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E2A EVIDENCE TO ACTION for Strengthened Reproductive Health

Building Evidence to Support the Provision of Implants at Community Level through Task Shifting

Operations Research report

Kaduna and Cross River State, Nigeria

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About E2A

The Evidence to Action Project (E2A) is USAID's global flagship for strengthening family planning and reproductive health service delivery. The project aims to address the reproductive health care needs of girls, women, and underserved communities around the world by increasing support, building evidence, and leading the scale-up of best practices that improve family planning services. A Cooperative Agreement awarded in September 2011, E2A will continue until September 2019. E2A is led by Pathfinder International in partnership with ExpandNet, IntraHealth International, Management Sciences for Health, and PATH.

Contact Information

E2A Project
1250 23rd Street NW
Suite 475
Washington, DC 20036

Tel. 202-775-1977
Fax 202-775-1988
www.e2aproject.org

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Four persons lost their lives in a car accident while traveling to support trained CHEWs in Kajuru LGA, Kaduna State on September 17, 2015: Fatima Tumsah, Project Officer with Pathfinder International; Rabi Kachiro, Kaduna State FP coordinator; Mairo Sani, Kajuru LGA FP Coordinator; and Sandra Garba, Research Assistant. This work is dedicated to their memory.

The CHEWs implant report authors consisted of: Dr. Bamikale Feyisetan, former E2A Director, Monitoring and Evaluation (formerly of PATH); Dr. Gwendolyn Morgan, E2A Deputy Director, Management Sciences for Health; Dr. Mahesh Shukla, Management Sciences for Health; Dr. Abdulmumin Saad, former E2A Research and Metrics Advisor (formerly of Pathfinder International); Ms. Allison Schachter, E2A Monitoring and Evaluation Technical Advisor, Pathfinder International; and Dr. Farouk Jega, Nigeria Country Representative, Pathfinder International.

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Acronyms

CBO	Community Based Organization
CHW	Community Health Worker
CHEW	Community Health Extension Worker
CHO	Community Health Officer
CLMS	Commodity Logistics Management System
CYP	Couple Years of Protection
DiD	Difference in Differences Analysis
E2A	Evidence to Action for Strengthened Family Planning and reproductive Health Services for Women and Girls
FMOH	Federal Ministry of Health
FP	Family Planning
HEP	Health Extension Program
HEW	Health Extension Worker
HMIS	Health Management Information System
IDI	In-Depth Interview
IFHP	Integrated Family Health Program
IUD	Intrauterine Device
JSI	John Snow Incorporated
LARCs	Long-Acting Reversible Contraceptives
LGA	Local Government Area
LM	Logistics Management
M&E	Monitoring and Evaluation
MANOVA	Multivariate Analysis of Variance
MEC	Medical Eligibility Criteria
MNCH	Maternal, Newborn and Child Health
MOH	Ministry of Health
MSION	Marie Stopes International Organization Nigeria
NDHS	Nigeria Demographic and Health Survey
NGO	Non-Governmental Organization
NHMIS	Nigeria Health Management Information System
NPHCDA	National Primary Health Care Development Agency
OR	Operations Research
PHC	Primary Health Care
PI	Pathfinder International
RH	Reproductive Health
SMOH	State Ministry of Health
TSHIP	Targeted States High Impact Project
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

In many resource-poor settings, women and girls' access to contraception has been hindered by a shortage of health workers who can provide a range of contraceptive methods, including long-acting reversible contraceptives (LARCs). To address these types of human resource shortages, the World Health Organization (WHO), in 2012, recommended targeted research on task-shifting (also referred to as task-sharing) for implants—that is, training lower-cadre health workers, such as community health workers, to provide implant insertion and removal services.[a] According to WHO, evidence generated through the research could be used to encourage national policy changes allowing for task-sharing, and revisions and additions to existing task-sharing guidelines focusing on contraception.

The USAID-funded Evidence to Action (E2A) Project responded to WHO's recommendation by conducting the operations research study, "Building Evidence to Support the Provision of Implants at the Community Level through Task-Sharing," in Nigeria's Kaduna and Cross River states. Conducted from April 2015-June 2016, the study assessed the effects of Community Health Extension Workers (CHEWs) providing implants on contraceptive uptake at health facilities in select Local Government Areas (LGAs) of the two Nigerian states.

The study set out to meet the following objectives:

(i) Document the process, outcomes, and cost of training CHEWs to provide implants services, and identify the extent to which trained CHEWs meet international competency standards by the end of the training and when delivering services during regular supervision visits.

(ii) Examine clients' experience and satisfaction with implant services obtained from CHEWs; and,

(iii) Examine how the provision of implants by CHEWs affects FP uptake, implant uptake, and contraceptive method mix.

The study also responds to the low rates of contraceptive use—and, in particular, long-acting reversible contraception (LARC)—among women in Nigeria. The 2013 Nigeria Demographic and Health Survey (NDHS) showed that only 10%[1] of currently married women were using modern methods of contraception, and only 0.4% reported using an implant.[b] One of the factors inhibiting uptake of implants is the lack of providers trained to offer implants at health facilities. Evidence from the study will be used to support operationalization of a 2014 policy shift in Nigeria that addresses these human resource shortages by expanding CHEWs' current family planning (FP) tasks to include implant services.

Training and Program Intervention

In both Kaduna and Cross River states, E2A/Pathfinder Nigeria staff, with the School of Health Technology and State Ministry of Health, organized two FP trainings, from June 15-26, 2015, focusing on competency-based training approaches for insertion and removal of implants. Forty CHEWs (two CHEWs from each of the 20 intervention facilities in each state) participated in the training, which was

[a] World Health Organization. (2012) Optimizing health worker roles to improve access to key maternal and newborn health interventions through task shifting.

[b] National Population Commission, Federal Republic of Nigeria, Abuja and ICF International (2014). Nigeria Demographic Survey 2013. Rockville, Maryland, USA.

conducted with the single rod "classic" Implanon and the two-rod Jadelle. The WHO Medical Eligibility Criteria (MEC), the national FP/RH service delivery protocol, and Jhpiego's revised and updated global training manual were adapted for the training. As part of the training curriculum, participants learned about infection prevention, FP counseling, and commodity logistics management, how to use NHMIS-approved registers and forms, and demand-generation approaches, such as group talks at antenatal care and immunization visits at facility-level as well as in the community. They also received a refresher on short-acting methods. To determine changes in knowledge and skills of trainees, pre- and post-training assessments were conducted.

Assessing the effects of task-sharing on uptake of implants is meaningful only when clients are aware of FP, convinced of the benefits of using FP to space their pregnancies, and determined to use a method. Consequently, during the training, the CHEWs were trained on "proactive" demand-generation approaches. For instance, group talks at antenatal care and immunization visits, holding event days, or screening all postpartum women during immunization and child health visits regarding their desire for postpartum FP (of which implants can now be offered).

In the months following the training, the CHEWs at the intervention sites provided FP services, including implant services to women who requested them. Government and Pathfinder/Nigeria staff provided supportive supervision to ensure adherence to approved standards (WHO MEC and national FP/RH service delivery protocol) in providing implant services. CHEWs also conducted sensitization/mobilization activities in their communities. To ensure availability of commodities and other consumables, CHEWs at intervention facilities were trained to monitor the supply of FP commodities in their health facilities to track consumption, available stocks, and additional quantities needed.

Study Methods

The operations research was conducted in Kaduna state in the North-West zone and Cross River state in the South-South zone, because of the existence of past or ongoing activities conducted by Pathfinder International and partners. From each state, two Local Government Areas (LGAs) with greater levels of facility-based uptake of FP (as documented through state HMIS data)—one intervention LGA and one comparison LGA—were purposively selected by the state Ministry of Health. In Cross River state, the intervention LGA was Akpabuyo and the comparison was Calabar South. In Kaduna state, the intervention LGA was Kajuru and the comparison was Igabi. Within each LGA, 10 Primary Health Care (PHC) facilities staffed with nurses, nurse-midwifes, community health officers, and CHEWs, were randomly selected for the study. Two CHEWs were trained at each intervention facility.

For purposes of analysis, the study pre-intervention period (baseline) was defined as April, May, and June of 2015. The post-training supervision and other elements of intervention continued until the end of June 2016. April, May, and June of 2016 were therefore considered the post-intervention period. FP uptake data were collected monthly from both intervention and comparison sites to track changes in the uptake of implants (insertions and removals of Implanon and Jadelle) and four other FP methods (combined oral pills, male condoms, injectables, and IUDs).

The operations research involved: (i) routine data collection to monitor activities and outputs, including uptake of FP/LARC/implants and changes in method mix; (ii) baseline and endline assessments, including interviews with CHEWs on their experience inserting and removing implants, as well as the challenges

they face while providing the services; (iii) observations of CHEWs to assess the extent to which they provide services according to national standards/service provision checklist (quality of services); and (iv) exit interviews with FP (implants) clients to determine satisfaction with information on implant side effects and efficacy, as well as with insertion of their implants by the CHEWs (intervention sites) and other service providers (comparison sites). While the collection and analysis of cost data was initially part of the study protocol, it was not implemented due to the constraints in Pathfinder/Nigeria's financial system and documentation of expenses.

Descriptive statistical analyses of the FP method uptake at the 40 health facilities over time were performed to assess whether the intervention and comparison facilities were similar to each other during the two periods in terms of the uptake of condoms, pills, injections, implants, and IUDs. A series of different multivariate regression analyses were conducted to test if there were changes in the overall FP method mix across the intervention and comparison facilities, and if there was a difference between the pre-intervention and post-intervention periods with respect to mean monthly uptake of each of the five FP methods. Data were also collected on uptake of all implants, and the number provided specifically by CHEWs (as a subset of the total) was also recorded and analyzed.

Results

Results

Implant services performed by CHEWs: CHEWs inserted 1,900 implants in the 20 intervention facilities over a period of 12 months (July 2015-June 2016), generating 7,220 couple-years of protection (CYP). On average, the monthly mean number of the CHEW-inserted implants at the intervention facilities was higher by about six implants provided during the post-intervention period. At endline, nearly all interviews with CHEWs indicated that they had performed implant insertions (23 out of 24 interviews conducted) and removals (22 out of 24) since their last in-service training. . Trained CHEWs in intervention facilities seem to be carrying out most of the insertions and removals at facility level after completing their in-service training and follow-up certification.

Method mix: There was no overall increase in the number of implants provided at facility level by all staff over time, and there were no observed changes in the method mix, with the exception of a decrease in pill users. These findings suggest that while CHEWs have been successful in providing greater numbers of implants over time, the number of total implant clients did not increase at facility level. More information at facility-level is needed to understand this finding, such as whether facilities were truly capable of meeting increased demand (in terms of available commodities, and patterns of assignments and duties at facility level where a trained CHEW is available to provide services). It is also likely that greater attention needs to be given to demand generation activities, both within facilities in coordinating units (ANC, PMTCT, immunizations, etc.), and externally in communities served by the facilities, keeping in mind the need for volunteerism, informed choice, and equal promotion of all methods.

Competency of CHEWs: Most CHEWs reported that their skills were "good" or "very good" and required "none" or "little" supervision to offer the service. CHEWs demonstrated a high level of general contraceptive counseling competency that was maintained during the post-training period. On average, there was also a high level of implant counseling competency through the period of observation. However, the implant counseling and insertion competency scores, on average, declined at the end of the study,

suggesting the need for ensuring ongoing routine supervision visits, including ongoing attention, mentoring, and coaching during supervision.

Client satisfaction: Clients were equally likely to be satisfied with implant services from CHEWs at intervention sites and providers at comparison sites, showing that CHEWs can provide services with the same level of client satisfaction as clients who receive services from nurses and other trained providers.

Supportive supervision: All (100%) of the CHEWs in intervention facilities had received feedback through supervision and reported to find the feedback useful.

Conclusions

Policy change is an important first step in expanding access to contraceptive implants in Nigeria. However, it is not sufficient on its own to enable successful task-sharing of implants. Findings from this study point to the need to continue to support initiatives at health facilities including:

1. Better tracking the extent to which CHEWs have the time to conduct community outreach on a regular basis, or whether other factors to increase demand need to be added to the program to complement CHEW-provided implants.
2. Greater community outreach to generate voluntary demand in the context of informed choice, preferably by dedicated outreach staff who are not busy providing clinical services (this would also serve to decrease the time for providers to complete their competency certification);
3. Close mentoring and supportive supervision for certifying and maintaining high-quality service provision focused on gaps observed during visits, such as professionalism, respect, demand creation, and aseptic techniques in midst of potentially high workloads;
4. Functional referral systems for difficult removals and implant-related services unavailable at facilities;
5. Training and re-training CHEWs to provide implant services and replace trained staff who have been transferred;
6. Supply chain and commodity logistics support to ensure availability of commodities at facilities;
7. Support for monitoring data collection and feedback on implant insertions and removals; and
8. Advocacy initiatives to ensure that the newly adopted task-sharing policy is scaled up appropriately in all Nigerian states.

Next Steps

Based on the findings of this study, E2A is now in the process of providing technical assistance to support systematic scale-up of task-sharing for injectable and implant services via CHEWs in CRS. E2A is providing technical assistance to Pathfinder Nigeria and stakeholders at the state and local levels to develop a strategy for systematic scale-up of task-sharing via CHEWs, and document the scale-up experience. Beginning in early 2017, E2A hosted a scale-up strategy development workshop with state and local stakeholders in CRS, which highlighted the role of adaptation and served as a dissemination meeting for the OR study on task-sharing for implant services. Applying the ExpandNet systematic approach to scale-up, E2A supports regular scale-up resource team meetings to monitor the scale-up process and to develop a strategy to document the scale-up experience to additional health facilities and LGAs in CRS. Findings from this scale-up effort will be available by October 2018.

1. Introduction

This report provides a full description of the findings from the operations research entitled, "Building Evidence to Support the Provision of Implants at the Community Level through Task Sharing," in Cross River and Kaduna states, Nigeria. This study, which started in April 2015, assessed the effects of Community Health Extension Workers (CHEWs) providing implants on contraceptive uptake at health facilities in select Local Government Areas (LGAs) of the two Nigerian states. Informed by the successful introduction and scale-up of implant provision by Health Extension Workers (HEWs) in Ethiopia, the USAID-funded Evidence to Action (E2A) Project implemented a demonstration project and documented a scale-up process for provision of implants through task sharing to CHEWs. Evidence from the study can be used to support operationalization of a recent policy shift in Nigeria that expands CHEWs' current family planning (FP) tasks to include provision of implants.[c]

The study set out to meet the following objectives:

(i) Document the process, outcomes, and cost of training CHEWs to provide implants services, and identify the extent to which trained CHEWs meet international competency standards by the end of the training and during regular supervision visits.

(ii) Examine clients' experience and satisfaction with implants services obtained from CHEWs; and,

(iii) Examine how the provision of implants by CHEWs affects FP uptake, implant uptake, and contraceptive method mix.

This report assesses the intervention's ability to meet these objectives and demonstrates the feasibility of CHEWs providing implants to guide future scale-up of the intervention in Nigeria. Additionally, it provides information on the technical and professional background of the CHEWs relevant to their provision of FP. The report contains data collected at baseline and throughout the intervention.

1.1 Rationale of the Study

Despite several years of donor investments in Nigeria, use of modern contraception is still low. The 2013 Nigeria Demographic and Health Survey (NDHS)[1] showed that only 10%[d] of currently married women were using modern methods of contraception at the time of the survey. The survey also showed significant variations across the zones: 12% (North Central), 3% (North East), 4% (North West), 11% (South East), 16% (South South), and 25% (South West). The 2013 NDHS also showed that unmet need for FP was relatively high and varied across zones: 16% nationally and 24% (North Central), 18% (North East), 12% (North West), 13% (South East), 22% (South South), and 15% (South West). Similar to the 2008 NDHS results, the 2013 NDHS showed that the use of long-acting reversible contraceptives (LARCs) (intrauterine devices (IUDs) and implants) was low as compared to other methods. Only 1% of currently married women reported use of an IUD and 0.4% reported using an implant, whereas 8% of currently married women reported use of the injectable (3%), pill (2%), male condom (2%), or Lactational Amenorrhea Method/Standard Days Method (1%).

[c] The current Nigerian National Family Planning and Reproductive Health Policy guidelines and standards of practice identify CHEWs as facility-based providers of all FP methods except for surgical methods.

[d] This figure indicates that current use of modern contraception remained constant between 2008-2013. In 2008, it was 10%.

In order to increase use of contraception and decrease unmet need for FP, efforts must be made to increase the availability of long-acting methods, particularly reversible methods, which have been found to be highly effective in preventing unwanted pregnancies and suitable for different categories of women.[2,3,4] Because these methods are efficacious over a long period of time, independent of user adherence and therefore are not administered as frequently, LARCs have proven to be highly efficacious and cost-effective in preventing unwanted pregnancies.[4]

While cultural factors, fear of side effects, and the desire to become pregnant may influence the preference for short-acting methods (provided by lower cadre health staff) over long-acting methods (provided by higher cadre health staff), shortage and mal-distribution of higher cadre health staff in several settings may limit access to the long-acting methods for clients who do desire to use them. Nigeria, for example, faces a shortage and inequitable distribution of health workers, which limits access to voluntary FP and other essential health services for underserved populations and areas.

In Nigeria, CHEWs significantly outnumber nurses and midwives; the country has 36,737 CHEWs compared with 5,604 nurses and midwives.[4] There are two categories of CHEWs – "junior" CHEWs who complete two years of preservice training and CHEWs who complete three years of pre-service training following a standard pre-service training curriculum. CHEWs are classified as 'upper-lower' health staff, trained to offer different health services at the facility and community levels. They are expected to spend half of their time on community-based functions and the other half in the clinic. However, because of the chronic shortage of higher cadre health staff in some parts of Nigeria (particularly in the rural areas, urban slums, and underserved and resource-constrained, high-need states of Northern Nigeria), CHEWs are being deployed to work in health facilities in many states throughout Nigeria (including in Cross River State and Kaduna State) and provide a wide range of primary health care services, including family planning services. By not being able to provide implants due to policy restrictions and inadequate capacity, clients at static health facilities managed by CHEWs might have limited access to this highly effective LARC.

