baseline in arm 1. Moreover, there was a statistically significant secular trend of increase in the postnatal counseling rate but not in antenatal counseling rate. Treatment i.e., LDP+ intervention significantly predicted counseling rates and also explained a significant proportion of variance in antenatal counseling rate, $R^2 = .94$, $F(7, 16) = 37.91$, $p < .001$ and postnatal counseling rate, $R^2 = .92$, $F(7, 15) = 23.72$, $p < .001$. On average, LDP+ intervention plus the clinical intervention increased a hospital's antenatal counseling rate by 36% and postnatal counseling rate by 32% controlling for hospital type (referral or district), governance structure (autonomous or ministry governed), number of maternity beds, number of FP/RH trainings, and existence of FP/RH training policy at the hospital.

Table: Summary of Hierarchical Regression Analysis for Variables Predicting Antenatal and Postnatal Counseling Rates and Couple Years of Protection (N = 24) Arm #1 vs. Arm #2

	Model 1			Model 2			Model 3			Model 4		
Variable	*B*	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β
% of ANC women receiving FP/SRH counseling (ANC)												
treat	0.00	0.04	0.00	0 .03	0.05	0.07	0 .03	0.05	0.07	0 .06	0.05	0.13
post	0.13**	0.04	0.27**	0.13**	0.04	0.27**	0.13**	0.04	0.27**	0.19	0.13	0.39
treat x post	0.43**	0.06	0.77**	0 .43**	0.05	0.77**	0 .43**	0.05	0.77**	0 .36**	0.08	0.66**
gov				-0.07	0.05	-0.12	-0.06	0.04	-0.12	-0.07	0.05	-0.12
hosp				0.00	0.03	0.00						
bed							0.00	0.00	0.00	0.00	0.00	0.01
trainings										-0.00	0.08	-0.02
policy										0.06	0.04	-0.13
R^2	0.92			0.93			0.93			0.94		
F for change in R^2	080.72**			50.47 **			50.47 **			37.91 **		
% of women who deliver in the hospital receiving FP/SRH counseling (PNC)												
treat	0.11	0.07	0.17	0.09	0.08	0.15	0.10	0.08	0.16	0.20*	0.09	0.33*
post	0.09	0.07	0.15	0.10	0.07	0.16	0.10	0.07	0.16	0.60*	0.21	0.96*
treat x post	0.52**	0.10	0.73**	0.51**	0.10	0.71**	0.51**	0.10	0.72**	0.32*	0.12	0.44*
gov				0.04	0.10	0.06	0.00	0.08	0.00	0.08	0.08	0.11
hosp				-0.09	0.07	-0.15						
bed							-0.00	0.00	-0.12	-0.00*	0.00	-0.30*
trainings										0.30*	0.13	0.63*
policy										-0.06	0.06	-0.09
R^2	0.8699			0.8846			0.8846			0.9172		
F for change in R^2	42.34 **			26.05 **			26.05 **			23.72 **		
Couple Years of Protection (CYP)												
treat	4.67	8.58	0.15	-15.56**	1.97	-0.51**	-13.71**	1.94	-0.45**	-10.04 **	0.43	-0.33 **
post	15.90	8.58	0.52	15.90**	1.60	0.52**	15.90 **	1.60	0.52**	35.97**	1.04	1.19**
treat x post	-6.57	12.13	-0.18	-6.57*	2.27	-0.18*	-6.57*	2.27	-0.18*	-13.26**	0.57	-0.38**
gov				40.49**	2.27	1.16**	24.43 **	1.85	0.70**	28.27 **	0.42	0.81 **
hosp				-37.66 **	1.60	-1.24**						
bed							-0.61**	0.02	-1.03**	-0.72**	0.007	-1.22 **
trainings										13.38	0.66	0.61
policy												
R^2	0.1892			0.9743			0.9743			0.9990		
F for change in R^2	1.56			136.72**			136.72 **			2770.2 **		

*$p < .05$. **$p < .01$.

For couple years of protection as outcome variable, the coefficient on treat X post (DD) variable is statistically significant at 0.01 level in full model, $R^2 = .999$, $F(6, 17) = 2770$, $p = 0.0000$. On average, LDP+ intervention combined with the clinical intervention was associated with decrease in couple years of protection offered by a hospital by 13 couple years controlling for the hospital type (referral or district), governance structure (autonomous or ministry governed), number of maternity beds in the hospital, and number of FP/RH trainings conducted at the hospital.

Power Analysis

We assessed the power of our difference-in-differences regression model to detect the effect size we detected at 0.05 level given our sample size of 24 observations using post-estimation powerreg command in Stata. For antenatal counseling rate analysis, the power of our model was 0.40. It was 0.67 for postnatal counseling rate analysis. Counseling rate regression had low power given our modest sample size whereas the difference-in-differences regression model for couple years of protection had 1.00 power. The number of observations needed for this analysis was 13 whereas we had 24 observations in the analysis sample.

Arm #1 vs. Arm #3

Arm #1 is exposed to a treatment (LDP+ intervention) in the second period but not in the first period. Arm #3 is not exposed to the LDP+ intervention during either period. The average gain in the second group is subtracted from the average gain in the first group.

The coefficient on treat X post (DD) variable is statistically significant for antenatal and postnatal counseling rates as dependent variables at 0.01 level in all the four models. There were no statistically significant difference in terms of these two outcome variables at the baseline between the treatment arm (Arm #1) and control arm (Arm #3). There was no statistically significant secular trend of increase in the antenatal and postnatal counseling rates. Treatment i.e., LDP+ intervention significantly predicted counseling rates and also explained a significant proportion of variance in antenatal counseling rate, $R^2 = .95$, $F(7, 16) = 46.11$, $p < .001$ and postnatal counseling rate, $R^2 = .95$, $F(7, 13) = 33.89$, $p < .001$. On average, LDP+ intervention increased a hospital's antenatal counseling rate by 54% and postnatal counseling rate by 69% controlling for hospital type (referral or district), governance structure (autonomous or ministry governed), number of maternity beds, number of FP/RH trainings, and existence of FP/RH training policy at the hospital.

For couple years of protection as outcome variable, the coefficient on treat X post (DD) variable is statistically significant at 0.01 level in the full model, $R^2 = .99$, $F(6, 17) = 1441$, $p < 0.001$. On average, LDP+ intervention decreased couple years of protection offered by a hospital by 17 couple years controlling for the covariates mentioned above.