In its 2012 recommendations, the World Health Organization (WHO) also supported targeted research on task shifting for implants as one of the strategies to optimize the delivery of essential reproductive health/maternal, newborn, and child health (RH/MNCH) interventions in resource-poor settings.[5] These recommendations define both task shifting (the full delegation of a task from one cadre to another) and task sharing (when providers retain responsibility for a task while a new cadre also adopts it). The document calls for policy change to allow task sharing in accordance with the WHO recommendations where it is needed, as well as for additional, rigorous research to inform future revisions and additions to the task-sharing guidelines, focusing on contraception.[6]

Recent efforts have been made in various countries to increase access to these LARCs, particularly implants, and reduce unmet needs for FP. One of these efforts has involved task sharing to appropriate lower cadre staff (CHEWs), as has been successfully done in Ethiopia where Health Extension Workers were trained to provide implants.[7] Task shifting to lower cadre staff has been used, where and when feasible, to redress shortages of higher skilled health staff. [8]

Until recently, the Nigerian National Family Planning and Reproductive Health Policy guidelines and standards of practice permitted CHEWs to offer only male and female condoms, as well as ongoing resupply of oral contraceptive pills (*initiation* or initial supply of pills is not permitted). Based on the WHO's recommendations to embrace task sharing in circumstances where it can be done safely, the Nigeria Federal Ministry of Health (FMOH) developed a policy to enable Senior CHEWs to add LARCs (both IUDs and implants) to their service offering. According to a presentation made by Dr. Kayode Afolabi, Head, Reproductive Health, FMOH, at the LARC and PM Community of Practice meeting (July 2016), the policy development process included:[5]

- Advocacy and consensus building among all stakeholders including professional regulatory bodies, state and non-state actors, pre-service institutions, service providers, and others.
- Review of examples of task sharing in country as well as evidence from other countries with similar health systems.
- Engagement with stakeholders to develop a more comprehensive essential health services package.
- Approval of the policy at the National Council on Health meeting in Uyo, Akwa Ibom State in 2014.

In his presentation, Dr. Afolabi also stated that under the policy, senior CHEWs can:[5]

- Provide FP education and counseling in support of informed choice.
- Promote dual protection.
- Provide short-acting contraceptive methods including initiation and maintenance of injectables.
- Insert and remove implants and copper IUDs.
- Refer for other methods and services.

Although the policy to permit CHEWs to provide implants is in place, discussions with stakeholders suggest that since there are costs associated with the implementation of the policy, there is need to demonstrate the value added of task shifting and document a process for successful implementation of the policy. For instance, will task shifting lead to increased uptake of implants and other LARCs? Will the CHEWs be able to perform implants services (insertions and removals) according to national standards? Additionally, consultations at the state level highlighted a need to understand the state-level differences in the functions that CHEWs are permitted to perform and how these differences can affect the implementation of the implants task-shifting policy across states. For instance, while in Kaduna and Cross River States, Senior CHEWs are permitted to provide injectables and even manage a primary health care facility, in Lagos state, CHEWs are not permitted to perform any of these functions. It is thus important to understand and document system and other implementation challenges before embarking on national implementation of the policy. This study seeks to add to the evidence base, which shows that with adequate training, CHEWs can provide implants thereby increasing their clients' access to FP methods, particularly LARCs. Consequently, our study adds value by showing the benefits of engaging CHEWs in the provision of LARCs and identifying issues and processes to consider in the implementation of the policy shift.

Additionally, two similar studies took place during the same period, both with support from USAID/Nigeria: the USAID-funded, Jhpiego-led Targeted States High Impact Project (TSHIP) undertook

a similar study in Sokoto[9] and Bauchi States; and Marie Stopes Nigeria-led Family Health Plus Project planned a similar study in one or two states at the initial stages of this study. To increase comparability among the three studies, E2A harmonized its methods and data collection tools with the other ongoing or proposed studies. E2A designed this study to generate additional multi-state evidence to support and guide implementation of the policy that would allow CHEWs to provide LARCs.

1.2 Findings from Jhpiego's Task-shifting Study in Bauchi and Sokoto States

TSHIP implemented a study that assessed an intervention on task shifting of contraceptive implants to CHEWs in Bauchi and Sokoto states in Northern Nigeria.[9] The intervention trained 166 CHEWs from the same number of facilities (166) over a two- to three-week period and focused on CHEWs' ability to administer Implanon 1 and 2 rod implants. Over 40% of CHEWs in the study were male, and all had participated in prior FP training. Training included counseling skills for all FP methods, and implants specifically, learning sessions, practice of insertion and removal on model arm and supervised insertion on clients followed by six months of post-training supportive supervision. CHEWs were also provided with a commodity security and logistics training and engaged in sensitization activities and mobile outreach.

At the conclusion of the intervention, 95% of CHEWs received certification in implant insertion within six months of their training. The percentage of CHEWs able to provide implants increased from 6% at baseline to 93% at endline, and observation of counseling skills demonstrated statistically significant increases in competency from baseline to endline. CHEWs took longer to master the 2-rod implant as compared to the 1 rod. The intervention found that CHEWs retained their skills throughout the duration of the study and experienced increased job satisfaction.

Furthermore, clients reported a statistically significant increase in their satisfaction with the treatment and counseling they received from CHEWs from baseline as compared to endline. However, the number of implant insertions per health facility per month remained low throughout the study. CHEWs noted that supportive supervision was important to their success and in maintaining quality assurance. CHEWs preferred to have three to six supportive supervision visits per quarter, exceeding current supervision guidelines. When CHEWs were asked what additional support they felt they needed to provide implants, they stated the need for retraining and suggested training of additional practitioners to increase the number of available providers.

1.3 The Health Care System in Nigeria

Nigeria operates both orthodox and traditional health care delivery systems that are formally independent of each other.[10] While traditional health care services are provided mainly by individuals or families, the orthodox health care system is operated by the private and public sectors. The public health service is organized into primary, secondary, and tertiary levels. In 2011, the estimated total number of health facilities in Nigeria was 34,300, of which 30,221 (88%) were primary health care (PHC) facilities; 3,996 (11%) were secondary health care facilities; and 83 (1%) were tertiary health care facilities. Of the 30,221 PHC facilities, 21,028 (72%) were publicly owned while the remaining 8,413 (28%) were privately owned. At the secondary health care level, 969 (24%) of 3,996 health facilities were publicly owned, while 3,027 (76%) were privately owned. Lagos state, with 2,253 facilities, had the most

health facilities, Kaduna state was second with 1,588 health facilities, and Cross River was twenty-fourth with 734 health facilities. [11]

The National Health Policy ascribes responsibilities for PHC to local governments, secondary care to states, and tertiary care to the federal level. However, federal-level parastatals, for example, the National Primary Health Care Development Agency (NPHCDA), are involved in the development and provision of PHC services. Although national policies, formulated by the FMOH, provide some level of standardization, each level is largely autonomous in the financing and management of services under its jurisdiction.

The PHC facilities are the entry points of communities into the health care system. They include health centers and clinics, dispensaries, and health posts which typically provide general preventive, curative, promotive, and pre-referral care. PHC facilities are typically staffed by nurses, community health officers (CHOs), CHEWs, junior CHEWs, and environmental health officers. It is the expectation and practice that LGAs finance and manage PHC under the supervisory oversight of the state government.[12]

2. Description of Intervention

The study interventions aimed to build the capacity of CHEWs to provide implants to ensure high quality counseling, implant insertion services, and implant removal services, to facilitate ongoing supportive supervision, and to document the results of these efforts through operations research. A description of the various components of the intervention is presented below.

2.1 Training and Certification

The World Health Organization (WHO) Medical Eligibility Criteria (MEC), the national FP/RH service delivery protocol, and Jhpiego's revised and updated global training manual were adapted for development of the training curriculum. In both Kaduna and Cross River states, E2A/Pathfinder Nigeria staff, in collaboration with the School of Health Technology and State Ministry of Health, organized two 10-day FP trainings in each state (June 15-26), with special focus on competency-based training approaches on insertion and removal of implants. The training in Cross River state took place in Calabar while that of Kaduna State took place in Kaduna. Forty CHEWs (two CHEWs from each of the 20 intervention facilities in each state) participated in the two trainings, which were conducted with both the single rod Implanon and Jadelle.[e]. The two-week training consisted of classroom teaching (first week) and practicum (second week). LARC certified trainers were hired as facilitators for the first week while highly qualified providers were hired as preceptors for the practicum. As part of the training, participants also learned about infection prevention and FP counseling. Furthermore, the training provided a refresher on short-acting methods, which the CHEWs had already been providing. The training consisted of classroom-based instruction and practice of insertion techniques using model arms, followed by supervised clinical practice on counseling and insertion/removal of implants.

Aside from building their capacity to insert and remove implants, as well as provide FP counseling and short-term methods, the training of CHEWs provided an opportunity to strengthen their capacity to

[e] During the study, Implanon NXT was introduced at facility level in Nigeria in a phased approach.

keep records of services provided, track data on commodity stocks, and project future needs. The training covered record keeping using NHMIS-approved registers and forms. In addition, the training was supplemented with on-site technical assistance from their health facility supervisors and the monitoring team members. Supervisors used a competency checklist to certify CHEWs post-training; CHEWs were certified as competent if they scored "optimal" during 20 insertions and 5 removals as observed and rated by the supervisor. In Kaduna, 19 out of 20 trained CHEWs were certified, and in Cross River, 14 out of 20 trained CHEWs were certified as competent to insert and remove implants. Each facility remained with at least one trained CHEW.

2.2 Supportive Supervision

In the months following the training, the CHEWs at the intervention sites provided FP services, including implants services to women who requested them at their facilities. Post-training supportive supervision was provided by appropriate government, facilitated and coordinated by Pathfinder/Nigeria staff in both states to ensure adherence to approved standards (WHO MEC and national FP/RH service delivery protocol) in providing implant services monthly. To mobilize implant acceptors in advance of supportive supervision visits (in order to have sufficient implant counseling and insertion services to observe during support supervision), village and neighborhood "town criers"[f] were used to announce a package of services for women provided at government health facilities, encouraging women to visit a facility. No supportive supervision visits were organized for comparison sites by the program team; it was assumed that they continued to receive supervision through their regular facility management systems.

2.3 Commodity Security and Logistics

Adequate supply of commodities, particularly implants, was essential for the successful implementation of this study. Assessing the effects of task shifting on uptake of implants is meaningful only when clients who request implants are able to obtain them. Consequently, the availability of commodities and other consumables in the intervention facilities was monitored during supervision.[g] CHEWs in the intervention areas were responsible for monitoring the supply and adequacy of FP commodities in their health facilities, using a form developed to track consumption, available stocks, and projections of additional quantities needed.[h] These forms were forwarded to the LGA Ministry of Health office, then compiled and forwarded to the state-level FP coordinator on a bi-monthly (every two months) basis. Requests were fulfilled at the state based on historical consumption and available stock in facilities.[i] No additional support was given to comparison sites in improving commodity management and logistics.

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[f] One form of communication about community events is the deployment of "town criers" – designated members of the community who move up and down the streets of a village or urban neighborhood with a megaphone, making general announcements on issues or events relevant to community members.

[g] Ensuring adequate supply of implants in the comparison sites is one of the efforts to ensure that supply conditions are similar in both the intervention and comparison sites and that the only difference between the two is training of CHEWs to insert/remove implants in the intervention sites.

[h] The quantities needed for any month were estimated as the number distributed in the previous month multiplied by 110%.

[i] No information was gathered on whether intervention facilities anticipated increased need for implant commodities (based on participating in the intervention and potentially having a greater number of implant clients), nor whether bi-monthly projected requests included an increase in implant stocks, nor whether the state complied with any request for additional implants based on participating in the training and the research.

Implants were provided to clients free of charge. Clients were asked to pay for provider's service fees and often, some consumables needed for implant insertions. These charges were not consistent within or across facilities.

2.4 Demand Generation

During the training, the CHEWs were trained on "proactive" demand generation approaches: for instance, group talks in the facility during antenatal care and immunization visits, holding event days, or screening all postpartum women during immunization and child health visits regarding their desire for postpartum FP (of which implants can now be offered). As mentioned previously, health facilities and LGA staff mobilized "town criers" in order to increase community members' awareness of women's health services (which, of course, included implants) and to encourage them to go to a government hospital for these services. Pathfinder did not support any additional communication, demand generation, or outreach services as part of this intervention, in either the intervention or the comparison sites.

3. Methods

3.1 Study Duration

The study duration lasted 15 months, from April 2015 to June 2016. The implant-related training intervention was simultaneously conducted in Calabar, Cross River, and Kaduna, 15-26 June, 2015. For purposes of analysis, the study pre-intervention period is defined as April, May, and June of 2015. The post-training supervision and other elements of intervention continued until the end of June 2016. April, May, and June of 2016 are therefore considered the post-intervention period.

3.2 Design and Sampling

The operations research was conducted in two states of Nigeria: Kaduna in the North-West zone and Cross River in the South-South zone. Both states were selected in part because Pathfinder International, in partnership with other organizations, had previously or were implementing FP-related service delivery activities.[j] [k]

In collaboration with the relevant state and local government officials and in consultation with other stakeholders, E2A selected two LGAs in each state for the study, one intervention and one comparison, for a total of two intervention and two comparison LGAs. In Cross River state, the intervention LGA was Akpabuyo and the comparison was Calabar South. In Kaduna state, the intervention LGA was Kajuru and the comparison was Igabi. Within each LGA, 10 facilities, including Comprehensive Health

[j] Since one of the objectives of the study is to promote use of implants, it thus made more sense to implement the study in settings where some demand for family planning methods already exists. Increased use of implants may occur in two ways: demand from new users and method switching among continuing users.

[k] In Cross River State, the intervention LGA is Akpabuyo and the comparison, Calabar South. In Kaduna State, the intervention LGA is Kajuru and the comparison LGA is Igabi

Centers, Primary Health Centers, Primary Health Clinics, and Health Posts/Dispensaries, were randomly selected for the study.[l]

Table 1 below shows the distribution of health facilities by state and type of facility.

Table 1: Distribution of sample by group, state, and type of facility

Health Facility characteristics	Cross River				Kaduna			
	Intervention (10)		Comparison (10)		Intervention (10)		Comparison (10)	
	n	%	n	%	n	%	n	%
1. Health Facilities								
Comprehensive Health Center[m]	0	0%	0	0.0%	0	0.0%	1	10.0%
Primary Health Center	9	90.0%	9	90.0%	10	100.0%	7	70.0%
Primary Health Clinics[n]	0	0.0%	0	0.0%	0	0.0%	2	20.0%
Health Posts and Dispensaries	1	10.0%	1	10.0%	0	0.0%	0	0.0%

Two CHEWs were trained at each intervention facility.[o] Staffing in each of the individual facilities varied, with a majority of facilities having both nurses and CHEWs, among other staff, in the facility. The specific numbers and cadres of all staff for intervention and comparison facilities included in the study was not collected.

3.3 Data Collection

Several data sources were used to collect data at baseline, through the life of the intervention, and at endline. The section below outlines the different data sources, when data were collected and how.

The operations research involved: (i) routine data collection to monitor program activities and outputs, including uptake of FP/LARCs/implants and changes in method mix; (ii) baseline and endline assessments of CHEWs' experience inserting and removing implants, including the challenges they face while providing the services; (iii) observations of CHEWs to assess the extent to which they provide services

[l] We avoided having both the intervention and comparison sites in an LGA in recognition of the fact that LGA officials might decide to introduce the intervention in non-intervention sites in the middle of the study, thus "contaminating" the study. Attempts were made to select non-intervention sites that were similar in some background characteristics to the intervention sites.

[m] A Comprehensive Health Center is the highest level of primary care in the Nigeria government health system. As opposed to a Primary Health Center, a CHC, in principle, has a small operating theater and one doctor on staff, in addition to other nurses, nurse-midwives, and community health staff. For the purposes of providing family planning services, however, the two levels of facilities offer virtually the same level of services and methods.

[n] It should be noted that primary health center classification was made according to the National Primary Health Care Development Agency (NPHCDA). The differences between each level (eg primary health center vs. primary health clinic) were originally centered around the population served and the minimum health personnel requirement. For example, centers serve a population of 10,000 – 30,000 with a least one Community Health Officer (CHO) and PHN (Primary Health Nurse). 3 CHEWs, 6 Junior CHEWs (JCHEWs) and 3 Nurses/Midwives; while a clinic serves a population of less than 10,000 with at least 2 CHEWs and 4 JCHEWs. However, this classification has not changed over time despite facility expansions and/or population growth in the catchment area, and differences between the two classifications are no longer meaningful.

[o] At the time the decision was made regarding the number of CHEWs to train, the number of CHEWs per health facility was unknown. Where there were more than 2, only two were trained.

according to national standards (quality of services); and (iv) exit interviews with FP (implants) clients to determine satisfaction with services obtained from the CHEWs (intervention sites[p]) and other service providers (comparison sites). The text below describes each of the data collection instruments, responsible parties, and the ideal or intended number of completed tools to be collected during the study (actual numbers completed are presented in the Results section).

To identify the proportion of CHEWs who met competency standards and the extent to which CHEWs observed recommended safety practices, support supervision teams directly observed CHEW provision of implants and completed a service provision standards checklist. The checklist contained both the standard counseling and clinical procedures that should be followed during the provision of implants. The performance of each observed CHEW was assessed against the standard. Counseling and service provision checklists were completed by trained clinical support supervisors, usually MOH staff, during organized monthly support supervision visits in intervention sites only. It was expected that each trained CHEW would be observed at least four times during the duration of the project, generating a total of 160 observation reports.

Client exit interviews were conducted with a sample of clients who obtained an implant insertion/removal services on the day of the interview to assess their level of knowledge and use of FP, experiences with counseling and service provision, and satisfaction with services obtained from the CHEWs (at the intervention sites) and non-CHEWs (at the comparison sites). For the client exit interview, it was initially planned that two clients would be systematically selected and interviewed from all clients who received implants services on the day of the interview.[q]

To measure changes in FP uptake and method mix, routine service data from intervention and comparison health facilities were collected before and during the study from the FP registers at facility level. Uptake of FP during the three months before the study (pre-intervention) served as the baseline data against which service data collected during the study/intervention were compared. FP uptake data were collected monthly once the study commenced from both the intervention and comparison sites, in order to track changes in the uptake of implants (insertions and removals of Implanon and Jadelle) and method mix. It was expected that this would result in 40 records per month (20 at intervention sites and 20 at comparison sites; 1 per health facility), for 15 months.

Provider interviews with CHEWs generated information on their experience offering implants services. These interviews were also conducted to obtain baseline and endline information from CHEWs about their socio-demographic characteristics, knowledge of implants, training on implants, experience providing FP methods, particularly implants, data use ability, and organizational support and supply. Interviews with CHEWs in comparison facilities were conducted only at baseline, whereas interviews with CHEWs in intervention facilities were conducted at both baseline and endline. A maximum of 120

[p] At intervention sites with both CHEWs and non-CHEW staff providing implant services, exit interviews among women who received implant services from non-CHEW providers were conducted, focusing only on their satisfaction with implant services, as this study focuses on the extent to which CHEWs can provide FP services according to national standards. The supervision teams were to observe only provision of implant services among CHEWs.

[q] Exit interviews were conducted at the comparison sites to enable an analysis of clients' level of satisfaction between sites that task shift implants services to CHEWs (intervention sites) and those that do not (comparison sites).

interviews were expected: 80 at baseline in both intervention and comparison sites (two CHEWs per facility) and 40 interviews at endline in just intervention facilties (two CHEWs per facility).

Research assistants were recruited and trained to collect service data and conduct provider surveys and exit interviews. Two research assistants, with some background in FP/RH and experience in quantitative research, were recruited, one for each state. To ensure adequate completion of data at the comparison sites, the research assistants visited the sites at the beginning of the study to identify the staff responsible for compiling data and offered on-the-job assistance where needed. At the end of each month, the research assistants visited the comparison sites to collect data on implant services provided and to interview clients upon exit.

3.4 Data Management

Excel and Access databases were used to manage and enter information as it was collected. At both intervention and comparison sites, monthly FP service data were compiled using approved forms collected by the research assistants at the end of each month. The research assistants entered the data into an Excel or Access database that had a variable to differentiate between intervention and comparison sites. Data from the observation checklists and associated scores were entered into the appropriate database by the research assistants following site visits.

The data were exported into Stata for data analysis. All data analysis was conducted using Stata version 14. Percentage tables that showed the distribution of facilities, CHEWs, clients, and contraceptive method mix were generated and disaggregated by intervention and comparison sites as feasible. Graphs and bar charts to explore the outcome of the project intervention service delivery model on acceptors of implants over the project lifetime (April 2015- June 2016) were generated as exploratory analysis.

3.5 Data Analysis

For this operations research, measures of FP uptake and services examined include:

(i) Mean number of implant insertions during the study[r] (intervention and comparison sites) performed by all staff and by CHEWs from baseline to endline;

(ii) Changes in overall contraceptive method mix and Couple Years Protection (CYP) (intervention and comparison sites, baseline and endline);

(iii) Percentage of implant users who obtained implant services from a CHEW (intervention sites only); and

(iv) Percentage of trained CHEWs able to provide implant services according to international standards (intervention sites only).

A data analysis plan was developed to measure all variables related to the study objectives. Data analysis was performed to determine CHEWs competency following the training as well as at the end of the study intervention; determine client satisfaction with services provided by the CHEWs at the intervention sites and by other providers in the comparison group; address the organizational support received by the CHEWs, post-implant training; and examine how the provision of implants by CHEWs

[r] The number of implant insertions and removals/referrals for removal was recorded during the training and at the health facilities after training

affects the FP method uptake and method mix. Details on the analysis procedures utilized for each of these different objectives and components are described below:

Observation of Service Provision by CHEWs: Observation data related to service provision by CHEWs were collected in three parts at the intervention sites: observation of contraceptive counseling, observation of counseling on implants, and clinical observation of implant insertion. Each of these sections contained a series of questions. A composite scale for each section was created using a binary score with each question receiving the same weight. Paired t-tests were then conducted to determine whether there was a statistically significant mean difference in service provision at the beginning (months 3, 4, 5) and end of the intervention (months 10, 11, and 12).

Client Satisfaction: Client interviews and questionnaires were conducted to assess client satisfaction at both intervention and comparison facilities. Two composite scales were created, one for client satisfaction and another on client information provision, which included questions on whether the CHEW provided necessary information to the client during the visit. T-tests and Pearson chi-square tests of independence were conducted to determine whether client satisfaction differed across intervention and comparison facilities, and to examine the relationship between intervention/comparison facilities and the respective variable of interest, including willingness of the client to recommend the health facility to a friend and cleanliness of the facility.

CHEW Interviews: Interviews with CHEWs were conducted to gather the CHEW perspective and address the organizational support they received, post-implant training support and implementation of guidelines and protocol. Descriptive statistics were run on the data, and composite scores on organization support, post-implant training and guidelines and protocol implementation scale were created. Using the composite scores, a t-test was run to determine whether the organization support and guidelines and protocol implementation differed across facility type (intervention vs. comparison).

Family Planning Uptake: To understand changes in FP uptake, FP service provision data were collected monthly from April 2015 through June 2016 for all 40 health facilities. Several tests were applied to the service provision data including:

1. T-tests: A series of t-tests were conducted to assess whether the intervention and comparison facilities had similar uptake of condoms, pills, injections, implants (including CHEW-provided implants), and IUDs at pre-and post-intervention.
2. One-way ANOVA: The ANOVA confirmed the results of the t-test to determine the difference between the intervention and comparison facilities in terms of individual method uptake during the two periods.
3. Two-Way ANOVA: This test compared the mean differences in implant uptake between two independent variables (time and facility type) to test the relationship between intervention and time period and whether the intervention had an effect on implant uptake (both for CHEW-provided implants and for total implants offered by all providers).
4. Multivariate Analysis of Variance (MANOVA): A multivariate analysis of variance (MANOVA) was similar to the two-way ANOVA in that it tested whether there was a statistically significant interaction effect of the intervention on implant uptake. However, unlike the Two-Way ANOVA, the MANOVA looked at the method uptake as a collective

of FP methods, whether there was a difference in contraceptive method mix among the intervention and comparison sites, and over time.

5. Difference in Difference (DiD) Analysis: A DiD analysis was also conducted to determine the effect of the intervention on uptake of each FP method (including CHEW-provided implants). Data varies by health facility (i), and time (t). Outcome is Y_{it}, and there are two periods: pre-and post.

The baseline, or "pre-intervention phase" was the three-month period before or during the training, April-June 2015. The endline, or "post-intervention phase" was captured as the last three-month period of the study, April-June 2016. This three-month post-intervention phase was selected as it was the same number of months as the baseline (three) and it was at the end of the intervention, thus representing a more realistic "snapshot" of the intervention, after any immediate post-training effect had subsided (services usually dramatically increase right after a training, and then taper off).

Descriptive statistical analyses of the FP method uptake at the 40 health facilities over time were performed using a series of t-tests to assess whether the intervention and comparison facilities were similar to each other during the two periods in terms of the uptake of condoms, pills, injections, implants, and IUDs. These t-test results were confirmed by one-way ANOVA, which tested the difference between the intervention and comparison facilities in terms of method uptake during the two periods. A two-way ANOVA was also performed, comparing the mean differences between groups by intervention group, time, and interaction between intervention and time. A statistically significant interaction between intervention and time affecting the dependent variable means that the intervention had an effect on uptake of implants.

A two-way multi-level MANOVA was conducted to test if there were changes in the FP method mix across the intervention and comparison facilities, as well as the difference between the pre-intervention and post-intervention periods. MANOVA examines the collective impact of independent variables on a collection of dependent variables. In two-way ANOVA, implant uptake was the only dependent variable. Whereas in MANOVA, there were two independent and five dependent variables, i.e. monthly uptake of condoms, pills, injections, implants, and IUDs at health facility; this phalanx of five dependent variables represents the entire contraceptive method mix at each facility. By measuring FP methods as separate dependent variables in a single analysis, there is a better chance of discovering which method increased significantly as a change in the contraceptive method mix. The two independent variables were "intervention" and "time". We also included interaction term, *intervention X time,* in the model. The primary aim of the two-way MANOVA was to determine whether there was a statistically significant interaction effect. A statistically significant interaction effect would indicate that the intervention had an impact on implant uptake.

A series of hierarchical regression analyses using a DiD analysis with mean monthly uptake of each of the five FP methods as the dependent variable were performed. In all of these regressions, the simplest model was employed where an outcome (Y) was observed for two groups for two time periods for all three models. One of the groups (intervention facilities) was exposed to an intervention during the second period, but not during the first period. The second group (comparison facilities) was not exposed to the intervention during either period. Since we observed the same facilities within a group

during each time period, the average increase in the second group (comparison facilities) was subtracted from the average increase in the first group (intervention facilities). This removed biases during second period comparisons between the two groups that could result from permanent differences between those groups (such as differences in age or marital status), as well as biases from comparisons over time in the treatment group that could be the result of trends which started before the intervention as a result of some other separate, undocumented process (e.g., a communications campaign or large training initiative by another organization). We began with Model 1 with the three key aforementioned variables. In Model 2, we added the covariates, i.e. uptake of the remainder of the FP methods. The basic model for these analyses is shown in Appendix III, and detailed results of these analyses for the five FP methods offered by all providers at facility level are contained in Appendix IV.

Data were collected on uptake of all implants, and the number provided specifically by CHEWs was also recorded. A separate analysis incorporating the same methods described above (t-tests, one-way ANOVA, two-way ANOVA, and a DiD analysis of CHEW-provided implants) was also included. This analysis was performed to show the effect of training on CHEWs' service provision of implants.

3.6 Ethical Considerations and Confidentiality

The study was conducted only after obtaining ethical approval from ethics review boards in Nigeria and the United States. Although the intervention revolves around a policy shift about which the CHEWs might be expected to be enthusiastic, efforts were nevertheless made to ensure that recruitment into the program was voluntary—no CHEWs were recruited for training against their wish. Participation in the provider survey was also voluntary and the research assistants were trained to communicate this to the respondents.

Regarding especially the client exit interviews, measures were taken to assure the respect, dignity, and freedom of each respondent. During training of research assistants, trainers emphasized the importance of obtaining informed consent and avoiding coercion of any kind. In order to guarantee the anonymity of respondents, their names, addresses, or other identifying information was not included in the questionnaire. Verbal informed consent was obtained from each participant by reading a short paragraph that summarizes the study and the role of the participant. Each participant was assured of confidentiality.

3.7 Study Limitations

The study design was a quasi-experimental study, and therefore intervention and comparison sites may not be comparable at baseline, which may have led to potential problems with internal validity. For example, if clients at intervention sites were more likely to be older, educated, and married as opposed to comparison sites, then this would have affected internal validity, which would bias the outcome in favor of the intervention. In a randomized control trial, clients are randomly assigned to intervention and comparison services, and therefore have the same chance of being assigned to the intervention group or the comparison group. This was not feasible or possible in the context of community- and facility-based FP service delivery; clients cannot be randomly assigned to seek services at one facility or another. In order to compensate for this, some of the statistical techniques used in this report attempt to correct for some of these differences at baseline in demonstrating whether the intervention had a significant and positive effect on uptake of implants.

A second limitation is that both LGAs and facilities were purposively selected due to logistical and budget constraints. This means that the MOH staff, implementation teams, and research staff used certain objective criteria and their best judgement to choose facilities. However, this may have led to unintentional errors in selecting the most comparable and representative facilities. It may have introduced a low level of reliability and high level of bias if the facilities with some unique characteristics, which were not representative of other similar facilities in the region and in the country, leading to an inability to generalize the findings. One of the biggest limitations is that intervention facilities were "high volume" facilities in terms of family planning service provision, and comparison facilities were low volume. Thus, these groups of facilities are not particularly comparable with respect to non-CHEW provision of FP services, including commodity management, quality of services provided, and uptake of implants and other methods of FP.

In addition, the total sample size of facilities included in the study was relatively small: 20 intervention and 20 comparison sites; this also increased the chance that the sites chosen and clients served were not representative or were biased in some way. It also increased the design effect and error terms measured at client level, and required more robust interpretation of statistical significance to make conclusions about the effect of the intervention on the outcomes of the study.

The implementation of the intervention varied by region, and in some cases, facility. The project was designed to align with the routine health facility and program activities and decisions were made by the LGA and state governments to best meet their needs—an implementation science approach corresponding to field needs. In addition, variations in service provision undoubtedly occurred at facility level due to availability of a trained CHEW on each day of service. During the post-intervention period, CHEWs transferred, resigned, and took extended leave (vacation and/or sick) at intervention and non-intervention sites that might have adversely affected implants uptake.

No information was routinely gathered on the supply context of the facilities from in-charges or other responsible managers included in the study, which may have impacted uptake and study outcomes. For example, availability of commodities, equipment, and consumables were not collected monthly. Nor were non-CHEW staffing levels in each individual facility recorded. While some data on availability of commodities and consumables were obtained from facilities at baseline, and indirectly obtained from CHEWs and exit interview clients at endline, information on these significant factors in uptake was not systematically documented throughout the study period.

In addition, we have limited information on the clients themselves due to the small attained sample size for exit interviews. Given that comparison facilities had a mean of one (1) implant client every two months, it may have been impossible to attain the desired sample size of 40 clients in comparison sites. As only 14 interviews were completed, descriptive statistical comparisons between measures on client satisfaction and experiences of implant services lacked statistical power and were impossible to make and thus not presented. The information gathered may have been sensitive to collect (especially for young clients) and subject to reporting bias. Finally, clients who chose not to use services were not interviewed as part of this study, so uptake measured at facility level presents only one side of the "picture" of increasing access to implants.

4. Results

As previously stated, the operations research aimed to meet three objectives. Results presented in this report are organized by these three objectives:

(i) Document the process and outcomes of training CHEWs to provide implants services, and identify the proportion of CHEWs who meet international competency standards at the end of the training or during regular supervision visits. Examine the extent to which the CHEWs provide implants according to national standards;

(ii) Examine clients' experience and satisfaction with implants services obtained from CHEWs; and,

(iii) Examine how the provision of implants by CHEWs affects FP uptake, implant uptake, and contraceptive method mix.

Findings were based on 119 interviews completed with CHEWs throughout the study, 275 observations collected during supervision visits, and checklists completed related to CHEWs' counseling and implant insertion skills, as well as 54 exit interviews conducted with implant clients who received FP counseling and implant services from a CHEW. Monthly data on uptake of all methods of FP (including implants) at facility level, including the number provided by CHEWs for all months between April 2015 to June 2016 was also recorded.

Table 2 shows similar but more detailed information, by state and type of facility (intervention vs. comparison).

Table 2: Completed interviews from intervention and comparison facilities, by state and intervention group

Sample characteristics	Cross River		Kaduna	
	Intervention (10)	Comparison (10)	Intervention (10)	Comparison (10)
	n	n	n	n
1. CHEW interviews				
April-June 2015	20	20	20	20
April-June 2016	7		18	
2. CHEW observations				
Early intervention period (Sept 2015-Dec 2015)	42		1[s]	
Post-intervention period (April 2016-June 2016)	82		32	
3. Client exit interviews				
Sept 2015-June 2016	20	4	20	10

In comparing actual achieved sample sizes with desired sample sizes, it should be noted that CHEW observations from the baseline period in comparison sites were destroyed in a car accident, and hence, not obtained. In addition, we have limited information on the clients themselves due to the small attained sample size for exit interviews. Given that comparison facilities had a mean of one (1) implant

[s] It should be noted that this data are missing due to a fatal auto accident that occurred in Kaduna in September 2015 and which destroyed the only available copy of the data collected in the baseline phase of the study.

client every two months, it proved impossible to attain the desired sample size of 40 clients in comparison sites. As only 14 interviews were completed, descriptive statistical comparisons between measures on client satisfaction and experiences of implant services lack statistical power and as demonstrated in a later section, were impossible to make on many indicators of client satisfaction and perceptions of quality. These and other limitations are discussed in further detail in the Discussion section.

Data collected from CHEW interviews at baseline and endline, intervention facility observations, and uptake of FP in all facilities are used to make most of the observations and draw conclusions in this study.

4.1 Background Characteristics of Health Facilities and CHEWs

The majority of participating facilities were primary health centers/clinics, with the exception of one comprehensive health center in the comparison group in Kaduna State, and one health post/dispensary in both of the intervention and comparison groups of facilities in Cross River State. In Cross River, all of the intervention sites were based in a rural area; comparison sites were classified as urban.[t] In Kaduna, all intervention sites and 90% of comparison sites were based in predominantly rural areas (data shown in Table 1, page 20).

In both states, most facilities were open between five and seven days per week. Intervention facilities in both states were open for business seven days per week, whereas comparison sites were more often open five days per week. All intervention sites in Cross River and 40% in Kaduna reported to be open nine to twelve hours per day. Kaduna sites (both intervention and comparison) were more often open less than eight hours per day. As almost all facilities were primary health care sites, FP was not offered on any special day or time during the week by any dedicated or assigned provider[u], so services were theoretically available during normal operating hours and days.

Table 3: Characteristics of intervention and comparison health facilities at baseline, Cross River and Kaduna states, June 2015

Health facility characteristics	Cross River				Kaduna			
	Intervention (10)		Comparison (10)		Intervention (10)		Comparison (10)	
	n	%	n	%	n	%	n	%
1. Location of health facility								
Rural	10	100.0%	0	0.0%	10	100.0%	9	90.0%
Urban	0	0.0%	10	100.0%	0	0.0%	1	10.0%
2. Number of days facility is open								
< 5 days	1	10.0%	0	0.0%	0	0.0%	0	0.0%
5 days	2	20.0%	10	100.0%	3	30.0%	6	60.0%
7 days	7	70.0%	0	0.0%	7	70.0%	4	40.0%

[t] While it appears that comparison sites may not share similar to intervention sites in CRS State in terms of urban/rural classification, Calabar South is the least developed part of urban Calabar municipality with social infrastructure that is not very different from what is available in the rural areas of CRS State.

[u] Nurses and CHEWs in these sites generally provide a wide range of preventative and curative primary care services, including malaria treatment, respiratory infection treatment, immunizations, ANC, and family planning. Providers are not typically assigned as dedicated providers of family planning on any specific day of the week in these facilities.

3. Number of working hours per day								
< 8 hours	0	0.0%	2	20.0%	5	50.0%	6	60.0%
8 hours	0	0.0%	6	60.0%	1	10.0%	1	10.0%
9-12 hours	10	100.0%	2	20.0%	4	40.0%	3	30.0%

4.1.1 Availability of Contraceptives in the Selected Health Facilities

Information on the availability of contraceptives at facility level was collected during the CHEW interviews. The percentages of CHEWs reporting the availability of contraceptive methods in the six months preceding the baseline and endline surveys in the two states are shown in Table 4. According to CHEWs, the most widely available contraceptive methods in the health facilities in the six months preceding the survey were male condoms, oral pills, and injectables (each of which was reported to be available in 39 of 40 facilities in the two states. Female condoms were also widely available at baseline (available in 29 of 40 facilities in the two states).