Power Analysis

We assessed the power of our difference-in-differences regression model to detect the effect size we detected at 0.05 level given our sample size of 24 observations using post-estimation powerreg command in Stata. For antenatal counseling rate analysis, the power of our model was 0.58. It was 0.29 for postnatal counseling rate analysis. Counseling rate regression had low power given our modest sample size whereas the difference-in-differences regression model for couple years of protection had 1.00 power. The number of observations needed for this analysis was 12 whereas we had 24 observations in the analysis sample.

Arm #2 vs. Arm #3

Arm 2 is exposed to a treatment (clinical intervention) in the second period but not in the first period. Arm 3 is not exposed to the treatment during either period. The average gain in the second group is subtracted from the average gain in the first group.

The coefficient on treat X post (DD) variable is statistically significant for antenatal counseling rate as dependent variables at 0.01 level in all the four models. On the contrary, it is not significant for postnatal counseling rate. There were no statistically significant difference in terms of these two outcome variables at the baseline between the treatment arm (Arm #2) and control arm (Arm #3). Moreover, there was no statistically significant secular trend of increase in the ante and postnatal counseling rates. Treatment i.e., clinical intervention significantly

Table: Summary of Hierarchical Regression Analysis for Variables Predicting Antenatal and Postnatal Counseling Rates and Couple Years of Protection (N = 24) Arm #1 vs. Arm #3

	Model 1			Model 2			Model 3			Model 4		
Variable	*B*	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β
% of ANC women receiving FP/SRH counseling (ANC)												
treat	0.00	0.04	0.00	0.00	0.04	0.00	0.04	0.04	0.08	0.08	0.05	0.17
post	0.02	0.04	0.04	0.02	0.04	0.04	0.02	0.04	0.04	0.04	0.05	0.08
treat x post	0.54**	0.05	0.93**	0.54**	0.05	0.93**	0.54**	0.05	0.93**	0.54**	0.05	0.93**
gov				-0.22	0.02	-0.04	-0.59	0.36	-1.17	-0.59	0.34	-1.17
hosp												
bed							0.01	0.00	1.13	0.01	0.00	1.13
trainings										0.02	0.03	0.05
policy										-0.06	0.03	-0.11
R^2	0.9328			0.9348			0.9428			0.9528		
F for change in R^2	92.52**			68.11**			59.31 **			46.11**		
% of women who deliver in the hospital receiving FP/SRH counseling (PNC)												
treat	0.05	0.05	0.08	0.05	0.05	0.08	0.09	0.05	0.14	0.11	0.08	0.17
post	-0.07	0.06	-0.11	-0.07	0.06	-0.12	-0.07	0.06	-0.11	-0.09	0.10	-0.14
treat x post	0.69**	0.08	1.00**	0.70**	0.08	1.00**	0.69**	0.08	0.99**	0.69**	0.08	1.00**
gov				-0.02	0.03	-0.03	-0.50	0.03	-0.80	-0.46	0.53	-0.74
hosp												
bed							0.01	0.01	0.77	0.01	0.01	0.71
trainings										-0.01	0.06	-0.03
policy										-0.06	0.05	0.08
R^2	0.9376			0.9385			0.9422			0.9480		
F for change in R^2	85.11 **			61.02 **			48.87 **			33.89 **		
Couple Years of Protection (CYP)												
treat	2.94	5.24	0.13	2.94	4.28	0.13	-9.90**	1.25	-0.45**	-11.96**	.43	-0.54**
post	-7.38	5.24	-0.33	-7.38	4.28	-0.33	-7.38**	1.02	-0.33**	-11.5**	.46	-0.52**
treat x post	16.71*	7.41	0.66*	16.71*	6.05	0.66*	16.71**	1.44	0.66**	16.71**	.46	0.66**
gov				-10.02**	3.02	-0.46**	-152.68 **	9.18	7.01**	-152.68 **	2.96	7.01**
hosp												
bed							-4.28**	0.24	-7.52**	-4.28**	0.07	-7.52**
trainings										-4.11**	0.33	-0.25**
policy												
R^2	0.4192			0.6315			0.9801			0.9980		
F for change in R^2	4.81*			8.14**			177.64 **			1441.4 **		

*$p < .05$. **$p < .01$.

predicted counseling rates and also explained a significant proportion of variance in antenatal counseling rate, R^2 = .80, F(6, 17) = 11.76, p < .001. The intervention was not a predictor of postnatal counseling rate, R^2 = .35, F(6, 13) = 1.20, p < .3656. On average, clinical intervention increased a hospital's antenatal counseling rate by 12% but did not have impact on postnatal counseling rate controlling for hospital type (referral or district), governance structure (autonomous or ministry governed), number of maternity beds, number of FP/RH trainings, and existence of FP/RH training policy at the hospital.

For couple years of protection as outcome variable, the coefficient on treat X post (DD) variable is statistically significant at 0.01 level in full model, R^2 = .98, F(6, 17) = 113.18 p = 0.011. On average, clinical intervention increased couple years of protection offered by a hospital by 23 couple years controlling for the covariates mentioned above. Hospital type (referral or district) was by far a stronger and more significant predictor of the couple years of protection.

Power Analysis

We assessed the power of our difference-in-differences regression model to detect the effect size we detected at 0.05 level given our sample size of 24 observations using post-estimation powerreg command in Stata. For antenatal counseling rate analysis, the power of our model was 0.25. It was 0.33 for postnatal counseling rate analysis. Counseling rate regression had low power given our modest sample size whereas the difference-in-differences regression model for couple years of protection had 1.00 power. The number of observations needed for this analysis was 13 whereas we had 24 observations in the analysis sample.