Implants, the major focus of this study, were reported to be available in only 30% and 40% of intervention and comparison sites, respectively, in Cross River, and 20% and 70% of intervention and comparison sites, respectively, in Kaduna at baseline. However, at endline, intervention sites in both states reported to have implants fully available in facilities. IUDs remained widely unavailable both at baseline at all sites and toward the end of the study at intervention sites. When asked about availability of methods on the day of the interview, results revealed patterns similar to availability of methods in the past six months.

Health facilities that reported unavailability of implant insertion services in the six months preceding the baseline survey primarily attributed this unavailability to lack of trained staff to provide the methods. When CHEWs at intervention sites were asked the same question at endline, only one (1) CHEW from an intervention site mentioned unavailability of trained staff, and four (4) CHEWs from intervention facilities responded that the trained staff were not available to provide the service (possibly due to transfers or authorized leave). Encouraging availability of at least one trained staff in a facility who can provide implant services is a challenge for programs which invest in training and support supervision – turnover and reassignments requires that facilities obtain additional training for replacement CHEWs and other qualified staff to ensure continuity of services.

Table 4: Summary data on availability of FP methods, Cross River and Kaduna states, intervention and comparison sites, baseline and endline (intervention only)

Organizational support variables	Cross River				Kaduna				Intervention Endline (25)[v]	
	Intervention (10)		Comparison (10)		Intervention (10)		Comparison (10)			
	n	%	n	%	n	%	n	%	n	%
1. Available FP methods in the past 6 months (as reported by CHEWs on the day of interview)										
Male condom	10	100.0%	10	100.0%	9	90.0%	10	100.0%	25	100%
Female condom	8	80.0%	6	60.0%	7	70.0%	8	80.0%	23	92%
Oral pills	10	100.0%	10	100.0%	9	90.0%	10	100.0%	24	96%
Injectables	10	100.0%	10	100.0%	10	100.0%	9	100.0%	24	96%
IUD	2	20.0%	4	40.0%	2	20.0%	4	40.0%	2	8%
Implants	3	30.0%	4	40.0%	2	20.0%	7	70.0%	24	96%
Female sterilization	2	20.0%	0	0.0%	0	0.0%	1	10.0%	1	4%
Male sterilization	1	10.0%	0	0.0%	0	0.0%	1	10.0%	0	0%
Cycle beads/Standard Days Method	2	20.0%	0	0.0%	0	0.0%	1	10.0%	17	68%
2. Method available today (as reported by CHEWs on the day of the interview)										
Male condom	10	100.0%	10	100.0%	9	90.0%	10	100.0%	24	96%
Female condom	8	80.0%	6	60.0%	8	80.0%	9	90.0%	19	76%
Oral pills	10	100.0%	10	100.0%	9	90.0%	10	100.0%	25	100%
Injectables	10	100.0%	10	100.0%	9	90.0%	10	100.0%	25	100%
Jadelle	4	40.0%	4	40.0%	0	0.0%	0	0.0%	10	40%
Implanon	3	30.0%	5	50.0%	2	20.0%	7	70.0%	20	80%
Implanon NXT	0	0.0%	0	0.0%	1	10.0%	3	30.0%	6	24%
IUD	3	30.0%	5	50.0%	0	0.0%	0	0.0%	4	16%
3. Reasons given by CHEWs as to why implant services not offered (for those not offering implant services)										
Staff trained not available	1	14.3%	1	16.7%	1	12.5%	2	66.7%	4	80%
No staff trained	6	85.7%	5	83.3%	6	75.0%	1	33.3%	1	20%
Implants not available	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0%
No demand for implant	0	0.0%	0	0%	0	0.0%	0	0.0%	0	0%

[v] It should be noted that at baseline, 20 CHEWs representing 20 facilities were interviewed, though at endline, 25 CHEWs were interviewed from the 20 intervention facilities in both states. The results were analyzed and are presented in Table 6 and other tables; thus, five of the facilities at endline are "counted" twice.

4.1.2 Background Characteristics of CHEWs and Willingness to Provide Implants

At baseline, 80 CHEWs were interviewed in both Cross River and Kaduna states. Half (40) of the 80 interviewed CHEWs were drawn from intervention sites (20 in Cross River and 20 in Kaduna) and the remaining 40 were drawn from the comparison sites (20 in Cross River and 20 in Kaduna). Table 5 shows the characteristics of the CHEWs at baseline. The following is a summary of their demographic characteristics:

- The modal age group of the interviewed CHEWs was 35 years and above. In Cross River, 70% and 75% of CHEWs at the intervention and comparison sites, respectively, were aged 35 and above; in Kaduna, 95% and 50% of CHEWs at intervention and comparison sites, respectively, were aged 35 and above. No CHEW was aged below 25.
- An overwhelming majority of the CHEWs were married at baseline, with the percentage 'currently married' ranging from the minimum of 65% among CHEWs at the comparison sites in Cross River to the maximum of 95% among the CHEWs at the comparison sites of Kaduna.
- The interviewed CHEWs were predominantly women, with the percentage of women ranging from 90%-100%. At the comparison sites in Kaduna, all CHEWs were women.

CHEWS included in the study were experienced in their positions. In the two states and at both the intervention and comparison sites, the modal length of time since completing the CHEW pre-service training was 10 or more years. Since almost all the CHEWs started working immediately after their initial pre-service CHEW training, the data show that most of the CHEWs had been working for 10 or more years. All the CHEWs expressed willingness to provide implant services when trained and permitted.

Table 5: Background characteristics of Senior CHEWs interviewed at Cross River and Kaduna states, intervention and comparison sites, June 2015, baseline

Background characteristics	Cross River				Kaduna			
	Intervention (20)		Comparison (20)		Intervention (20)		Comparison (20)	
	n	%	n	%	n	%	n	%
1. Age								
25-29	3	15.0%	4	20.0%	0	0.0%	2	10.0%
30-34	3	15.0%	1	5.0%	1	5.0%	8	40.0%
35+	14	70.0%	15	75.0%	19	95.0%	10	50.0%
2. Marital status								
Married	15	75.0%	13	65.0%	18	90.0%	19	95.0%
Divorced/separated/widowed	5	25.0%	5	25.0%	1	5.0%	1	5.0%
Single	0	0.0%	2	10.0%	1	5.0%	0	0.0%
3. Sex								
Male	2	10.0%	1	5.0%	2	10.0%	0	0.0%
Female	18	90.0%	19	95.0%	18	90.0%	20	100.0%
4. Number of years since completing CHEW pre-service training								
< 1 year	0	0.0%	1	5.0%	0	0.0%	2	10.0%
1-2 years	2	10.0%	2	10.0%	1	5.0%	1	5.0%
3-5 years	5	25.0%	2	10.0%	0	0.0%	1	5.0%
5-9 years	2	10.0%	3	15.0%	3	15.0%	2	10.0%
10+ years	11	55.0%	12	60.0%	16	80.0%	14	70.0%
5. Willing to provide implants service when trained and permitted?								
Yes	20	100.0%	20	100.0%	20	100.0%	20	100.0%
No	0	0.0%	0	0.0%	0	0.0%	0	0.0%

4.2 Study Objective 1: CHEWs Provision of Implants, according to National Standards

In-service training and supervision are critical to ensure that providers have the skills and knowledge to provide quality FP services. Once CHEWs and other health providers start working, they must continue to update to their skills and knowledge in order to stay current with new protocols, FP methods, and guidelines. In-service training can also address gaps in pre-service FP education. The next few sections highlight the organizational support, post-implant training provided to the CHEWs, and implementation of guidelines and protocol in the CHEW setting.

These factors related to objective 1 of examining the extent to which the CHEWs provide implants according to national standards.

Interviews were conducted with CHEWs to gather their perspectives. Seventy-nine (79) interviews were conducted at intervention facilities and 40 at comparison facilities. The interviews provided insight on the in-service training experiences of CHEWs at intervention sites, supervision and observation of FP services, use and availability of guidelines, protocols, and record keeping, as well as organizational support received.

4.2.1 In-service FP Training Experiences of CHEWs

Before implementation of the intervention, only 12 of the 80 CHEWs (15%) from the two states reported receiving in-service training in FP (baseline, data not shown). At endline, however, as a result of the intervention, 100% of CHEWs interviewed at intervention sites reported that they had received in-service FP training (see Table 6, below).

CHEWs interviewed at intervention sites were also asked at endline which family planning service areas were covered in their last in-service training. Table 6 below also shows that all (100%) interviews conducted with CHEWs at endline revealed that CHEWs had received training on insertion of implants, 96% mentioned receiving training on removal of implants, and 83% mentioned that they had received training on FP counseling. Other topics mentioned are also presented below; it should be noted that all topics were covered in the two-week CHEWs training at the beginning of the study.

These same CHEWs were asked to rate their level of comfort in providing implant insertions and the level of supervision needed to offer these services post-training. In the 25 interviews conducted with CHEWs at endline in intervention sites, CHEWs reported that their skills were "good" (10) or "very good" (12) and required "none" (20) or "little" (3) supervision to offer the service (data not shown).

Table 6: Summary data on in-service training experiences for family planning services, endline (intervention only)

Organizational support variables	Both States, endline Intervention only (n=25)	
	n	%
Received in-service FP training since commencing work as a CHEW		
Yes	25	100%
No	0	0%
FP service areas covered in the last in-service training		
FP counseling	19	83%
Community mobilization for FP	8	38%
Provision of pills	9	43%
Provision of injectables	7	35%
Insertion of IUD	7	35%
Removal of IUD	11	52%
Insertion of implants	25	100%
Removal of implants	24	96%
Management of side effects	14	64%
HMIS/M&E	19	80%
CLMS	18	75%

CHEWs were also asked about the types of FP services provided before and after the last in-service training. At endline in intervention sites, nearly all CHEWs interviewed from these sites were providing implant insertions (96%) and removals (88%), as well as management of side effects (96%, n=25; see Table 9) since their last training.

Table 7: FP services provided by CHEWs after last FP in-service training, Cross River and Kaduna states, intervention and comparison sites, baseline and endline (intervention only)

FP services provided	Cross River (baseline)				Kaduna (baseline)				Both states (endline)	
	Intervention (20)		Comparison (20)		Intervention (20)		Comparison (20)		Intervention (25)	
	n	%	n	%	n	%	n	%	n	%
FP counseling	5	100.0%	0	0.0%	3	100.0%	4	100.0%	25	100%
Provision of pills	5	100.0%	0	0.0%	3	100.0%	4	100.0%	25	100%
Provision of injectables	5	100.0%	0	0.0%	2	66.7%	4	100.0%	25	100%
Insertion of IUD	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	4%
Removal of IUD	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	4%
Insertion of implants	0	0.0%	0	0.0%	0	0.0%	0	0.0%	23	96%
Removal of implants	0	0.0%	0	0.0%	0	0.0%	0	0.0%	22	88%
Management of side effects	2	40.0%	0	0.0%	0	0.0%	1	20.0%	24	96%

4.2.2 Supervision for Family Planning Services

Support supervision is an important component of a health program aimed at ensuring efficiency and improving quality and performance of the health care system. Supportive supervision is a process of helping staff to improve their own work performance continuously. It is carried out in a respectful and non-authoritarian way with a focus on using supervisory visits as an opportunity to improve knowledge and skills of health staff (WHO, 2008). A major component of the operations research activity included monthly visits organized and facilitated by E2A and Pathfinder/Nigeria, and conducted by state MOH staff responsible for oversight. However, these visits were almost exclusively focused on CHEW provision of implants, not all family planning services offered by all staff. Feedback was usually given orally during supervision. If supervisors observed an incorrect procedure or failure to adhere to set policy, a correction was made at that moment. This includes implant insertion and removal steps – providers were given feedback and then observed again with an additional client(s) to ensure errors were corrected.

As part of the research, CHEWs were asked questions on the nature of supervision they had received on family planning. Table 8 (below) shows CHEW feedback on their experiences with supervision. At baseline, most CHEWs (with the exception of those in CRS State comparison sites) reported that they "usually received supervision" on all FP methods (55-90%). However, at endline, most interviews with CHEWs at the intervention sites revealed that they usually received supervision on some FP methods. While the consistency of supervision improved during the study period, it is clear that E2A's supervision was more narrowly focused on CHEW provision of implants.

The type of support services provided to CHEWs varied by state and by the site type (intervention or comparison). Most CHEWs reported that the supervisors observed service provision activities, reviewed registers and commodity supplies, and occasionally provided on the job training. At endline in intervention sites in both states, interviews with CHEWs revealed that they had received supervision visits and support in all areas surveyed (76-100%), with the exception of "material supply" (20%).

CHEWs from all sites at baseline and intervention sites at endline received feedback on the supervision either during or after each supervision visit. None of the intervention sites mentioned "never" receiving feedback after supervision visits at endline.

Table 8: Summary data on supervision for family planning services, Cross River and Kaduna states, intervention and comparison sites

Organizational support variables	Cross River (baseline)				Kaduna (baseline)				Intervention Endline (25)	
	Intervention (20)		Comparison (20)		Intervention (20)		Comparison (20)			
	n	%	n	%	n	%	n	%	n	%
1. Received supervision on FP services?										
Yes, all FP methods	12	60.0%	4	20.0%	11	55.0%	12	60.0%	5	20%
Yes, some FP methods	6	30.0%	3	15.0%	1	5.0%	6	30.0%	20	80%
Never	2	10.0%	13	65.0%	7	35.0%	1	5.0%	0	0%
Not applicable	0	0.0%	0	0.0%	1	5.0%	1	5.0%	0	0%
2. Support received during supervision visits										
On-the-job training on FP service delivery	7	38.9%	2	28.6%	4	33.3%	5	27.8%	25	100%
Guidelines and protocols review	15	83.3%	5	71.4%	9	75.0%	16	88.9%	23	92%
Completing registers	10	55.6%	2	28.6%	6	50.0%	16	88.9%	20	80%
Commodities supply	5	27.8%	3	42.9%	4	33.3%	14	77.8%	19	76%
Material supply	5	27.8%	3	42.9%	4	33.3%	14	77.8%	5	20%
Guidance on service provision	3	16.7%	5	71.4%	0	0.00%	0	0.00%	19	76%
3. Feedback received during supervision visits?										
Yes, during each visit	11	61.1%	5	71.4%	10	83.3%	16	88.9%	0	0%
Yes, after each visit	6	33.3%	2	28.6%	0	0.0%	0	0.0%	25	100%
Yes, after some visits	0	0.0%	0	0.0%	1	8.3%	0	0.0%	0	0%
Never received feedback	1	5.6%	0	0.0%	1	8.3%	2	11.1%	0	0%

As described in the methods (data analysis) section, two composite scales were created to measure supportive supervision and protocol and record keeping from a multi-dimensional perspective. T-tests were then performed to determine whether the CHEWs experience differed between the intervention and comparison sites. Appendix I, Composite Score Scales, list the questions which make up each of the two scores and the value associated with each response used to calculate these composite scores.

On average, the CHEWs received similar levels of supportive supervision at both intervention and comparison facilities. Out of the total supportive supervision score of 9, both intervention and comparison facilities scored 6.1 ± 1.4, with no statistically significant differences ($t(71) = 0.2341$, $p = 0.5922$, data not shown).

4.2.3 Guidelines/Protocols and Record Keeping for Family Planning Services

CHEWs were also asked about the availability of written guidelines and protocols for implant insertions and removals in facilities, if they kept client records in a register, and if they compiled reports and forwarded them on a regular basis. These questions were asked at baseline and endline in intervention facilities to determine availability and frequency of reporting and ability to compile appropriate data. A total of 97 provider questionnaires were completed.

At baseline, at both intervention and comparison sites, the availability of guidelines and protocols was quite low: 76% of CHEWs at intervention sites reported not having written guidelines and protocols for implant insertions and removals in facilities and 43% at comparison sites (data not shown). The proportion of CHEWs who reported that the facility kept records of services to clients and reported this data on a monthly basis was improved at endline for the intervention sites.

Regarding the protocol and record keeping scale (see Appendix 1), intervention facilities scored higher overall with respect to the protocol and record keeping scale. A paired t-test was run on a sample of 117 CHEW interviews to determine whether there was a statistically significant mean difference between the protocol and record keeping score in the intervention facilities when compared to the score in the comparison facilities. Out of the total score of 5, the protocol and record keeping score in the intervention facilities of 3.5 ± 0.9 was higher than the score in the comparison facilities (3.0 ± 0.9); a statistically significant difference of 0.5 (95% CI, 0.1 to 0.8), $t(115) = 2.84$, $p = 0.0026$, $d=0.55$ (data not shown).

Intervention sites demonstrated an improvement in data collection and reporting and availability of guidelines and protocols at endline as compared to the comparison facilities. This is likely due to the increased focus on data collection around the operation research, and monthly supportive supervision visits which gave supervision and mentorship to providers for completing registers and reports.

4.2.4 Service Provision Observation

This section continues to address the intervention's objective of examining the extent to which CHEWs provided implants per national standards. The instruments for observation of service provision by CHEWs had three parts, by area of knowledge and expertise:

1. Observation of contraceptive counseling
2. Observation of counseling on implants
3. Clinical observation of implant insertion

Observation of Contraceptive Counseling

CHEWs were trained to insert and remove implants according to national standards in the last two weeks of June 2015. The service provision was observed in the months between and inclusive of September 2015 and June 2016. June/July 2015 refers to Month 1 of the intervention, August 2015 is Month 2, and September 2015 is Month 3, and so on up to June 2016, which is Month 12).[w] As mentioned previously, CHEWs who scored lower on observed skills (including FP counseling) received immediate feedback and were asked to perform a second observed skill to ensure that errors had been corrected.

Findings on the individual items of the contraceptive counseling checklist are presented in Table 9 for intervention facilities at baseline and endline. Increases are noted on some items, although no statistical testing is presented for percentage change on these individual items. Many of the counseling items were observed at both time periods to be nearly 100%. Only items on number of/multiple sexual partners decreased or stayed low over the study period. Items such as discussing the client's desire for more children, discussing the timing of the next child, asking about the client's currently pregnancy status, history of pregnancy complications, and discussing the partner's attitude about FP all appeared to increase substantially from baseline to endline.

[w] Note that service provision was observed only at the intervention facilities (total 20, 10 in Kaduna and 10 in Cross River.