Table: Summary of Hierarchical Regression Analysis for Variables Predicting Antenatal and Postnatal Counseling Rates and Couple Years of Protection (N = 24) Arm #2 vs. Arm #3

	Model 1			Model 2			Model 3			Model 4		
Variable	*B*	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β
% of ANC women receiving FP/SRH counseling (ANC)												
treat	0.00	0.01	0.00	0.00	0.02	0.07	0 .01	0.02	0.07	0 .01	0.02	0.10
post	0.02	0.02	0.17	0.02	0.01	0.17	0.02	0.01	0.17	0.03	0.02	0.30
treat x post	0.11**	0.02	0.76**	0.11**	0.02	0.76**	0 .11**	0.02	0.76**	0.12**	0.02	0.82**
gov				0.02	0.02	0.12	0.02	0.02	0.13	0.02	0.02	0.17
hosp				0.00	0.01	0.02						
bed							0.00	0.00	0.02	-0.00	0.00	-0.03
trainings										0.01	0.01	0.20
policy												
R^2	0.7792			0.7953			0.7953			0.8058		
F for change in R^2	23.53**			13.98 **			13.98 **			11.76 **		
% of women who deliver in the hospital receiving FP/SRH counseling (PNC)												
treat	-0.05	0.06	-0.27	-0.00	0.07	-0.03	-0.01	0.07	-0.05	0.02	0.08	0.09
post	-0.07	0.07	-0.36	-0.07	0.07	-0.33	-0.07	0.07	-0.33	0.01	0.10	0.06
treat x post	0.17	0.09	0.75	0.17	0.09	0.77	0.17	0.09	0.77	0.19	0.09	0.84
gov				0.12	0.09	0.47	0.09	0.08	0.35	0.13	0.09	0.53
hosp				-0.09	0.06	-0.46						
bed							-0.00	0.00	-0.40	-0.00	0.00	-0.53
trainings										0.06	0.06	0.52
policy												
R^2	0.1775			0.3019			0.3019			0.3564		
F for change in R^2	1.15			1.21			1.21			1.20		
Couple Years of Protection (CYP)												
treat	-1.73	10.00	-0.04	5.66*	2.26	0.15*	3.81	2.23	0.10	3.67	2.31	0.10
post	-7.38	10.00	-0.20	-7.38**	1.85	-0.20**	-7.38**	1.85	-0.20**	-8.00**	2.54	-0.22**
treat x post	23.28	14.15	0.56	23.28**	2.61	0.56**	23.28**	2.61	0.56**	22.97**	2.81	0.56**
gov				14.80 **	2.61	0.36**	2.45	2.23	0.05	2.24	2.35	0.05
hosp				-37.66 **	1.85	-1.06**						
bed							-0.61**	0.03	-0.91**	-0.61**	0.03	-0.90**
trainings										-0.61	1.69	-0.02
policy												
R^2	0.2009			0.9754			0.9754			0.9756		
F for change in R^2	1.68			142.67**			142.67**			113.18 **		

*$p < .05$. **$p < .01$.

APPENDIX 7: DIFFERENCE-IN-DIFFERENCES ANALYSIS—HEALTH SYSTEM OUTCOMES

Below is the difference-in-differences analysis between comparing Arm 1 versus Arm 2 versus Arm 3.

DD Regression Analysis for Variables Predicting Availability of IEC and Job aids, and Range of Contraceptive Options (N = 36)

Variable	Model Arm 1 vs. Arm 2 vs. Arm 3		
	B	*SE B*	β
# service delivery points with IEC materials (IEC)			
treat	1.25	0.71	0.34
post	2.5**	0.58	0.73**
treat x post	-2	1.01	-0.43
R^2	0.36		
F for change in R^2	6.26**		
# service delivery points with job aids (jobaids)			
treat	1.25**	0.43	0.47**
post	0.75*	0.35	0.30*
treat x post	0.75	0.62	0.22
R^2	0.55		
F for change in R^2	13.47 **		
# contraceptive methods made available by a hospital (methods)			
treat	2.25**	0.80	0.59
post	1.5*	0.65	0.42*
treat x post	-1.5	1.13	-0.31
R^2	0.27		
F for change in R^2	4.07*		
# of units that offer PPFP (units)			
treat	0.25	0.47	0.06
post	2.75**	0.39	0.81**
treat x post	0.25	0.67	0.05
R^2	0.7153		
F for change in R^2	26.80**		

*$p < .05$. **$p < .01$.

Below is the difference-in-differences analysis between comparing Arm 1 versus Arm 3.

Summary of DD Regression Analysis for Variables Predicting Availability of IEC and Job aids, Range of Contraceptive Options and Number of Units That Offer PPFP (N = 24)

Variable	Arm 1 vs. Arm 3		
	B	*SE B*	β
# service delivery points with IEC materials (IEC)			
treat	0.5	0.52	0.26
post	0.00	0.52	0.00
treat x post	0.5	0.74	0.23
R^2	0.20		
F for change in R^2	1.67		
# service delivery points with job aids (jobaids)			
treat	1	0.57	0.36
post	0	0.57	0
treat x post	1.5	0.80	0.47
R^2	0.56		
F for change in R^2	8.59 **		
# contraceptive methods made available by a hospital (methods)			
treat	2*	0.79	0.65*
post	0.5	0.79	0.16
treat x post	-0.5	1.11	-0.14
R^2	0.33		
F for change in R^2	3.40*		
# of units that offer PPFP (units)			
treat	0.00	0.54	0.00
post	2**	0.54	0.64**
treat x post	1	0.77	0.27
R^2	0.69		
F for change in R^2	15**		

*$p < .05$. **$p < .01$.

Below is the difference-in-differences analysis between comparing Arm 2 versus Arm 3.

Summary of DD Regression Analysis for Variables Predicting Availability of IEC and Job aids, Range of Contraceptive Options and Number of Units That Offer PPFP (N = 24)

Variable	Arm 2 vs. Arm 3		
	B	*SE B*	β
# service delivery points with IEC materials (IEC)			
treat	-1.5**	0.38	-0.38**
post	0.00	0.38	0.00
treat x post	5**	0.54	1.11**
R^2	0.90		
F for change in R^2	60**		
# service delivery points with job aids (jobaids)			
treat	-0.5**	0.15	-0.41**
post	0	0.15	0
treat x post	1.5**	0.22	1.08**
R^2	0.82		
F for change in R^2	31.67 **		
# contraceptive methods made available by a hospital (methods)			
treat	-0.5	1.11	-0.12
post	0.5	1.11	0.12
treat x post	2	1.58	0.43
R^2	0.21		
F for change in R^2	1.87		
# of units that offer PPFP (units)			
treat	-0.5	0.57	-0.14
post	2**	0.57	0.59**
treat x post	1.5	0.80	0.38
R^2	0.71		
F for change in R^2	16.79**		

*$p < .05$. **$p < .01$.

APPENDIX 8: BEHAVIORAL ASSESSMENT ANALYSIS

Effect size

For Cohen's d of 0.85, we estimated Cohen's U3, % Overlap, Probability of Superiority, and Number Needed to Treat. Cohen's U3 is a measure of non-overlap while the overlapping coefficient (OVL) measures overlap. Common language effect size (CL) or Area under the receiver operating characteristics (AUC) is meant to be more intuitive for persons without any training in statistics and gives the probability of superiority. Number Needed to Treat (NNT) is the number of subjects we would need to treat with the intervention to achieve one more favorable outcome compared to the control group.

We found Cohen's U3 = 0.8023, OVL=0.6708, AUC=0.7261, and NNT=3.3. This means 80 % of the treatment group will be above the mean of the control group, 67 % of the two groups will overlap, and there is a 73 % chance that a person picked at random from the treatment group will have a higher score than a person picked at random from the control group (probability of superiority). Moreover, in order to have one more favorable outcome in the treatment group compared to the control group we need to treat 3.3 people. This means that if 100 people go through the treatment, 30.3 more people will have a favorable outcome compared to if they had received the control treatment.

Cronbach's Alpha

The leadership and management behavioral assessment scale consisted of 21 items. The scale was found to be highly reliable (21 items; a = 0.92). Specifically, the scale has high internal consistency i.e., items of the scale are very closely related as a group.

APPENDIX 9: L+M BEHAVIORAL ASSESSMENT DATA

	Baseline		Endline	
	Frequency	Percent	Frequency	Percent
1. Looked at any data for trends?				
Never	3	27.3	0	0.0
1 time	2	18.2	1	9.1
2-5 times	0	0.0	6	54.5
Regularly	6	54.5	4	36.4
N/A	0	0.0	0	0.0
Missing: 99	0	0.0	0	0.0
Total	11	100.0	11	100.0
2. Conducted any activity to better understand your team members or your organization?				
Never	2	18.2	0	0.0
1 time	2	18.2	0	0.0
2-5 times	1	9.1	3	27.3
Regularly	6	54.5	8	72.7
N/A	0	0.0	0	0.0
Missing: 99	0	0.0	0	0.0
Total	11	100.0	11	100.0
3. Conducted any activity to review your team or your organization's capacity?				
Never	4	36.4	2	18.2
1 time	1	9.1	1	9.1
2-5 times	1	9.1	3	27.3
Regularly	5	45.5	5	45.5
N/A	0	0.0	0	0.0
Missing: 99	0	0.0	0	0.0
Total	11	100.0	11	100.0
4. Conducted any activities to look for examples of opportunities or best practices outside of your organization?				
Never	5	45.5	4	36.4
1 time	1	9.1	3	27.3
2-5 times	4	36.4	0	0.0
Regularly	1	9.1	2	18.2
N/A	0	0.0	2	18.2
Missing: 99	0	0.0	0	0.0
Total	11	100.0	11	100.0

5. Carried out a prioritization activity?				
Never	4	36.4	1	9.1
1 time	3	27.3	3	27.3
2-5 times	3	27.3	3	27.3
Regularly	1	9.1	3	27.3
N/A	0	0.0	1	9.1
Missing: 99	11	100.0	11	100.0
Total	11	100.0	11	100.0
6. Used data and trends to identify any critical workplace challenges that could prevent the organization from achieving its objectives?				
Never	5	45.5	0	0.0
1 time	1	9.1	1	9.1
2-5 times	1	9.1	2	18.2
Regularly	2	18.2	7	63.4
N/A	1	9.1	0	0.0
Missing: 99	1	9.1	1	9.1
Total	11	100.0	11	100.0
7. Kept yourself and your staff motivated despite any hardships or obstacles that may get in the way of achieving your organization's goals?				
Never	3	27.3	1	9.1
1 time	1	9.1	3	27.3
2-5 times	1	9.1	1	9.1
Regularly	3	27.3	5	45.5
N/A	2	18.2	1	9.1
Missing: 99	1	9.1	0	0.0
Total	11	100.0	11	100.0
8. Publicly praised or acknowledged others for their work?				
Never	3	27.3	0	0.0
1 time	2	18.2	0	0.0
2-5 times	1	9.1	3	27.3
Regularly	4	36.4	6	54.5
N/A	0	0.0	2	18.2
Missing: 99	1	9.1	0	0.0
Total	11	100.0	11	100.0
9. Discussed challenges with your team and given them a voice in finding the solution?				
Never	4	36.4	0	0.0
1 time	2	18.2	1	9.1
2-5 times	1	9.1	2	18.2
Regularly	3	27.3	7	63.4
N/A	0	0.0	0	0.0
Missing: 99	1	9.1	1	9.1
Total	11	100.0	11	100.0

10. Been able to mobilize additional resources to carry out the organization's operational plan?				
Never	4	36.4	2	18.2
1 time	1	9.1	2	18.2
2-5 times	1	9.1	5	45.5
Regularly	4	36.4	2	18.2
N/A	0	0.0	0	0.0
Missing: 99	1	9.1	0	0.0
Total	11	100.0	11	100.0
11. Brought together multiple stakeholders to discuss or address a shared challenge?				
Never	5	45.5	1	9.1
1 time	2	18.2	5	45.5
2-5 times	1	9.1	4	36.4
Regularly	2	18.2	1	9.1
N/A	0	0.0	0	0.0
Missing: 99	1	9.1	0	0.0
Total	11	100.0	11	100.0
12. Met as a group to develop a team or organizational plan that defines activities, timelines, and responsibilities?				
Never	4	36.4	1	9.1
1 time	4	36.4	3	27.3
2-5 times	1	9.1	7	63.4
Regularly	0	0.0	0	0.0
N/A	1	9.1	0	0.0
Missing: 99	1	9.1	0	0.0
Total	11	100.0	11	100.0
13. Communicated team or organizational plans to relevant stakeholders?				
Never	4	36.4	0	0.0
1 time	1	9.1	6	63.4
2-5 times	1	9.1	5	45.5
Regularly	2	18.2	0	0.0
N/A	1	9.1	0	0.0
Missing: 99	2	18.2	0	0.0
Total	11	100.0	11	100.0
14. Met as a team to define and distribute accountability for achieving your operational plan objectives?				
Never	5	45.5	0	0.0
1 time	1	9.1	1	9.1
2-5 times	2	18.2	7	63.4
Regularly	1	9.1	3	27.3
N/A	0	0.0	0	0.0
Missing: 99	2	18.2	0	0.0
Total	11	100.0	11	100.0