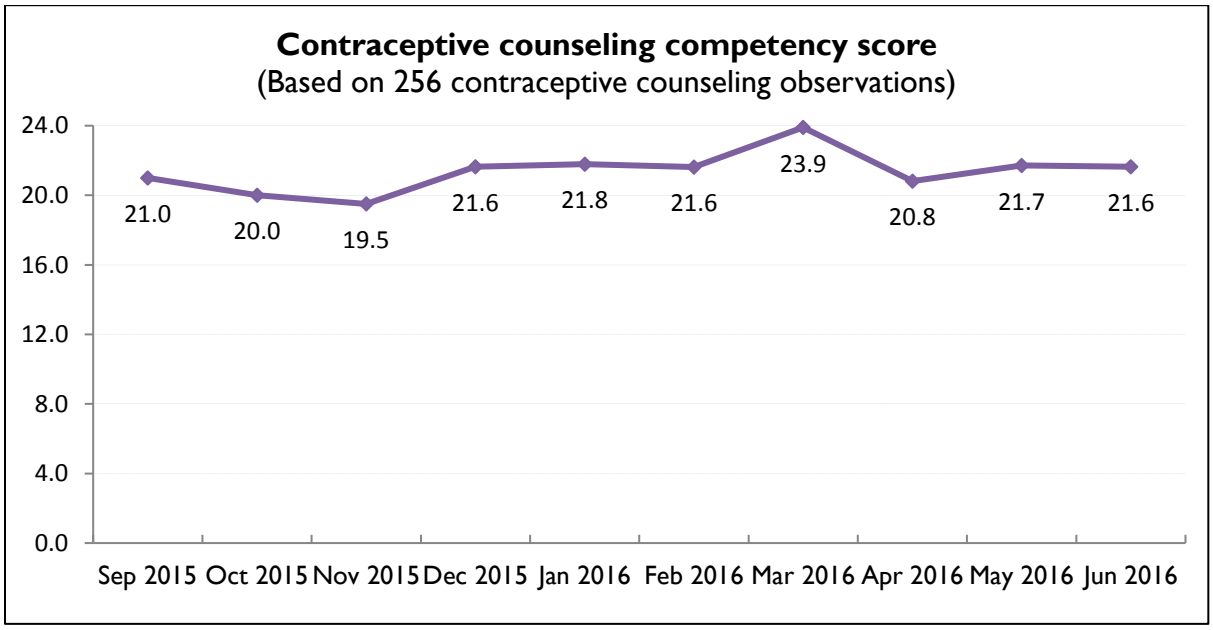
Table 9: Percentage of CHEW service interactions in which measured general FP counseling factors were observed, intervention sites only, Kaduna and Cross River states, by intervention period

Counseling factors	Early intervention period (Sept 2015-Dec 2015) (n=43)		Post-intervention period (April 2016 to June 2016) (n=114)	
	Yes (n)	%	Yes (n)	%
Welcome a client in a friendly manner?	43	100%	113	100%
Provide information on different types of contraceptives?	42	98%	113	100%
Ask open-ended questions?	42	98%	111	98%
Encourage client to ask questions?	42	98%	113	100%
Allow client to ask questions?	42	100%	113	100%
Treat client with respect?	43	100%	113	100%
See client in private?	42	100%	113	100%
Discuss a return visit?	43	100%	113	100%
Ask client her concerns with any method?	42	98%	112	99%
Use visual aids?	41	95%	104	93%
Use client record?	43	100%	113	100%
Assure client of confidentiality?	43	100%	111	100%
Ask current age of client?	42	98%	107	95%
Ask marital/relationship status?	42	98%	106	95%
Ask number of living children?	42	98%	108	96%
Discuss client's desire for more children?	35	81%	106	94%
Discuss timing of next child?	27	63%	103	91%
Ask current pregnancy status?	36	84%	104	92%
Ask history of pregnancy complications?	28	65%	86	76%
Ask partner's attitude about FP?	25	58%	98	87%
Ask about multiple/single sexual partner(s)?	22	51%	42	37%
Discuss partner multiple/single sexual partner?	11	26%	27	24%
Discuss HIV/AIDS and STIs?	30	70%	106	94%
Ask history/signs/symptoms of STIs?	30	70%	91	81%

These scores were combined into a composite counseling score; mean contraceptive counseling competency scores were plotted over months during which the service provision assessment was conducted. See Figure 1 for the plot based on 256 contraceptive counseling observations.

On average, there exists a high level of contraceptive counseling competency at the beginning of the study and throughout the period of observation. None of the mean scores is less than 80% of the maximum score, i.e. less than 19.2 (80% of 24). The competency score on average seems to be similar in the early period following the intervention (i.e. months 3, 4, and 5 post-training) to the score in the later period (i.e. months 10, 11, and 12 post-training). No statistical difference exists between baseline and endline scores in intervention facilities (both are around 21.0). It appears that the high level of contraceptive counseling competency is maintained over 12 months during the post-training period, likely due to the combination of training and supportive supervision of counseling during the intervention, which is a positive finding; with training and regular support supervision, CHEWs can maintain a high level of competency in general FP counseling over time.

Figure 1: Mean contraceptive counseling competency score, by calendar month



Observation of Counseling on Implants

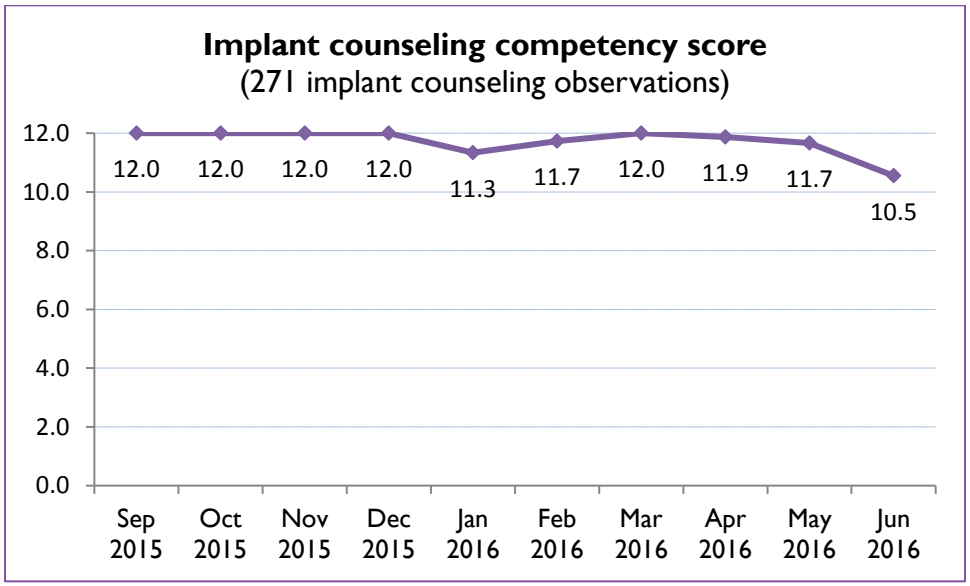
In addition to measuring overall contraceptive counseling, the observer also recorded findings on a series of 12 questions relating to different aspects of counseling specifically on implants. Table 10 lists the 12 individual elements of an implant counseling competency scale and their frequencies by time (early intervention vs. post-intervention). CHEWs generally scored consistently high on all factors at baseline and post intervention. One exception was "Provide services in a respectful, professional manner?" which was observed to be met 100% of the time immediately after the training, but was recorded at 68% in the last three months of the study. While it is possible that different supervisors which performed the observation varied in their interpretation of this factor, it is still worthy of further examination. This is a critical factor in ensuring high demand for family planning services, and it would be important for supportive supervision activities to ensure continued professionalism and respectful care in providing family planning services.

Table 10: Percentage of CHEW service interactions in which measured implant counseling factors were observed, intervention sites only, Kaduna and Cross River states, by intervention period

Counseling factors	Early intervention period (Sept 2015-Dec 2015) (n=43)		Post-intervention period (April 2016-June 2016) (n=114)	
	Yes (n)	%	Yes (n)	%
Provide information on LARCs?	43	100%	114	100%
Explain that the method does not protect against STIs and AIDS?	42	98%	105	92%
Encourage use of condoms for STI/HIV protection?	42	98%	104	91%
Provide information about duration of protection from pregnancy?	43	100%	114	100%
Give accurate information about anticipated effects (e.g., menstrual changes) and side effects (e.g., headache, blurred vision)?	42	98%	113	99%
Discuss the need for the client to come back to the health facility if there are side effects with use, or not tolerating menstrual changes?	42	100%	114	100%
Provide the client with a review of the content of the information card?	42	100%	112	98%
Provide the client with the information card about the contraceptive (implants)?	42	100%	112	98%
Provide the client with information on removal?	43	100%	114	100%
Encourage the client to tell friends about implant insertion service available at the health facility?	43	100%	95	83%
Provide services in a respectful, professional manner?	43	100%	78	68%
Ask the client what method she prefers to have?	43	100%	114	100%

Mean implant counseling competency score was plotted over months during which the service provision assessment was conducted. These scores were combined into a composite implant counseling score; mean implant counseling competency scores were plotted over months during which the service provision assessment was conducted. See Figure 2 below for the plot based on 271 implant counseling observations.

Figure 2: Mean implant counseling competency score, by calendar month



On average, there exists a high level of implant counseling competency through the period of observation. None of the mean scores is less than 80% of the maximum score, i.e. less than 9.6 (80% of 12).

Contrary to what we saw in the plot of general contraceptive counseling competency over time, the implant counseling competency score on average declined in the later period, i.e. months 10, 11, and 12 post-training. It appears that the high level of implant counseling competency maintained over 12 months in the post-training period starts declining in the later period of the year.

A paired t-test was run on a sample of 271 implant counseling observations to determine whether there was a statistically significant mean difference between the implant counseling competency score in months 10, 11, and 12 of the intervention when compared to the score in months 3, 4, and 5 of the intervention. Out of the total score of 12, the implant counseling competency score was lower in months 10, 11, and 12 (11.3 ± 0.9) as opposed to the score in months 3, 4, and 5 of the intervention (12 ± 0.0); a statistically significant decrease of 0.7 (95% CI, 0.3 to 1.0), $t(139) = 3.81$, $p = 0.0001$, $d=0.81$. Effect size is large and practically significant (Cohen's $d = 0.81$, data not shown). Thus, the implant counseling competency score has declined in the later period. It appears there needs to be refocus of support supervision on a few key areas, such as respectful client care for all family planning clients, improved demand creation, and encouraging referrals for implants. As noted above, continued supportive supervision to ensure professionalism and respectful care for clients receiving implant services is also critical.

Clinical Observation of Implant Insertion

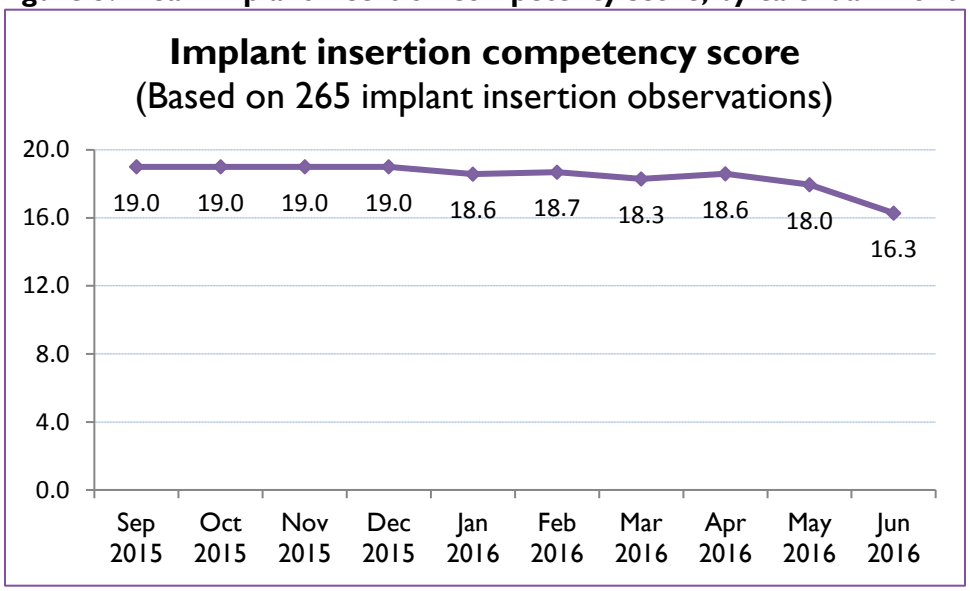
The observer recorded findings on a series of 19 questions relating to different aspects of implant insertion. Table 11 lists the individual elements of the implant insertion competency scale. Encouragingly, most steps required to provide high quality implant services were observed during implant insertion services and remained very high or at nearly 100% throughout the study. While no significance tests were

performed on these comparisons, declines are specifically noted on reconfirming client's method choice (100% in the early intervention phase to 63% during the last three months of the study) as well as several measures of infection control, including: "Apply aseptic rules in un-packing Implanon/Jadelle?" (100% to 68%); "Wash hands after removing gloves?" (100% to 65%); and "Ensure that instruments and reusable gloves are decontaminated?" (100% to 80%). Follow-up supportive supervision should ensure that these steps are followed post-training.

Table 11: Percentage of CHEW service interactions in which measured elements of implant insertion competency were observed, intervention sites only, Kaduna and Cross River states, by intervention period

Provision factors	Early intervention period (Sept 2015-Dec 2015) (n=43)		Post-intervention period (April 2016-June 2016) (n=114)	
	Yes (n)	%	Yes (n)	%
Reconfirm client's method choice?	43	100%	71	63%
Verify client is not pregnant?	43	100%	113	100%
Wash hands before inserting implant?	43	100%	113	100%
Wash hands before putting on gloves?	43	100%	113	100%
Wear gloves?	43	100%	113	100%
Position client correctly for Implant insertion?	43	100%	113	100%
Correctly identify insertion site?	43	100%	113	100%
Anaesthetize insertion site?	43	100%	113	100%
Apply aseptic rules in un-packing Implanon/Jadelle?	43	100%	77	68%
Correctly insert Implanon/Jadelle?	43	100%	109	96%
Place a small adhesive bandage over insertion point?	43	100%	98	87%
Verify the presence of Implant in the patient's arm immediately after insertion by palpation?	43	100%	113	100%
Ask client to palpate?	43	100%	113	100%
Apply pressure bandage and sterile gauze to insertion site?	43	100%	113	100%
Wash hands after removing gloves?	43	100%	74	65%
Ask client to wait/rest for at least 15 minutes after insertion?	42	98%	108	96%
Complete user card and give it to client?	43	100%	107	95%
Dispose of sharps in puncture resistant containers?	43	100%	113	100%
Ensure that instruments and reusable gloves are decontaminated?	43	100%	90	80%

Figure 3: Mean implant insertion competency score, by calendar month



On average, there exists a high level of implant insertion competency through the period of observation. None of the mean scores is less than 80% of the maximum score, i.e. less than 15.2 (80% of 19).

Like the plot of implant counseling competency over time, the implant insertion competency score on average seems to be declining in the later period i.e. months 10, 11, and 12 post-training. It appears that the high level of implant insertion competency though maintained over 12 months in the post-training period starts declining in the later part of the year.

A paired t-test was run on a sample of 265 implant insertion observations to determine whether there was a statistically significant mean difference between the implant insertion competency score in the months 10, 11, and 12 of the intervention when compared to the score in the months 3, 4, and 5 of the intervention. Out of the total score of 19, the implant insertion competency score was lower in the months 10, 11, and 12 (17.4 ± 1.5) as opposed to the score in the months 3, 4, and 5 of the intervention (19 ± 0.0); a statistically significant decrease of 1.5 (95% CI, 0.9 to 2.0), $t(138) = 5.24$, $p = 0.0000$, $d=1.10$. Effect size is large and practically significant (Cohen's $d = 1.10$, data not shown). Thus, the implant insertion competency score has declined in the later period.

Given that CHEWs are not dedicated FP providers in facilities and provide a variety of primary care services in a busy PHC, workload issues may also be a factor in understanding the declines in the implant counseling and implant insertion scales over time. It may be concluded that the items that declined over time may be areas that a busy practitioner might fail to complete to save themselves time. Again, intensive and regular supportive supervision of implant insertions (and possibly re-training) will be needed continuously for trained CHEWs to maintain their implant insertion competency scores, with an emphasis on aseptic techniques to prevent infection.

4.3 Study Objective 2: Client Characteristics, Experiences with Services, and Satisfaction

Exit interviews were conducted to assess client satisfaction. Forty (40) interviews were conducted at intervention facilities and 14 at comparison facilities between November 2015 and June 2016 (with about half (25) conducted during the endline, April-June 2016). There were no statistically significant differences between clients at intervention and comparison sites with respect to background characteristics; therefore, only client data from intervention facilities is presented in Table 12 (on next page). Most clients who received implant services from a CHEW on the day of interview were 20-30 years old, married with at least two children, and had attended primary or a higher level of education. Nearly half (48%) of clients were in the extended (less than 12 months since the last birth) postpartum period at intervention sites.

Table 12: Client background characteristics, by intervention and comparison facilities, Kaduna and Cross River states

Background Characteristics	Intervention (n=40)	
	Yes (n)	Col. %
State		
Cross River	20	50%
Kaduna	20	50%
Location of Health Facility		
Rural	40	100%
Urban	0	0%
Age of client		
10-19 years	4	10%
20-24 years	5	13%
25-30 years	8	20%
30-34 years	6	15%
35-39 years	5	13%
40-44 years	1	3%
45 plus years	0	0%
Don't know the age	11	28%
Currently in school		
Yes (in school now)	0	0%
Out of school now/no/no response	40	100%
Highest level attended		
None	10	25%
Primary	11	28%
Secondary	19	48%
Higher	0	0%
Marital status		
Married	31	78%
Living with a partner	2	5%
Single, never married	7	18%
Separated/divorced	0	0%
Widowed	0	0%
Number of living children		
0	2	5%
1	3	8%
2	4	10%
3	8	20%
4	8	20%
5	4	10%
6+	11	28%
Age of youngest living child		
0-6 months	15	38%
7-11 months	4	10%
1 year	4	10%
2 years	4	10%
3 years	7	18%
4 years	1	3%
5+ years	5	13%
Desires to have (a) another child in future	18	45%

Table 13 shows data on client's purpose of visit, source of information about FP methods, and prior experience with FP. None of these variables was significantly different between intervention and comparison groups; thus, only the intervention data (with 40 clients) is presented. Nearly half (45%) of intervention implant clients had come to the facility to initiate contraceptive use. "Service providers" and "friends" were the most important sources of information for intervention site clients. Over half of intervention (53%) clients had previous experience with injectables. Only 20% (6) clients at intervention sites were completely new to FP (answering "none" to methods used before the FP visit).