15. Assessed and aligned staff capacity to carry out planned activities?				
Never	3	27.3	1	9.1
1 time	2	18.2	1	9.1
2-5 times	0	0.0	4	36.4
Regularly	5	45.5	4	36.4
N/A	0	0.0	1	9.1
Missing: 99	1	9.1	0	0.0
Total	11	100.0	11	100.0
16. Met regularly and used data for decision-making during program implementation?				
Never	3	27.3	1	9.1
1 time	2	18.2	1	9.1
2-5 times	2	18.2	5	45.5
Regularly	3	27.3	4	36.4
N/A	0	0	0	0.0
Missing: 99	1	9.1	0	0.0
Total	11	100.0	11	100.0
17. Used data to make necessary adjustments to resource allocation or operational plan to overcome obstacles to achieving your program's objectives?				
Never	5	45.5	3	27.3
1 time	0	0.0	1	9.1
2-5 times	0	0.0	2	18.2
Regularly	3	27.3	3	27.3
N/A	2	18.2	2	18.2
Missing: 99	1	9.1	0	0..0
Total	11	100.0	11	100.0
18. Coordinated with other programs or delegated responsibilities as necessary to help you achieve your program's objectives?				
Never	3	27.3	4	36.4
1 time	3	27.3	1	9.1
2-5 times	0	0.0	4	36.4
Regularly	4	36.4	1	9.1
N/A	0	0.0	1	9.1
Missing: 99	1	9.1	0	0.0
Total	11	100.0	11	100.0
19. Tracked and recorded data documenting your activities?				
Never	2	18.2	1	9.1
1 time	3	27.3	0	0.0
2-5 times	0	0.0	4	36.4
Regularly	4	36.4	6	54.5
N/A	1	9.1	0	0.0
Missing: 99	1	9.1	0	0.0
Total	11	100.0	11	100.0

20. Review progress against planned activities and deliverables?				
Never	3	27.3	1	9.1
1 time	2	18.2	0	0.0
2-5 times	2	18.2	5	45.5
Regularly	3	27.3	4	36.4
N/A	0	0.0	0	0.0
Missing: 99	1	9.1	1	9.1
Total	11	100.0	11	100.0
21. Reviewed data to determine whether or not activities are producing the intended results?				
Never	6	54.5	1	9.1
1 time	1	9.1	1	9.1
2-5 times	1	9.1	5	45.5
Regularly	2	18.2	3	27.3
N/A	0	0.0	1	9.1
Missing: 99	1	9.1	0	0.0
Total	11	100.0	11	100.0

APPENDIX 10: SELECTED EXCERPTS FOR LEADING AND MANAGING PRACTICES FROM LDP+ HOSPITALS (ARM 1)

	HOSPITAL 2	HOSPITAL 3
Leading practices		
Inspiring & motivating	*"I think that participating in this training here, this has been like a* ***renewed motivation*** *for those working in the FP unit. Because it has often been like a small abandoned unit in many health facilities, so the fact that we came to this training here, it was a bit like… we told ourselves "ok, so this means that there are nonetheless some organizations that pay attention to it." It was another motivation, that is why you have seen a bit, every time that you would come we were passionate, we were very motivated to go, we wanted a bit…we wanted to prove that "OK, with this training here we can get this unit out of its dormant state in which it was." That was a positive effect. And the fact really that we showed this type of passion, that we exchanged with the other colleagues who had asked us "but, where are you always going off to? What are you even doing there?" And we explained, and that resulted in the integration of the other units as they said earlier. So I think nevertheless that it is first of all the motivation that we had, that brought…that pushed forwards many of the positive changes. Because had we not been motivated, I don't believe that we would have had the results that we had." (FGD 02_T3)* *First of all, that the team's motivation remains permanent, and if a team has been trained and it has identified their problems on their own, that they receive the hospital's support, that of the hospital administration and also that the hospitals receive the support of the hierarchy to be able to encourage all those teams to carry out these activities* *Already the team trained locally,* ***the fact that they were in competition with other teams [which has] encouraged the team to take it as a challenge for itself, and that was already a motivation, to be the best team, so that alone meant that the services have improved.*** *And also, being encouraged by the fact that they were allowed to attend the training to improve the service delivery motivated them even more to improve themselves. So the teams were motivated by the competition…" (202_T3)* *"But the fact that they saw other colleagues …{for example} this person was in the maternity but did not participate in these things…BUT after, the fact that he saw other colleagues who were very motivated to work…he thought to himself "they went to a training and they came back…" and so he began to envy them and then, he was motivated to accept to be trained as well. And today actually he is a service provider. Thus it allowed us to recuperate those…the colleagues who had biases themselves about Planning, so that too is a benefit." (FGD_02_T3)*	*"Q: What types of behaviors of leaders or managers were useful to resolve problems?* *A: All I can say on that topic is that they have been motivating with regards to the staff, they have been motivating enough to encourage them to provide these services…* *Q: Could you give an example of motivation given by a manager or a leader, to motivate people ?* *A: They have, the motivation…* *Q: I know it is not always financial* *A: No; it is also true that we would have liked it to be financial [laughter] but this one in particular was not financial, it was a moral motivation, to encourage the staff…to do what has to be done" (303, T3)*