Table 13: Client's reported family planning visit purpose, prior use, and knowledge, intervention facilities, Kaduna and Cross River states

FP visit experience and FP knowledge	Intervention (n=40)	
	Yes (n)	Col. %
Main purpose for FP visit		
Start FP	18	45%
Get resupply of contraceptive	13	33%
Follow-up with problem	8	20%
Restart FP	1	3%
Stop contraceptive use	0	0%
Source of information about FP methods		
Service provider in health facility	12	31%
Friend	8	21%
Radio	5	13%
Pamphlets/posters	5	13%
Church/mosque	4	10%
Television	3	8%
Community events/meetings	1	3%
Community-based provider	1	3%
Methods used before today's visit		
None	6	20%
Injectable	16	53%
Male condom	4	13%
Oral contraceptive pills	2	7%
Female condom	1	3%
Standard Days Method	1	3%
IUD (intrauterine device)	0	0%
Implant	0	0%
Lactational amenorrhea method	0	0%
Emergency contraception	0	0%
Don't know	6	20%

Table 14 shows data on implant client's FP visit experience on the day of their interview. Only one of these variables was significantly different by intervention and comparison group (a question on payment for services); the remainder did not significantly differ by group. Thus, only intervention site interview results are presented (40 clients). Most clients reported receiving counseling on implants, male and female condoms, and the Standard Days Method of preventing pregnancy. None of the implant clients mentioned receiving counseling on pills, IUDs, or injectables. This suggests that either clients did not

receive counseling on a full range of methods in intervention facilities or, more likely, that they could only recall methods of interest or personal relevance out of the many unfamiliar methods presented to them. Future training and supportive supervision efforts should focus on ensuring that counseling covers a full range of methods (even those which may be stocked out) in order to maximize contraceptive method choice for clients, though recall issues may continue to persist for clients who are unfamiliar with the various methods of FP.

All clients who reported paying for services reported that they found the services to be either "affordable" or "highly affordable" (1). Clients in both groups reported paying for a full range of fees, such as for a hospital card, the FP commodity itself, disposable materials, such as gloves/syringes, and counseling services. Supportive supervision and recommendations made at facility level should address appropriate and affordable cost recovery strategies that do not burden clients significantly and inadvertently discourage FP use.

Table 14: Client's reported family planning visit experience, intervention facilities, Kaduna and Cross River states

FP visit experience	Intervention (n=40)	
	Yes (n)	Col. %
Methods counseled on today		
Female condom	13	33%
Implant	9	23%
Standard Days Method	9	23%
Male condom	5	13%
Emergency contraception	3	8%
Oral contraceptive pills	0	0%
IUD (intrauterine device)	0	0%
Injectable	0	0%
Lactational amenorrhea method	0	0%
Client paid for any services obtained today (yes)	16	41%
Services for which client paid (n=16)		
FP commodity	7	44%
Hospital card	6	38%
Counseling services	2	13%
Disposable materials (globe/syringes)	1	6%
Other drugs	0	0%
Affordability of serviced paid for today (n=14)		
Highly affordable	1	7%
Affordable	13	93%
Affordable with opportunity costs	0	0%
Unaffordable	0	0%
Highly unaffordable	0	0%

Information Provision Scale

Exit interview implant clients in intervention facilities were asked individual questions on information about using implants received during counseling. Table 15 lists the individual elements of information provision questions and proportions and numbers of clients who answered yes to each question. None of the differences in each of the items was statistically significant with respect to intervention vs. comparison group, so only intervention results are presented.

Nearly all (90% or above) clients in intervention sites reported that the provider explained how to use implants, informed them of what to do in case of any problems, informed them of the number of years the method would be effective, told them when to return for a follow up visit, and told them about other methods of family planning. Over 80% of clients were told about side effects and that the method affords no protection from STIs and HIV.

Table 15: Percentage of clients who reported that they received measured elements of information provided by CHEWs, intervention sites, Kaduna and Cross River states

For the method you obtained today (implants), did the provider (CHEW) do the following:	Intervention (n=40)	
	Yes (n)	Col. %
Explain to you how to use the method effectively?	39	98%
Describe possible side effects of using the method?	33	83%
Tell you what to do if you have any problems?	39	98%
Explain that this method does not provide protection against STIs and AIDS?	32	80%
Tell you how many years of protection the method (the implant) provides against pregnancy?	39	98%
Tell you when to return for a follow-up visit?	39	100%
Tell you about <u>other</u> methods of family planning (beside the one you are currently using)?	35	90%

From the data presented above in Table 15, a composite scale was created to measure client information provision from a multi-dimensional perspective. This scale looks at information provision **as reported by implant clients** during the exit interview, and was created using binary (yes/no) scores on questions that relate to whether the CHEW provided necessary information to the client during the visit. The binary score was combined (Yes=1, No=0) on each of the seven elements of the scale to arrive at the information provision score. The maximum score was 7 and minimum score 0.

Client information scales were compared across intervention and comparison facilities using t-tests and chi-square tests of independence with respect to client's recall of information provided to them during counseling. A paired t-test was run on a sample of 51 client exit interviews to determine whether there was a statistically significant mean difference between the information provision score at the intervention facilities when compared to the score at comparison facilities. Out of the total score of 7, the information provision score in the intervention facilities (6.4 ± 1.1) was statistically similar to the score in the comparison facilities (6.7 ± 0.5) [difference of 0.3 (95% CI, 0.3 to 0.9), $t(49) = 1.07$, $p = 0.1433$, data not shown]. Thus, no difference exists between intervention and comparison sites with respect to client's

recall of information provision on contraceptive implants. Clients in both types of sites were equally likely to get needed information about implant use during their FP counseling session.

Client Satisfaction Scale

Exit interview implant clients in intervention facilities were also asked individual questions on satisfaction with service delivery elements such as privacy, confidentiality, provider-client interactions, and client needs met. Table 16 lists the individual elements of information provision questions and proportions and numbers of clients who answered yes to each question. Several items were statistically significant with respect to intervention vs. comparison group comparisons, so both intervention and comparison site results are presented with chi-square tests of independence and p-values.

Clients at intervention facilities were more likely to be satisfied on the four items related to privacy and encouragement of questions than clients at comparison facilities. Implant clients from intervention facilities were more likely than clients in comparison facilities to agree that they met with the CHEW in a separate room, that there was enough privacy for counseling and implant provision during their visit, and that the provider encouraged them to ask questions. Aside from these measures of client satisfaction, there were no other significant differences in individual items related to client satisfaction between implant clients who received services at intervention vs. comparison sites.

Table 16: Percentage of clients who reported that they were satisfied with measured elements of services and information provided by CHEWs, by intervention and comparison groups, Kaduna and Cross River states

Client Satisfaction Scale Elements	Intervention (n=40)		Comparison (n=14)		Signif
	Yes (n)	Col. %	Yes (n)	Col. %	
Did you feel that your needs for FP were met?	40	100%	13	100%	NS
Did you feel the information you were provided today on your method of choice (implants) was just about right?	33	83%	14	100%	NS
Did you feel that the clinic site offered you privacy for counseling and provision of implants?	35	88%	8	57%	*
Did you meet with the provider (CHEW) in a separate room?	32	80%	7	50%	*
Did you believe that the information you shared about yourself with the provider will be kept confidential?	39	100%	12	92%	NS
During this visit, did you have any other questions you wanted to ask?	21	54%	3	21%	*
Did the provider encourage you to ask the questions?	26	65%	2	15%	**
During the visit today, did you feel that the clinic staff was friendly?	39	98%	13	93%	NS
During your visit to the clinic today, would you say you were treated very respectfully or respectfully by the provider (CHEW)?	40	100%	14	100%	NS
The provider did not do or say anything that made you uncomfortable.	38	95%	14	100%	NS
The provider (CHEW) was very responsive or responsive to your needs.	40	100%	12	92%	NS

****p<.01; *p<.05**

A composite client satisfaction scale was also created using binary scores on client satisfaction measures presented in Table 16 above. The binary score was combined (Yes=1, No=0) on each of the 10 elements of the scale to arrive at the client satisfaction score. The maximum score was 10 and minimum score 0. The client satisfaction scores were then compared across intervention and comparison facilities using t-tests and chi-square tests of independence. A paired t-test was run on a sample of 49 client exit interviews to determine whether there was a statistically significant mean difference between the client satisfaction score in the intervention facilities when compared to the score in the comparison facilities. Out of the total score of 10, the client satisfaction score at the intervention facilities (9.0 ± 0.8) was higher than the score at comparison facilities (8.1 ± 1.1); a statistically significant difference (95% CI, 0.3 to 1.6), $t(47) = 3.07$, $p = 0.0017$, $d=1.10$, data not shown. This means that implant clients at intervention sites were overall more satisfied than implant clients at comparison sites with respect to the items included in this client satisfaction scale.

Overall measures of client satisfaction, including wait times, cleanliness, and availability of methods

Finally, Table 17 presents percentages on individual question regarding overall client satisfaction, perceptions of wait times, cleanliness, availability of commodities, and willingness to recommend services to a friend, which are typical dimensions and measures of client satisfaction. None of the differences between intervention and comparison groups were statistically significant, meaning that clients at both groups of facilities were similar in their perceptions. All implant clients interviewed, irrespective of group, mentioned that they were either "highly satisfied" or "satisfied" with their services. A majority of clients in both groups (93% in intervention and 78% in comparison facilities) reported that their wait times were either non-existent or reasonable. Nearly all clients found the facility to be clean and nearly all, irrespective of intervention group, agreed that they would be willing to recommend the facility to a friend for FP services. Importantly, however, over one-third of clients at intervention facilities (36%) reported that the facility had a shortage of FP commodities, an important barrier to quality FP services. This feedback seems to contradict information obtained from CHEWs and program staff. It should be noted that this problem was only reported by one client at comparison sites (data not shown). One possible explanation is that providers may not be lacking commodities, but instead are lacking the consumables (sterile gauze, antiseptic, etc.) needed to provide implants. It is possible that this shortage of consumables may be explained to the client as lack of commodities by providers, though further investigation would be needed to confirm if this was the case or not.

Table 17: Percentage of clients who reported that they were satisfied with services, waiting time, cleanliness of the facility, and availability of commodities, Kaduna and Cross River states, intervention and comparison groups

Client Assessments	Intervention (n=40)	
	Yes (n)	Col. %
Level of satisfaction with the services you obtained today?		
Highly satisfied	19	48%
Satisfied	21	53%
Not satisfied	0	0%
Highly unsatisfied	0	0%
Don't know	0	0%
Do you feel that your waiting time was reasonable or too long?		
No waiting time; was seen immediately	8	21%
Reasonable amount of time	28	72%
Too long	3	8%
Don't know	0	0%
Was the health facility clean? (yes)	39	98%
Did health facility have any shortage of commodities (e.g., condoms, implants, IUDs, etc.)? (yes)	14	36%
Would you recommend this facility to a friend who wants to receive FP services? (yes)	38	95%
Why would you recommend this place to your friend? (n=38)		
Friendly service provider	12	32%
Distance (not far)	10	26%
Affordable services	9	24%
Confidentiality of services	4	11%
Good quality services	3	8%
Why would you not recommend this place to your friend? (n=2)		
Unfriendly service provider	2	100%
Distance (too far)	0	0%
Too expensive services	0	0%
Poor quality services	0	0%
Non-confidentiality of services	0	0%

4.4 Study Objective 3: Effect on Family Planning Method Uptake and Method Mix

Data were collected on the monthly uptake of condoms, pills, injections, implants, and IUDs beginning from April 2015- June 2016, i.e. for 15 months for the 20 intervention and 20 comparison facilities. As previously mentioned, the implant-related training intervention was conducted toward the end of June 2015—hence, the three months of April, May, and June of 2015 were treated as pre-intervention period in the study.[x] The post-training supervision and other elements of intervention continued until the end of June 2016—hence, the three months of April, May, and June of 2016 were treated as post-intervention period. This three-month post-intervention phase was selected as it was the same number of months as the baseline (three) and it was at the end of the intervention, thus representing a more realistic "snapshot" of the intervention, after any immediate post-training effect had subsided (services usually dramatically increase right after a training, and then taper off).

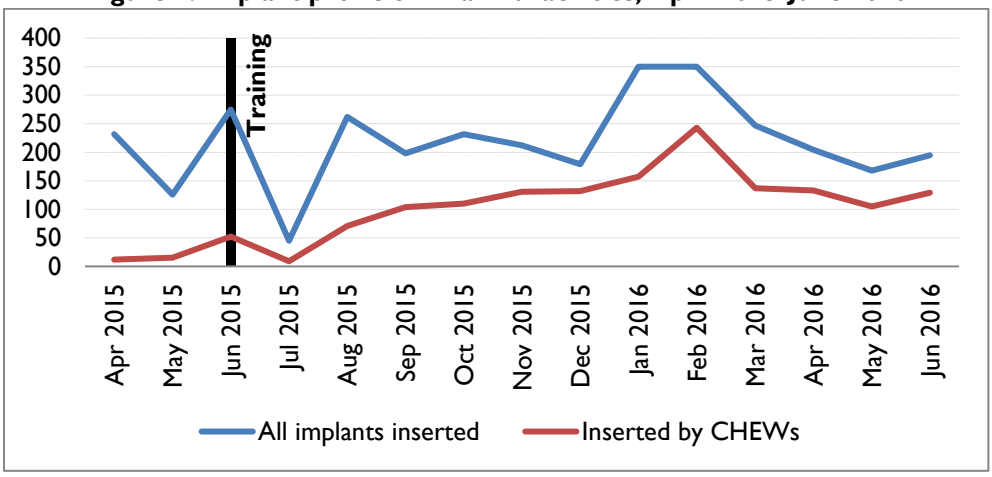
4.4.1 Effect on CHEW-Inserted Implants

The data extraction form used by the research assistants recorded total monthly provision of implants by all providers (CHEWs, nurse midwives, OB/GYNs) at facility level, as well as total monthly provision of implants by *only CHEWs* at facility level. This section examines how the intervention impacted the provision of implants by CHEWs specifically. FP service provision data were collected monthly from April 2015 through June 2016 for all 40 health facilities.

These data show that CHEWs inserted 1,900 implants in the 20 intervention facilities over a period of 12 months (July 2015-June 2016), generating 7,220 couple-years of protection (CYP). Figure 4, 5, 6, and 7 visually present these data and other details of the implants provided and removed by CHEWs, as compared to total number of implants provided and removed.

Figure 4 below shows all implants inserted and the number inserted by CHEWs, which is a subset of the former, in the 40 facilities over the same period. While overall implant uptake varied from month to month, it remained flat when comparing the pre-intervention level with the last three months of the study. In contrast, CHEW provision of implants appears to increase throughout the study period.

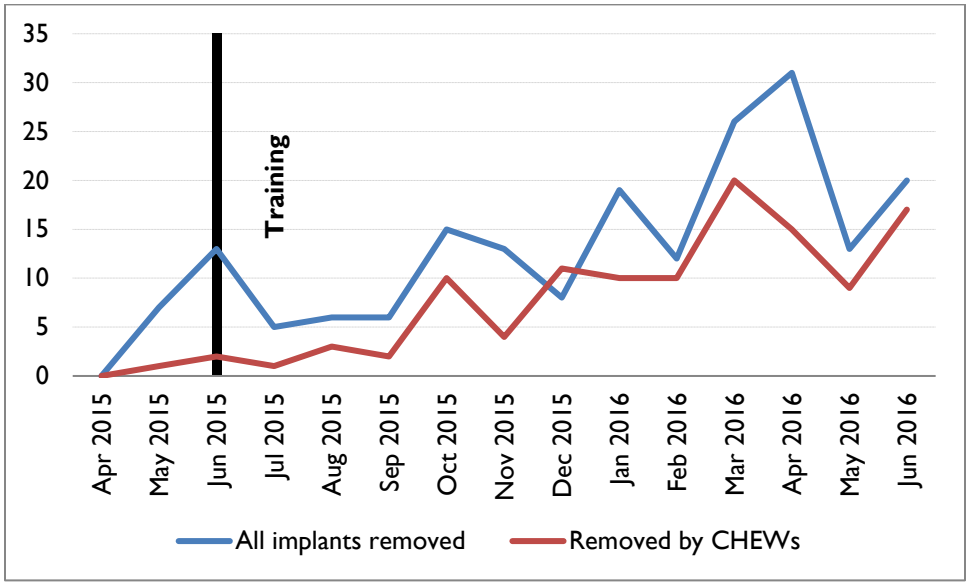
Figure 4: Implant provision in all 40 facilities, April 2015-June 2016



[x] It should be noted that there was a health worker strike in CRS during the month of July 2015, which accounts for the significant decrease in implant provision during that month. Similarly, in Kaduna, a staff audit exercise ordered by the state government immediately after the training took the CHEWs away from their facilities, and hence, could not start providing implant services until a few weeks after training.

Figure 5 shows all implants removed and the number removed by CHEWs, which is again, a subset of former, in the 40 facilities over the 15-month period. The trend for both insertions and removals by CHEWs appears to be increasing.

Figure 5: Implant removal in all 40 facilities, April 2015-June 2016



Figures 6 and 7 split the implant provision data by intervention and comparison facilities. In examining intervention vs. comparison facilities, it appears that intervention facilities, seen in Figure 6, show an increasing and positive trend of CHEWs inserting implants, whereas in Figure 7, the number of implants inserted by CHEWs implant appears near zero and unchanging.