Management practices		
Plan, Organize, Implement, M&E	*"There were efforts in all of the areas, meaning on top of the leadership in FP, we wanted to add the same leadership in other sectors of the hospital to try to keep an global vision of the development of the leadership in the entire health facility* *Q: OK. Could you explain to me how the approach was also integrated in the other departments of the hospital? In fact, the approach that took place in the other departments of the hospital was a similar approach because the others did not benefit from the training. However they were encouraged to take* ***responsibilities to evaluation their own units, to make decisions within their units, and encouraged by respecting the decisions made within those sectors so that it would lead towards improvement in service delivery"*** *(202_T3)*	*" If I have something to add it is that as a leader, to ensure that there aren't any barriers or for it to continue moving in a positive direction…we have to share. And offer quality service delivery. And on top of that monitor… the monitoring of our work, both at the unit level and the management. We have to monitor, we cannot just stop at our level and say: "ok that is enough" when there are problems that the management may not even know about or could even be useful in resolving but won't help us because we stayed…we stayed in our area and weren't able to go beyond that. We have to make efforts. There is the service delivery, which we must share, and we must do the reports with the hierarchy, because those reports are important.* ***If we have problems with the commodities and the hierarchy isn't informed…it is the hierarchy that provides us with the commodities so for our units to be good, it is necessary to have an open and honest collaboration between the leaders.*** *(Respondent 5 FDG 03_T3)*
Planning and Organizing: Effective HR Management	*"When it comes to human resources, in the beginning we had an issue since the delivery room-- each team has two members, but sometimes we have 3 women in labor and also some cases where we have 2 women giving birth at the same time. So it is not realistic to assist with the birth, to give counseling, to adopt a method but after, we found solutions. Since we trained a* ***considerable amount of caregivers, when it is crowded at maternity, we can call someone from ANC*** *or we can call one from the post-delivery room, we could also ask help from the coordinator in charge." (204_T3)* *"Yes, it is precisely what I wanted to say. That is what I wanted to add…it allowed us to reorganize the teams. The leadership allowed us to* ***reorganize the teams, to share the knowledge that we received with the others.*** *Because before we thought that when we are the boss it meant that…but then we understood that one can gain a bit more from the person who, who works with you… to be able to share what we received with the others to allow our work to progress.(Respondent 5, FGD 02_T3)*	*People want it and now I even…before it was the fact that when a lady was looking for me, no one would tell me. If I wasn't there to see that the woman was looking for me, my colleagues wouldn't say anything and the woman would leave. But now when the women come, because I have finished giving educational talks, where I spoke about FP and they listened…now when they are interested they want to come to see me,* ***even if I am not there my colleagues call me: "there is a woman who wants to do FP". Really that is a big change at my level. It was very difficult.*** *I continue to support this change because before even gynecologists…certain gynecologists weren't interested. But at the moment the majority of gynecologists, when the mothers return for their six-week consultation appointment, before this woman comes in, even if she doesn't adopt a method, she will first go to the FP.* ***So at the moment the majority of our patients who come for a six-week postpartum consultation appointment are sent first to the FP unit. So that has been the big change."*** *(Respondent 4 &6 FDG03_ T3)* *"The fact is that…the patients are not separated. When we go and see a patient, if it is to give them maybe an injection, while we are doing that, we will talk…we talk…we talk about breastfeeding, we talk about FP, we talk about infant feeding and her own nutrition, we talk about the use of mosquito nets… we talk about a lot of things. Which means that it cannot be separated. It cannot be detached. When we are finished there we take her contact information and we ask her if…as she has already heard us talk about FP, what are her opinions, what are the methods that she may want to adopt. When she tells us, we record it and we continue.* ***We cannot separate or detach FP care.*** *She is a bit against it because she doesn't see things like we see them. Because if she saw things as I am explaining them now, she wouldn't be opposed to it. (Respondent 1 FDG 03_ T3)*

		"So the effort first lies in the counseling, we have several service delivery points of counseling throughout. For instance in external pediatrics we take any woman coming to the vaccinations, we first start by those coming to post-birth consultations and we talk about PPFP, when they come to the delivery room we do counseling even when they are hospitalized. Meanwhile we bring them to understand that we are not bothering them, it is because we don't want criminal abortions, undesired deliveries or pregnancies, we don't want that any longer. We want women to be comfortable once they get pregnant so we mean no harm. So when they now come back to the six months check up to see the doctor we do counseling again, we make lots of efforts to reach all our clients (304_ T3)
Implementing: Better Collaboration & Integration of FP into MNCH services	*"But I think that, if we are talking about leadership, the leadership…I think that if there was something objective in this training, in this project…it was the fact that there was an active* ***participation both from the staff that is in the field, which means those who are in the unit in question, AND from the administration.*** *Because you see, the day that we came here with the Director and all the others, you heard the…the words of [Hospital #3's] Director: for him, it was something which at the beginning was like…there was really no consideration for these types of things and all that, but as time passed,* ***with the exchanges that we had here, it convinced them.*** *Thus they understood that they could also invest in this…in these services, and make them profitable. So there I think that if we talk about the training in leadership, there was this integration that was much more active both from the practitioners AND the administration that changed to give…to establish…how should I say, a "roadmap" for the health facility, and I think that this has been an asset. An asset, because sometimes we go to trainings where we don't even get to see the managers to be able to give them feedback or anything, but the fact that they themselves came directly here, to tangibly experience it, even when you were at the dissemination meeting you saw that it convinced them a bit more, it is more convincing for them." (Respondent 1, FGD 02_T3)* *"The inter-unit communication, because when, for example if you are in the maternity and you have a problem in the postnatal unit or the maternal unit, the other person could call on their colleague from the other unit, maybe from the FP unit, to help reinforce them. We tried to do that a bit, that is sort of what we are doing. We collaborate more, and we help one another. Because sometimes we find ourselves going to help the other who is overloaded with work…" (Respondent 2, FGD 02 T3)*	*"Certainly in the beginning, I believe there was a small issue related to… to the staff trained on leadership; that they should come back and disseminate what they had learned and maybe train the other staff… we were confronted with a small challenge with the personnel* ***who did not have enough authority to disseminate the training,*** *to train other staff. We had a few concerns because the staff that was trained had limited authority to make changes… to be able to follow up on the implementation but I think that with time, more people will be trained, we will try to correct that aspect of this… so that those who are trained, will at the same time be given the authority to allow them to be able to implement the training and to communicate within the hospital so that everybody knows what is effectively happening, but already, there is a large interest from the staff to know more about the FP that is offered in the hospital." (305_T3)*