Figure 6: Implant provision in the 20 intervention facilities, April 2015-June 2016

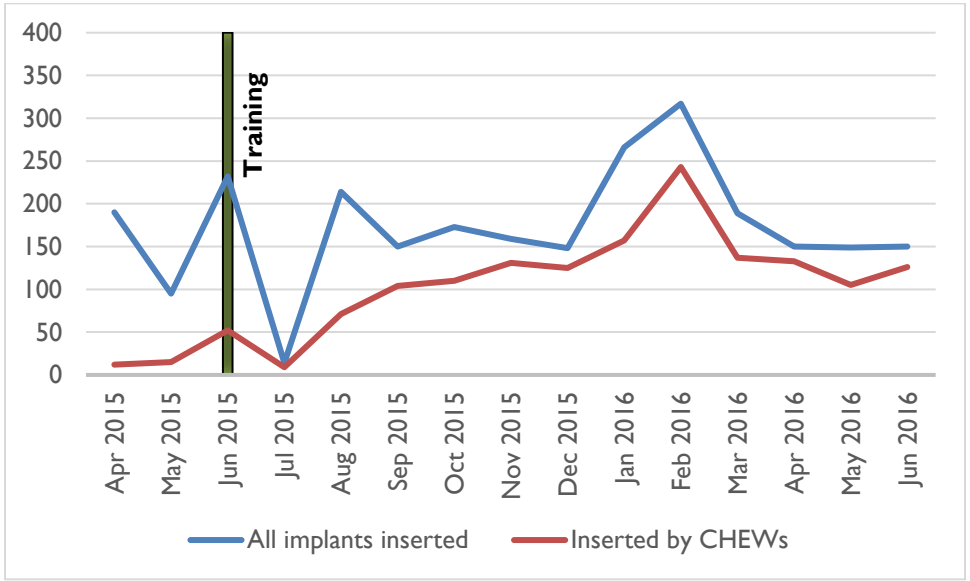
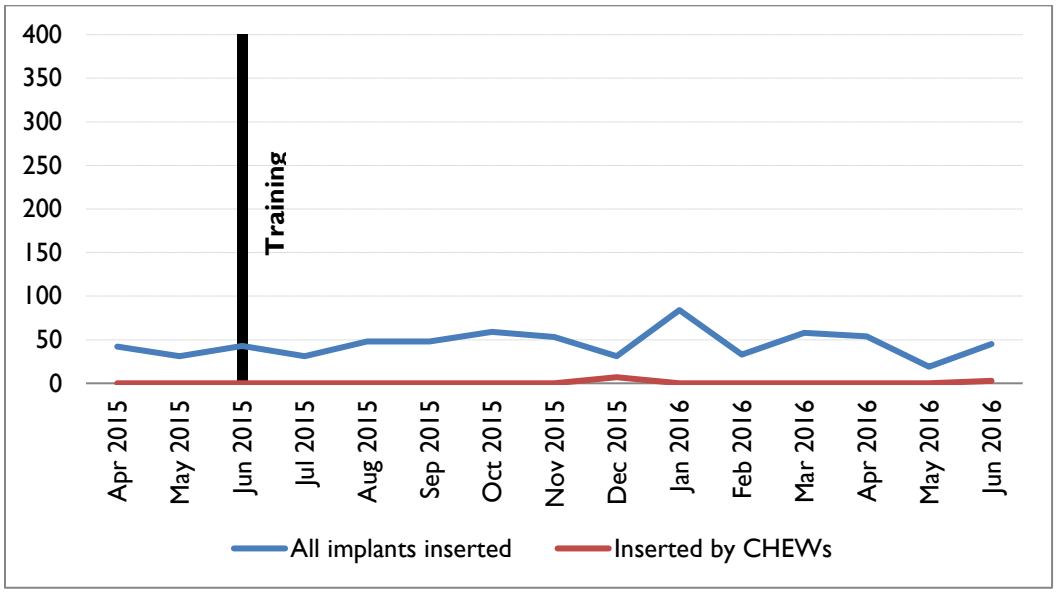


Figure 7: Implant provision in the 20 comparison facilities, April 2015-June 2016



While the graphs presented above visually demonstrate trends in CHEW and overall facility provision of implant insertions and removals over time in both intervention and comparison facilities, they do not give any information about whether these changes over time and differences between intervention and comparison facilities were statistically significant. To understand whether changes in FP uptake over the study period were statistically significant, several analytic tests were applied to the service provision data, including:

1. T-tests: T-tests are used to test the difference between two means. A series of t-tests were conducted to assess whether the intervention and comparison facilities had similar uptake of condoms, pills, injections, implants (including CHEW-provided implants), and IUDs at pre- and post-intervention.
2. One-way ANOVA: ANOVA tests means between three or more groups for one independent variable. It can confirm the overall results of the individual t-tests by determining the statistical difference between the intervention and comparison facilities in terms of individual method uptake during the two periods.
3. Two-Way ANOVA: This test compared the mean differences in implant uptake between two independent variables (time and facility type) to test the relationship between intervention and time period and whether the intervention had an effect on implant uptake (both for CHEW-provided implants and for total implants offered by all providers).
4. Multivariate Analysis of Variance (MANOVA): A multivariate analysis of variance (MANOVA) was similar to the two-way ANOVA in that it tested whether there was a statistically significant interaction effect of the intervention on implant uptake. However, unlike the Two-Way ANOVA, the MANOVA looked at the method uptake as a collective

of FP methods, whether there was a difference in contraceptive method mix among the intervention and comparison sites, and over time.

5. Difference in Difference (DiD) Analysis: A DiD analysis was also conducted to determine the effect of the intervention on uptake of each FP method (including CHEW-provided implants), after controlling for health facility, and time (pre-and post).

Descriptive statistical analyses of the FP method uptake at the 40 health facilities over time were performed using a series of t-tests to assess whether the intervention and comparison facilities were similar to each other during the two periods in terms of the uptake of condoms, pills, injections, implants, and IUDs. These t-test results were confirmed by one-way ANOVA, which tested the difference between the intervention and comparison facilities in terms of method uptake during the two periods. A two-way ANOVA was also performed, comparing the mean differences between groups by intervention group, time, and interaction between intervention and time. A statistically significant interaction between intervention and time affecting the dependent variable means that the intervention had an effect on uptake of implants.

Table 18 presents the descriptive statistics of the number of CHEW-inserted implants at the 40 health facilities. A series of t-tests were conducted to assess whether the intervention and comparison facilities were similar to each other during the two periods (pre-intervention and post-intervention months) in terms of the CHEW-inserted implants. The intervention facilities and comparison facilities were statistically similar to each other in the monthly mean number of CHEW-inserted implants during the pre-intervention period. However, they were statistically different during the post-intervention period. On average, the monthly mean number of the CHEW-inserted implants at the intervention facilities was higher by about 5.91 (approximately 6) during the post-intervention period. That is, CHEWs in intervention sites inserted an average of six (5.91) implants per month per facility whereas CHEWs in comparison sites inserted an average of 0 (0.5) per month per facility. This is a somewhat expected finding; if you train CHEWs and support them to provide implants in one group of facilities, and not in another, one would expect to see an increase in the number of CHEW-provided implants in the facilities where CHEWs were trained and supported to provide them.

Table 18: Descriptive statistics, CHEW-inserted implants and t-test results

Variable	Pre-intervention period (April, May and June of 2015)								Post-intervention period (April, May and June of 2016)							
	Intervention facilities			Comparison facilities			t	p	Intervention facilities			Comparison facilities			t	p
	Obs	M (SD)	95% CI	Obs	M (SD)	95% CI			Obs	M (SD)	95% CI	Obs	M (SD)	95% CI		
CHEW-inserted implants	64	1.23 (5.07)	-0.03, 2.50	56	0 (0)	0, 0	1.81	.0717	61	5.96 (4.21)	4.88, 7.04	59	0.05 (0.39)	-0.05, 2.96	10.72	.000

Notes:

1. Obs. = Observations, or the number of facility-months.
2. M is mean (mean number of CHEW-inserted implants per facility per month), SD is standard deviation, and CI is confidence interval.

3. t is t-statistic and p is p-value.

One-way ANOVA: CHEW-Inserted Implants

A one-way ANOVA test was calculated to confirm the t-test results above. A one-way ANOVA was calculated, which compares the mean number of CHEW-inserted implants per facility per month, by pre- and post-intervention period, to test the difference between the intervention and comparison facilities in terms of the CHEW-inserted implants. This test confirms the t-test results, demonstrating that there was no significant difference at baseline, but there was a significant difference at endline between intervention and comparison sites in the mean number of CHEW-inserted implants. See Table 19 below for the one-way ANOVA results.

Table 19: One-way analysis of variance of the CHEW-inserted implants between intervention and comparison health facilities

Dependent variable	Time Period	*df*	*F*	η2	*p*
CHEW-inserted implants	Pre-intervention	(1, 118)	3.30	0.02	.0717
	Post-intervention	(1, 118)	115.04	0.49	.0000

Two-way ANOVA: CHEW-Inserted Implants

A two-way ANOVA was then conducted to compare whether the intervention and comparison facilities behaved differently in terms of CHEW-inserted implants depending on whether the period under consideration was pre- or post-. Simply stated, the statistically significant interaction effect indicates that the intervention had an impact on the CHEW-inserted implants.

The monthly CHEW-inserted implants were subjected to a 2 (intervention versus comparison facilities) x 2 (pre- versus post-intervention period) two-way analysis of variance in order to test the relationship between intervention and time period. See Table 20 for the results.

The two-way analysis of variance yielded a main effect for the intervention variable, F(3, 236) = 66.83, p = 0.0000, such that on average, the number of CHEW-inserted implants was significantly higher overall in intervention facilities than for comparison facilities, and the average number of CHEW-inserted implants was significantly higher for post-intervention when compared to the pre-intervention period.

The interaction effect was also statistically significant, F(3, 236) = 28.65, p =.0000, indicating that the intervention had a statistically significant impact on CHEW-inserted implants when pre-intervention and post-intervention periods are compared.

Table 20: Two-way analysis of variance of CHEW-inserted implants between intervention and comparison health facilities and pre- and post-intervention periods

Dependent variable	Independent variable	*df*	*F*	*p*
CHEW-inserted implants	intervention	(3, 236)	66.83	.0000
	post	(3, 236)	29.91	.0000
	intervention X post	(3, 236)	28.65	.0000

Difference-in-Differences Analysis: CHEW-Inserted Implants

Table 21 shows that the DiD regression results broadly align with that of the two-way ANOVA results. There was a statistically significant difference in terms of the CHEW-inserted implants per month at the baseline between the intervention health facilities and comparison health facilities. On average, CHEW provision at intervention health facilities was higher by 1.23 per month at baseline. There was no statistically significant *secular trend* of change in the CHEW provision of implants per month, meaning that the mean monthly total of implants provided per facility did not increase over time.

However, the coefficient on intervention X post (DiD) variable is statistically significant for the CHEW-inserted implants per month ($p<0.01$ level of significance) in the DiD regression model. The intervention predicted the increase in CHEW-inserted implants, ($R^2 = .3478$, $F(3, 236) = 41.95$, $p = 0000$).

Table 21: Summary of differences-in-differences regression analysis for variables predicting the CHEW-inserted implants (N = 236)

CHEW-inserted implants	Model			Model with cluster robust standard errors (complex sampling SEs)[y]	
	B	*SE B*	*β*	*B*	*SE B*
intervention	1.23*	0.61	0.14*	1.23	0.89
post	0.05	0.63	0.00	0.05	0.05
intervention x post	4.68**	0.87	0.49**	4.68**	0.95
R^2	0.3478			0.3478	
F for change in R^2	41.95**			25.36**	

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

4.4.2 Effect on Inserted Implants and Method Mix (All Providers)

In addition to measuring the effect of the intervention on CHEW provision of implants, it was also of interest in this study to understand the comparability of the two groups of facilities (intervention vs. comparison) at baseline, as well as the overall effect of the intervention on FP provision in the target facilities at endline. At baseline, ideally there should be few, if any, statistical differences in the two groups of facilities with respect to provision of individual methods. And at endline, it is hypothesized that task-sharing implant insertions and removals by training CHEWs will result in an increase in the overall number of implants provided at facility level, since in theory, more providers are trained and able to serve a greater number of clients on any given day. This series of results presents analysis of all FP methods provided at facility level by all providers in order to look at both of these aspects.

Table 22 presents the descriptive statistics of FP method uptake in the 40 health facilities. A series of t-tests were conducted to assess whether the intervention and comparison facilities were similar to each other during the two periods in terms of the uptake of condoms, pills, injections, implants, and IUDs

[y] Robust estimates of variance are presented to account for likely increased intra-cluster correlations due to the multi-stage sample selection strategy (measurement within facilities).

provided by all providers, regardless of cadre. The intervention facilities and comparison facilities were statistically similar to each other in the uptake of condoms and IUDs during both periods, i.e. pre- and post-intervention. However, on average, at the beginning of the intervention period, intervention facilities had an average of 6.10 more implants inserted per month than in the comparison facilities. In addition, the uptake of pills was higher by 7.53 and the uptake of injections was higher by 8.04 in the intervention facilities when compared to the comparison facilities (highlighted in yellow). This indicates that intervention facilities were providing FP services to a higher number of clients per month at baseline than comparison facilities. This presents a limitation in this analysis, as the comparison sites are "lower volume" sites than intervention sites (with respect to FP clients), and therefore, are not truly comparable in terms of FP provision. Thus, these results should be interpreted carefully with this limitation in mind.

During the post-intervention period (endline), intervention and comparison sites were statistically similar in terms of the uptake of pills, injectables, condoms, and IUDs. However, the intervention facilities and comparison facilities were statistically different in terms of the uptake of implants during the two periods. The monthly uptake of implants at the intervention facilities was significantly higher by about 5.36 implants per month than in comparison sites. This indicates that intervention sites were higher both at baseline and endline than comparison sites in terms of implant insertions by all providers. The intervention did not result in any decrease in implant insertions, and in fact, led to a continuing significant upwards trend in terms of implant provision.

Table 22: Descriptive statistics on family planning method uptake and t-test results

FP method uptake per month	Pre-intervention period (April, May, and June of 2015)								Post-intervention period (April, May and June of 2016)							
	Intervention facilities			Comparison facilities			t	p	Intervention facilities			Comparison facilities			t	p
	Obs	M (SD)	95% CI	Obs	M (SD)	95% CI			Obs	M (SD)	95% CI	Obs	M (SD)	95% CI		
Implants	63	8.20 (17.63)	3.76, 12.64	55	2.10 (3.86)	1.06, 3.15	2.51	.006	61	7.36 (5.61)	5.92, 8.79	59	2 (3.71)	1.03, 2.96	6.14	.000
Condoms	63	46.15 (83.73)	25.07, 67.24	56	27.92 (128.72)	-6.54, 62.40	0.92	.178	61	12.13 (20.02)	7.00, 17.25	59	9.77 (23.86)	3.55, 15.99	0.58	.279
Pills	64	13.10 (27.21)	6.31, 19.90	56	5.57 (4.81)	4.28, 6.86	2.04	.021	61	6.32 (10.66)	3.59, 9.05	59	7.10 (6.58)	5.38, 8.81	0.47	.682
Injectables	64	24.68 (21.17)	19.39, 29.97	56	16.64 (15.67)	12.44, 20.84	1.22	.010	61	19.88 (19.39)	14.91, 24.85	58	18.60 (18.92)	13.62, 23.57	0.36	.358
IUDs	64	1.12 (3.45)	0.26, 1.98	56	0.33 (1.10)	0.04, 0.63	1.62	.053	61	0.55 (2.80)	-0.16, 1.27	59	0.06 (0.25)	0.00, 0.13	1.33	.092

Notes:

1. *Obs. is the number of observations of the monthly uptake of the given family planning method.*
2. *M is mean number of methods provided by facility per month, SD is standard deviation, and CI is confidence interval.*
3. *t is t-statistic and p is p-value.*

The results of the above t-tests were confirmed through a one-way ANOVA analysis. Results from the ANOVA can be found below in Table 23.

Table 23: One-way analysis of variance of family planning method uptake between intervention and comparison health facilities

Dependent variable	*Period*	*df*	*F*	η2	*p*
Implant uptake	Pre-intervention	(1, 116)	6.30	0.05	.0134
	Post-intervention	(1, 118)	37.75	0.24	.0000
Condom uptake	Pre-intervention	(1, 117)	0.86	0.00	.3567
	Post-intervention	(1, 118)	0.34	0.00	.5594
Pill uptake	Pre-intervention	(1, 118)	4.18	0.03	.0432
	Post-intervention	(1, 118)	0.23	0.00	.6346
Injectable uptake	Pre-intervention	(1, 118)	5.46	0.04	.0211
	Post-intervention	(1, 117)	0.13	0.00	.7161
IUD uptake	Pre-intervention	(1, 118)	2.65	0.02	.1059
	Post-intervention	(1, 118)	1.78	0.01	.1848

While there was a statistically significant difference between implant uptake at the comparison and intervention sites during both time periods, a two-way ANOVA demonstrated the intervention did not have an impact on implant uptake at facility level by all providers (see Table 28). The interaction effect was statistically non-significant ($F(3, 234) = 0.08$, $p = .7739$), indicating that the intervention had **no effect** on overall facility-level implant uptake when pre-intervention and post-intervention periods were compared. This means that while the number of CHEW-provided implants increased in the intervention facilities during the study period, the intervention did not result in an overall increase in the total number of implants provided by all cadres, as previously hypothesized.

Table 24: Two-way analysis of variance of implant uptake between intervention and comparison health facilities and pre- and post-intervention periods

Dependent variable	Independent variable	*df*	*F*	*p*
Implant uptake	intervention	(3, 234)	20.01	.0002
	post	(3, 234)	0.14	.7097
	intervention X post	(3, 234)	0.08	.7739

Finally, a MANOVA analysis was conducted to examine whether the method mix in the two groups of facilities changed over time. 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). No two dependent variables are highly correlated. The five outcome variables have low to moderate correlation; hence they were used as dependent variables in MANOVA analysis (data not shown).[z]

[z] An important caveat in this analysis is that the time period of use of each of these methods is different: condoms are used once, pills for one month, injectables for three months, and implants for 3-5 years (depending on the brand), and so on. As the period of observation was 15 months, it is likely that there may be repeat users of pills, but no repeat clients for implants, which may result in obscured results in any changes over time to the method mix.

In examining the contraceptive method mix in totality, including uptake of condoms, pills, injections, implants, and IUDs, a multivariate analysis demonstrated that there was a significant difference in method mix across intervention/comparison facility and time period with an overall F (3, 232) = 2.40, p =.0022 (highlighted in yellow), Wilk's Λ = 0.9171, p =.0013; Pillai's Trace = 0.0829, p = .0013. There was no statistically significant secular trend of change, in the method mix over time, Wilk's Λ = 0.9673, p =.1783; Pillai's Trace = 0.0327, p = .1783. The intervention did not predict the change in the method mix, Wilk's Λ = 0.9681, p =.1901; Pillai's Trace = 0.0319, p = .1901.

Table 25: Two-way MANOVA of method mix

Dependent variables	Independent variable	*df*	Λ	*F*	*p*
Monthly uptake of condoms, pills, injections, implants and IUDs	intervention	(5, 228)	0.9171	4.12	.0013
	post	(5, 228)	0.9673	1.54	.1783
	intervention X post	(5, 228)	0.9681	1.50	.1901

These results were further solidified by a DiD regression analysis. The analysis aligned with the results presented above, in that the intervention did not have an impact on the uptake of implants, or other FP methods examined, with the exception of pills. The DiD analysis found that the intervention was associated with a decrease in pill uptake in looking at all providers at facility level (which can be interpreted in a number of ways, though none definitively without additional investigation at facility level). DiD regression results broadly aligned with that of ANOVA and MANOVA. Complete information on the DiD analyses conducted for each method for all providers can be found in Appendix IV.