Planning/ Organizing Alternative Solutions	*"we were trained with E2A in service delivery among other things. Now after the training, we were separated in the training. We needed leadership… so that thanks to leadership we were able to learn other strategies. It was thanks to leadership we learned that it was important to limit the wait times for the woman to return …that we needed, before she left, to introduce the fees for the next consultation into the delivery fees so that when the woman would arrive we would take her directly into the room. So it is thanks to the leadership that we were able to find this solution. There are many things that were done…(Respondent 4, FGD 02_T3)*	*"The changes that we have seen, that we have identified within our unit, are that the methods are available in the delivery room. In the unit,* ***meaning that the woman does not need to go to the pharmacy to get the commodities, or even to go to the FP unit, so in maternity the methods are available such as the IUDs, the implants, we have everything in the delivery room.*** *So once the woman accepts, we can directly offer it to her, so there is no longer the barrier of... go first buy the consultation ticket, go to the unit, no the unit is closed, since the FP unit is not opened 24/7…Whereas now at the maternity, whether during the night or day, one can be able to access their method…*
	*R1: So in fact to tell you, to add to what she was saying, what we understood from the leadership training was that we could…****it was the power of finding strategies****…And it allowed us to elaborate strategies, such as: the payment of postnatal consultation fees while the woman is still there…and it allowed for women to come back systematically, systematically. And I also think, a bit like for the E2A trainings, I think that we had our colleagues…many were not very participative themselves in the methods.* *R4: Solidarity too. Because before, each person was in their own unit, we did not have the time to get together. With the Leadership project, we were forced to get together two or three times a month…* *R1: And each person might have had their own ideas…* *R4: And we took advantage of it to also talk about the problems in each of the units. We would find solutions. So it really was a positive contribution.* *R3: Going along with that…I think that with the Leadership training we understood that a leader is not a dictator. We understood that the leader must rather bring the others to do well, and not dictate the laws to follow. So in a unit we organize…each person can propose their ideas…some can ask "can we arrange the registers this way?" The leader says "OK," but someone can also bring forward their ideas to say "no, I think that if we do it like this it will be better etc." And it is constructive, instead of dictating the laws and being intransigent on them. Yes, with this there have been many improvements, even in the arranging of the registers, even in the ways that we provide care. We learned to discuss, to find other new strategies that improved the service delivery, so it really helped. Small notions like that are always welcome." (FGD 02_T3)*	*Q: Ok, and according to you what contributed to that change?* *A: What contributed to that change? The Administration of the hospital understood the need, since before we only looked at 'no women had to go and pay' but now by explaining to them how important FP is and the risks that we take by letting women go since they couldn't go and pay or because the service was closed, so I think that the administration understood and that is why they fixed that gap there, that is they allowed us to make that material available in the delivery room for instance." (205_T3)* *"R3: We also had difficulties within the Gynecology unit…where our current Major is opposed to counseling. The other day I was with Mme. X and we were giving an educational talk she [the major] came to scold us. So because we are leaders we remained calmed. But I think that now that Mme. X talked to Mme. X, I didn't receive any feedback, but I know that there was a change since Mme. X came to talk to her. I don't know what they said to each other but I know that there have been changes since because now when I speak openly I am not called in anymore to be told to: "stop that now"…* *Q: So what are the leader behaviors that you used to overcome this barrier?* *R5 : Dialogue* *R2: It was necessary to keep his cool. If he got carried away it would have created another problem but he kept his cool, he tried to convince the Major that he wasn't trying to make…it is as if you were trying to take a patient away from her, however that wasn't the case, it was in the framework of the hospital that he was doing the counseling…so that the patient could adopt a method. However she didn't understand it like that, she said "don't give your talks here, don't do your counseling here, that isn't the FP unit" so she thought that everything should happen at the FP unit and that they weren't allowed to do the counseling in Gynecology. So well, they understood that and they kept their cool, tried to talk with her. As a result he can now speak freely with his patients, with his clients without her interfering… "(FGD_03 T3)*

APPENDIX 11: How did the clinical and L+M+G capacity building influence leaders & managers attitudes towards PPFP service delivery?

HOSPITAL 2	HOSPITAL 3
"R2: Well there has nevertheless been a change, because many people, many staff first of all were trained. So this means that people were given the exact information that they needed to provide to patients… - because with regards to FP if the patient doesn't have the right information then people always have biases. They always say "oh that, not for me" because already when we ask a woman if they want to do FP she will say "oh it is my first delivery eh, so…" so she is telling herself that FP is the limiting of births. So now the staff has been…we have had many trainings, which means that we now provide the correct information to the women, which means that it is just a matter of time, people will very much adhere. That is my opinion. At least practically what we have observed is that the women are more and more informed and will be able to make good decisions based on…with regards to FP.…. R1: … And now the discussion is more accurate. Which means that we know now, my colleagues know now what to say to the women. And even colleagues who had some doubts on certain methods or on certain periods during which one had to adhere [to FP methods], because of those that were trained here, for them to go explain "listen, we were trained, and now we can do this even in the delivery room…" At the beginning it was… maybe it was a bit difficult but now they are more cooperative with the procedures and I think it has been beneficial, not only for the facility but also for the patients that benefit from our services." (FGD 02 T3)	*"And how could you say that it influenced PPFP services offered? R: Naturally, when you don't know, when you don't believe in what you do, it goes without saying that if you don't have the right information, if you yourself are not convinced, you will not be able to convince whomever is in front of you to adopt a method. So as long as the staff is fully briefed on the service, 'who should benefit, how it should be done etc.,' I think the limitations due to personal beliefs is no longer an issue. So, we think that with the trainings we have improved adherence of our clients and our providers to treatment protocols." (305_T3)* *"6 – I would like to add something with regards to my colleagues. Because in my unit, my colleagues weren't interested. But these past 6 months, my colleagues are now interested. Because when there is a lady who arrives and I am not nearby, they tell her to wait for me. Sometimes they even come and get me from where I am so that I can do the counseling. So there has been a very big change with regards to the unit, because I had that barrier, now it is better Q: And what were their attitudes before? The staff's attitudes with regards to FP/PPFP? 6 – They would say that it was my business. It was for me, they have not been trained: "she is the one that was trained" so no one was paying any attention to me [laughter]. And as a result of talking and talking finally I feel that it is moving forward." (Respondent 6, FGD_03 T3)* *"And how could you say that it influenced PPFP services offered? R: Naturally, when you don't know, when you don't believe in what you do, it goes without saying that if you don't have the right information, if you yourself are not convinced, you will not be able to convince whomever is in front of you to adopt a method. So as long as the staff is fully briefed on the service, 'who should benefit, how it should be done etc.,' I think the limitations due to personal beliefs is no longer an issue. So, we think that with the trainings we have improved adherence of our clients and our providers to treatment protocols." (305_T3)*

APPENDIX 12: BARRIERS TO PPFP SERVICE DELIVERY

BARRIERS	QUOTES
Adherence to pricing structure for FP services by hospital personnel	*"R2: There are negative attitudes from the staff. Because they mention the price, it is almost free…but there is some staff that will maybe increase a bit the cost, which means that if she has received one information in one unit, maybe in Prenatal Consultations, if I can use that example…when she comes into the delivery room and if she asks the person who can put it in or insert it, and they are giving a different price…so that also can result in the woman not choosing…because she already was given another price… so it is a little…it is the mentality." (FGD 02_T3)*
Societal attitudes towards FP, perceived FP side effects, partner's attitudes (positive & negative)	*"R1: Because given the opposition we will not always be able to erase the biases that people have about FP and the methods, the services that are offered. Because sometimes it only takes one of your neighbors, one of your sisters who has used a methods and who wasn't, who wasn't positive enough in her opinion, she tried it so she will convince you, she will really tell you all sorts of things. She will generalize for all of the methods even though maybe it was her body that was not favorable to that type of method and it would have only been a matter of changing the method. So it is not always…* *R5 – Or that she comes and speaks with you…if she had a question about the side effects…* *R1 – Right exactly, the side effects…instead she stays over there and everything she does is within that mindset… and to have a certain opinion on all of the methods…even though it was her method that was…maybe she even already had some predispositions that gave her negative reactions to the methods that she chose and it was just necessary to fight against, to combat these predispositions for her to feel better…but she did not see things that way so…that still remains. And then the partners that are not collaborative, cooperative on FP because they tell themselves "no after all of this the woman will not budge." (FGD 02_T3)*
Internal staffing transfers	*"R4: I think that we need a good handling of the patients because even when a lot of people are trained… what if we train someone in Pediatrics today and tomorrow they are transferred, that leaves a gap and it is a poor way to utilize us. Because since at the moment in the Maternity we talk about leaders… that there are no leaders in Maternity… So at the moment we cannot train today and tomorrow or after tomorrow when there are transfers we cannot rely on what we have done and we change…because just recently I was forced to go and consult in the Maternity because there weren't any leaders and their registers were completely empty, …after many transfers there were no longer any leaders there. … The Administration should try to see how they distribute those trained…because here they suggested Gynecology, Maternity, FP and Vaccination to you. Ok these are target units. But now once we are done transferring there and everything is disrupted, we realize that we can no longer work… during the transfers, their methods of transferring people, so they should transfer people with respect to their specialties." (FGD_03 T3)*
Workload in maternity	*"Sometimes also it is the workload…the workload can be such that…because we have teams of 2 people at night, and you find yourself with six women who are there [in delivery]…and your work is to monitor those six women there. So as a result, you are not…one can give birth while you were planning on trying to insert an IUD. If the other gives birth or something…that workload will mean that you cannot really satisfy the needs of all of those women. And you can lose some women like that…that you should have… that you could have recruited but you were overloaded. " (Respondent 1, FGD 02 T3)* *"We must simply awaken their [service providers] minds because when they are overwhelmed by the work they may forget to do the counseling with the women they see. Because there are days at the Maternity when they all arrive at once, you don't even have time to put something in and there is another one who arrives and you are forced to take care of…and in a team there are hardly three people…so it is the service provider who is there maybe who will prioritize taking care of the woman before, so that she first can finish giving birth. But in the time it takes to insert, another woman arrives." (Respondent 2, FGD_03 T3)*
Access to materials during the weekend, evenings	*"If I can speak again about other barriers…it is the material available in the delivery room during the weekend. Because people who want to do immediate PPFP complain that the material is not available. Because Mme. X who is in FP cannot take the risk of leaving the material in the delivery room while… because when we take…firstly they don't come to record the patients. That can create a barrier if it so happens that a supervisory visit is conducted. So it is better when it is a business day, then we can go place the implant in there and we know that someone will come record it in order to allow us to justify ourselves in the event that someone would issue a complaint. Now those who complain that they cannot…that they have cases that they receive during the weekend and we only come on business days or during the night…that prevents them from placing the implant and the woman will leave without her method. That creates a barrier." (Respondent 4, FGD_03 T3)*

Lack of IEC materials to distribute	*"…We don't have brochures to hand out, flyers…we have nothing. Because there is a problem that has been arising in our health facility. Because there is the adolescent clinic, and in the adolescent clinic they also go through the FP unit and when these children, these young girls…they are between 10 and 19 years old, when they come to see us: "Madame isn't there a brochure, a flyer?" Yes something they can take, we talk and talk but after when they ask us we say: « no, unfortunately we are out of stock, we will see next time…» And that really puts us at a disadvantage. Even with the colleagues who come in for their adolescent daughters that are a certain age, they want brochures or flyers but we have nothing in the units. Nothing." (Respondent 5, FGD_03 T3)* *"We have been asking for flyers last time, because when in FP they have these flyers that explain all of the methods, and even with small pictures on them explaining the advantages and disadvantages and everything…when the woman comes in and you are done speaking with her, if she has not chosen then you can give it to her and she can go home and show it to her husband. Sometimes the husbands go against the woman's choice because they aren't…they don't fully understand the advantages of it all… but if she goes home with that flyer, even if she doesn't give it to him – she can put it down nonchalantly and when he walks by he will see it and…he can absorb it…that can allow him to change his mind." (Respondent 1, FGD 02 T3)*
Lack of Motivation	*"I would say that the motivation for the staff…for example in Neonatal, where they take care of the babies more than of the mothers, so they don't have time to dedicate to speaking about things related to FP to the mothers, their focus is the babies first, so when the mother who has a baby in Neonatal has a problem, they tell her: "go see the people in the Maternity, go see them and they will introduce you to a doctor there, here we take care of the babies." So in that unit, in their heads they are (responsible for) the babies….(Respondent 2, FGD_03 T3)*
Linguistic barriers	*"… The linguistic barriers…because there are some women who give birth and cannot express themselves. We are forced to speak about it to the husband, as it is often people from our area …from the [muffled] regional area. Yes sometimes it is a bit difficult for them…or we need the family to be present, and sometimes it is the family who isn't informed who advises against it. When you tell them something…I don't know…sometimes you don't really know what they tell the woman, so it is there where it is…it remains a bit difficult. The linguistic barriers, we have yet to address." (Respondent 4, FGD 02_T3)*
Infrastructure restraints	*"Perhaps the small size of the premises. With regards to the organizational structure we have many more problems concerning the small space. Yes at the structural level. As she said earlier, it is too small. Really, our concern was that if the government could try to expand our hospital…because as we were talking about, even in terms of service delivery…for FP…A woman cannot adopt a method on the delivery table, so afterwards if she could remain for 48 hours…72 hours in the post-delivery room, she could change her mind. But we cannot [keep her], we are forced to let her go because there isn't enough space. We only have 6 beds for the women who have given birth, however there are some days where we do more than 6 deliveries in the night, so that too is a problem... It creates barriers, yes." (Respondent 3, FGD 02 T3)*
FP commodities security	*"R3: Yes and as [X] was saying earlier, we also have an issue concerning the availability of commodities. Because at the moment all is well, they are there. But will they be there continuously?* *R5: That is what we even said…it was a problem with the IUD…* *R3: Right, so that is really the main barrier. Yes. If there aren't any [commodities], what will we do? The women will come but they won't be served. It will even be discouraging." (FGD 02 T3)*
Patients who can't pay	*"R4: We also talked about financial blockages. Because there were people…even last week it was depleted because from time to time the destitute…we would go take it and insert it for them.* *R5: Yes without paying, it got worse because when we check and financially you have nothing and you are in need, we are forced to give it to you* *R4: So that is a barrier there.* *R5: So if we could have some commodities to help those types of people…" (FGD 02 T3)*

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