Table 26 summarizes the results of all of the regression analyses. These analyses show that while the intervention was successful in increasing CHEWs' provision of implants at facility level, it had no effect on the overall contraceptive method mix (with the exception of decrease in pills) or provision of implants by all providers at facility level. This means that while facilities were successful in having CHEWs offer implants to clients, this approach did not result in significant changes to the method mix, or any increase in the number of implants offered at facility level.

Table 26: Summary of regression results

#	Measure	At baseline	Secular trend	Impact of intervention
1	CHEW-inserted implants	CHEW provision at intervention health facilities was higher by 1.23 per month	None	Intervention resulted in increase in the CHEW provision of implants by 4.68 per month
2	Total implant uptake	Uptake at intervention health facilities was higher by 6	None	None
3	Condom uptake	Intervention facilities are similar to comparison facilities	None	None
4	Pill uptake	Uptake at intervention facilities was higher by 7.5	None	Intervention is associated with decrease in the pill uptake by 8.20 per month
5	Injection uptake	Model did not fit	None	None
6	IUD uptake	Intervention facilities are similar to comparison facilities	None	None

5. Discussion and Recommendations

In this study, we demonstrated that CHEWs who are trained to provide implants according to national and international standards for implant service provision can successfully provide high quality implant services to their clients. We also demonstrated that clients remain satisfied with implant services provided by CHEWs.

As a result of the intervention, 100% of CHEWs at intervention sites reported that they had received in-service training on general FP counseling, implant counseling, and implant service provision. Nearly all (n=25) of the interviews conducted at endline with these trained CHEWs reported providing implant insertions (96%), removals (88%), as well as management of side effects (96%).

CHEWs performed well throughout the study period with respect to general FP counseling. In addition, CHEWs reported that they felt confident in providing services. Most CHEWs reported that their skills were "good" or "very good" and required "none" or "little" supervision to offer the service. CHEWs demonstrated a high level of general contraceptive counseling competency that was maintained over 12 months during the post-training period. On average, there also exists a high level of implant counseling competency through the period of observation. However, the implant counseling competency score on average declined at the end of the study. Similar to implant counseling competency over time, implant insertion competency was high at the beginning of the study, but appeared to decline towards the end of the post-training period. It appears that the high level of implant insertion competency though maintained over 12 months in the post-training period starts declining in the later part of the year. While it is possible that this is due to attrition of a few of the most active and experienced providers, providing ongoing intensive supportive supervision is needed after the initial training to ensure that busy providers maintain strong service provision standards.

Good quality, regular supervision is also critical to ensure that providers have the skills and knowledge to provide quality FP services. At endline, all interviews with CHEWs at the intervention sites revealed that they usually received supervision on some or all FP methods. Most CHEWs reported that the supervisors observed service provision activities, reviewed registers and commodity supplies, and occasionally provided on the job training. Importantly, CHEWs from intervention sites at endline received feedback on the supervision either during or after each supervision visit. Almost all the CHEWs who have received feedback at baseline and endline reported to find the feedback useful. Regular supportive supervision needs to continue to take place continuously for trained CHEWs to maintain their implant insertion competency scores over an extended period. A judicious application of the competency checklist during ongoing supportive supervision can help maintain high competence in implant service counseling and provision.

Clients were equally likely to be satisfied with their implant provision services provided by a CHEW in intervention sites as compared to those provided by a higher-level cadre (nurse, CHO, etc.) in comparison sites. Clients in intervention sites were actually more likely to be satisfied with the privacy and ability/encouragement to ask additional questions. Overall, however, there were few differences between intervention and non-intervention sites in client satisfaction with services, the information she was given, or the implant method that she received. Notably, clients were highly satisfied with the wait times, the cleanliness, and the cost of services they had received. It indicates that CHEWs are able to provide at

least the same level of client satisfaction as non-CHEW providers and may actually provide more satisfaction that current implant providers.

Intervention sites in both states reported to have implants fully available in facilities both at baseline and endline: only one facility lacked implants in the six months preceding the baseline survey. Additionally, over one-third (36%) of clients in intervention sites mentioned that there was a shortage of one or more FP commodities at endline. However, it is possible that providers lacked the consumables/materials needed to provide the services, and that this was either explained to clients or interpreted by clients as lack of commodities. The rationale for this shortcoming requires a more thorough investigation.

Monthly service statistics from facilities showed that CHEWs provided a significantly greater mean monthly number of implants in intervention sites (vs. comparison sites) from pre-intervention to post-intervention. CHEWs inserted 1,900 implants in the 20 intervention facilities over a period of 12 months (July 2015-June 2016), generating 7,220 couple-years of protection (CYP). On average, the monthly mean number of the CHEW-inserted implants at the intervention facilities was higher by about six implants provided during the post-intervention period than CHEW-inserted implants in comparison facilities. Nearly all (23 out of 24 interviews conducted) of the trained CHEWs reported during the three month endline period that they were performing implant provision services. Trained CHEWs in intervention facilities seem to be carrying out most of the insertions and removals at facility level after completing their in-service training and follow-up certification. The MOH and the program should assess whether an average of six implants per month is sufficient in maintaining clinical competency in providing implant insertions.

One of the main assumptions of implementing a task-sharing initiative around implant provision is that it should result in increased access and uptake of implants facility-wide. In theory, training CHEWs to successfully offer implant services should expand the number of trained providers at facility level and hence, increase a facility's capacity to serve more clients. One might expect an upwards trend at facility level in the number of implant clients served, assuming other factors, such as implant commodities and consumables are available, and sufficient numbers of clients seeking services are present.

However, this study found that there was no overall increase in the total number of implants provided at facility level by all staff over time, and there were no observed changes in the method mix (with the exception of a decrease in pill users). These findings suggest that while CHEWs have been successful in providing greater numbers of implants over time, the number of total implant clients did not increase at facility level. More information at facility-level is needed to understand this finding, such as whether facilities were truly capable of meeting increased demand (in terms of available commodities, and patterns of assignments and duties at facility level where a trained CHEW is available to provide services). It is also likely that greater attention needs to be given to demand generation activities, both within facilities in coordinating units (ANC, PMTCT, immunizations, etc.), and externally in communities served by the facilities, keeping in mind the need for volunteerism, informed choice, and equal promotion of all methods.

This study was designed to be comparable to results collected in other studies, one of which was conducted by Jhpiego in Bauchi and Sokoto states. Results of the Jhpiego study are consistent with these findings. Both studies demonstrate improved or high implant counseling skills, strong implant insertion skills by CHEWs, and improved client satisfaction from baseline to endline. Both studies note a relatively

low number of implant insertions per health facility per month throughout the study, attributing this to a lack of demand in the communities, which are more familiar with injectable contraceptives, pills, and condoms. Both proof-of-concept studies conclude that ongoing, regular supportive supervision is critical to success in providing services and in maintaining quality assurance, and both studies highlight the need for possible retraining, especially training of additional practitioners to maintain and even increase the number of available providers. Finally, CHEWs in both studies identified a lack of demand in the communities as a major barrier to providing services.

6. Conclusion

Policy change is an important first step in expanding access to contraceptive implants in Nigeria. However, it is not sufficient on its own to enable successful task-sharing of implants. Findings from this study point to the need to continue to support health system strengthening initiatives at facility level including:

1. Better tracking on the extent to which CHEWs have the time to be able to conduct community outreach on a regular basis, or whether other factors to increase demand need to be added to the program to complement CHEW-provided implants.
2. Greater community outreach to generate greater voluntary demand in the context of informed choice, preferably by dedicated outreach staff who are not busy providing clinical services (this would also serve to decrease the time for providers to complete their competency certification);
3. Close mentoring and supportive supervision for certifying and maintaining high-quality service provision focused on gaps observed during visits, such as professionalism, respect, demand creation, and aseptic techniques in midst of potentially high workloads;
4. Functional referral systems for difficult removals and other implant-related services not available at facility level;
5. Training and re-training CHEWs to provide implant services and replace trained staff who have been transferred;
6. Supply chain and commodity logistics support for ensuring availability of commodities at facility level;
7. Support for continued monitoring data collection and feedback on both implant insertions and removals; and
8. Advocacy initiatives to ensure that the newly adopted task-sharing policy is scaled up appropriately in all states of Nigeria.

In addition, decision-makers need information on costing, data on continuation of use, effectiveness, and other information before bringing task sharing to scale. As noted during a 2016 DC-based stakeholder workshop on task-sharing, building consensus and obtaining buy-in from local governments and stakeholders throughout the testing and scale-up process is critical.[5] Demonstrating that a health service, such as providing contraceptive implants, can be safely task shared to less highly trained workers is crucial but is only one step toward effective implementation at scale. As noted by Shaefer (2015), providers need dedicated time, enough clients, supplies, supervision, and other system support, allowing them to maintain their competency, confidence, and productivity.[13] This study concludes that intensive support supervision is needed to ensure CHEWs maintain high standards of clinical competency, which

is not realistic in a resource-constrained supervision and management environment, or in an environment where demand and uptake of implants is extremely low, thus compromising provider's ability to maintain clinical competence through practice. Thus, while this provides evidence of proof-of-concept of task-shifting implant service provision to CHEWs, the next phase of this activity must consider solutions for maintaining and scaling up training and supervision for CHEW implant service provision and ensuring adequate demand creation at community level.

Next Steps

Based on the findings of this study, E2A is now in the process of providing technical assistance to support systematic scale-up of task-sharing for injectable and implant services via CHEWs in CRS. E2A is providing technical assistance to Pathfinder Nigeria and stakeholders at the state and local levels to develop a strategy for systematic scale-up of task-sharing via CHEWs, and document the scale-up experience. Beginning in early 2017, E2A hosted a scale-up strategy development workshop with state and local stakeholders in CRS, which highlighted the role of adaptation and also served as a dissemination meeting for the OR study on task-sharing for implant services. Applying the ExpandNet systematic approach to scale-up, E2A supports regular scale-up resource team meetings to monitor the scale-up process and to develop a strategy to document the scale-up experience to additional health facilities and LGAs in CRS. Findings from this scale-up effort will be available by October 2018.

7. References

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Appendix I: Composite Score Scales for CHEW Data

Supportive supervision scale

A composite post-implant training supportive supervision scale was created using linear combination of scores on supportive supervision-related questions. We combined the score on each of the six elements of the scale to arrive at the post-implant training supportive supervision score. The maximum score was 6 and minimum score 0. Table 27 lists the individual elements of the support scale.

A composite supportive supervision scale was created using linear combination of scores on supervision-related questions in the questionnaire. We combined the score on each of the nine elements of the scale to arrive at the supportive supervision score. The maximum score was 9 and minimum score 0. Table 27 lists the individual elements of the supportive supervision scale.

Table 27: Elements of the supportive supervision scale and their scoring

	Did the provider/CHEW:	YES	NO
Q301	As a CHEW, do you receive supervision on all, some or none of the family planning services that you provide in this facility?	On all FP services = 1 On some FP services =0.5	0
Q305A	Do you receive on the job family planning training during the supervision visits?	1	0
Q305B	Is review of guidelines/protocol done during the supervision visits?	1	0
Q305C	Is completing the registers done during the supervision visits?	1	0
Q305D	Are commodities supplied during the supervision visits?	1	0
Q305E	Are materials supplied during the supervision visits?	1	0
Q305E	Is guidance provided during the supervision visits?	1	0
Q306	Do you get a feedback after the supervision visit?	After each visit = 1 After some visits =0.5	0
Q309	Do you find the feedback useful?	1	0
Total		9	0

Guidelines and record keeping scale

Composite guidelines and record keeping scale was created using linear combination of scores on guidelines and protocol related questions. We combine the score on each of the five elements of the scale to arrive at the guidelines and record keeping score. The maximum score is 5 and minimum score is 0. Table 28 lists the individual elements of the guidelines and record keeping scale.

Table 28: Elements of the guidelines and record keeping scale and their scoring

	Did the provider/CHEW:	YES	NO
Q501	Do you have written guidelines and protocols for inserting and removing implants and managing side effects in this facility?	Yes, seen = 1 Yes but not seen =0.5	0
Q502	Do you keep records of clients and the services provided to them in this facility?	Yes, seen = 1 Yes but not seen =0.5	0
Q503	Do the registers differentiate between services provided by CHEWs and those provided by other providers?	1	0
Q504	Do you report service data to a higher authority?	1	0
Q506	Do you report service data on monthly basis?	1	0
Total		5	0

Appendix II: Composite Score Scales for Client Exit Data

Client satisfaction scale

A composite client satisfaction scale was created using linear combination of binary scores on client satisfaction related questions in the questionnaire. We combined the binary score (Yes=1, No=0) on each of the 10 elements of the scale to arrive at the client satisfaction score. The maximum score was 10 and minimum score 0. Table 29 lists the individual elements of the client satisfaction scale.

Table 29: Elements of the client satisfaction scale

		YES	NO
Q401	Did you feel that your needs for family planning were met?	1	0
Q402	Did you feel the information you were provided today on your method of choice (implants) was just about right?	1	0
Q403	Did you feel that the clinic site offered you privacy for counseling and provision of implants?	1	0
Q404	Did you meet with the provider (CHEW) in a separate room?	1	0
Q405	Did you believe that the information you shared about yourself with the provider will be kept confidential?	1	0
Q411	Did the provider encourage you to ask the questions?	1	0
Q413	During the visit today, did you feel that the clinic staff was friendly?	1	0
Q415	During your visit to the clinic today, would you say you were treated very respectfully or respectfully by the provider (CHEW)?	1	0
Q416	The provider did not do or say anything that made you uncomfortable.	1	0
Q418	The provider (CHEW) was very responsive or responsive to your needs.	1	0
Total		10	0

Information provision scale

A composite information provision scale was created using linear combination of binary scores on questions that relate to whether the CHEW provided necessary information to the client during the visit. We combined the binary score (Yes=1, No=0) on each of the seven elements of the scale to arrive at the information provision score. The maximum score was 7 and minimum score 0. Table 30 lists the individual elements of the information provision scale.

Table 30: Elements of the information provision scale

	For the method you obtained today (implants), did the provider (CHEW) do the following:	YES	NO
Q301A	Explain to you how to use the method effectively?	1	0
Q301B	Describe possible side effects of using the method?	1	0
Q301C	Tell you what to do if you have any problems?	1	0
Q301D	Explain that this method does not provide protection against STIs and AIDS?	1	0
Q301E	Tell you how many years of protection the method (the implant) provides against pregnancy?	1	0
Q301F	Tell you when to return for a follow-up visit?	1	0
Q301G	Tell you about <u>other</u> methods of family planning (beside the one you are currently using)?	1	0
Total		7	0

Appendix III: Differences in Differences Regression Model

The simplest model was employed where an outcome (Y) was observed for two groups for two time periods for all three models. One of the groups (intervention facilities) was exposed to the intervention in the second period but not in the first period. The second group (comparison facilities) was not exposed to the intervention during either period. Since we observed the same facilities within a group in each time period, the average increase in the second group (comparison facilities) was subtracted from the average increase in the first group (intervention facilities). This removed biases in second period comparisons between the two groups that could be the result from permanent differences between those groups (such as differences in age or marital status), as well as biases from comparisons over time in the intervention group that could be the result of trends which started before the intervention as a result of some other separate, undocumented process (e.g., a communications campaign or large training initiative by another organization).

The data varied by health facility (i), and time (t). Outcome was Y_{it}, and there were two periods – pre- and post-intervention. There were three key variables: $Intervention_{it}$ (or *intervention*), $Post_{it}$ (or *post*), and $Intervention_{it}*Post_{it}$ (or *intervention*post*).

$\mathbf{Y_{it} = \beta_0 + \beta_1}\ Intervention_{it} \mathbf{+ \beta_2}\ Post_{it} \mathbf{+ \beta_3}\ (Intervention_{it}*Post)_{it} \mathbf{+ \varepsilon_{it}}$ where

$Intervention_{it}$ =1 if observation i belongs to the facility that will eventually be treated

$Post_{it}$ =1 in the period when intervention has occurred

$Intervention_{it}*Post_{it}$ -- interaction term, intervention facilities after the intervention

The coefficient of our interest was β_3 which multiplies the interaction term, $(Intervention_{it}*Post)_{it}$. β_3 denotes true effect of treatment or the effect of the treatment on the treated.

Appendix IV: Difference in Difference Regression Results for Individual Methods

Uptake of implants

The coefficient on intervention X post (DD) variable was not statistically significant for the uptake of implants per month as dependent variable at 0.05 level of significance in either of the two models. There was a statistically significant difference in terms of the uptake of implants per month at the baseline between the intervention health facilities and comparison health facilities. On average, the uptake at intervention health facilities was higher by six per month. There was no statistically significant secular trend of change in the uptake of implants per month. The intervention predicted the uptake of implants per month, neither in Model 1 (R^2 = .0799, F(3, 234) = 6.77, p = 0002 and nor in Model 2 (R^2 = .36, F(7, 228) = 19.08, p =0.0000). See Table 31.

Table 31: Summary of hierarchical regression analysis for variables predicting implant uptake (N = 236)

Implant uptake	Model 1			Model 2			Model 2 with cluster robust standard errors	
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*
intervention	6.09**	1.82	0.29**	3.20*	1.56	0.15*	3.20	2.45
post	-0.10	1.84	-0.00	-0.03	1.57	-0.00	-0.03	0.66
intervention x post	-0.73	2.56	-0.03	1.61	2.18	0.06	1.61	2.56
condoms				0.01	0.00	0.10	0.01	0.01
pills				0.10	0.05	0.16	0.10	0.10
injectables				0.15**	0.03	0.28**	0.15*	0.06
IUDs				0.74*	0.34	0.17*	0.74	0.57
R^2	0.0799			0.3694			0.3694	
F for change in R^2	6.77**			19.08**			428.07**	

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

Uptake of condoms

The coefficient on intervention X post (DD) variable was not statistically significant for the uptake of condoms per month as dependent variable at 0.05 level of significance, in the two models. There was no statistically significant difference in terms of the uptake of condoms per month at the baseline between the intervention health facilities and comparison health facilities. Similarly, there was no statistically significant secular trend of change in the uptake of condoms per month. The intervention predicted the uptake of condoms per month, neither in Model 1 (R^2 = .0359, F(3, 235) = 2.92, p = .0348 and nor in Model 2 (R^2 = .2192, F(7, 228) = 9.14, p =0.0000). See Table 19.

Table 32: Summary of hierarchical regression analysis for variables predicting condom uptake (N = 236)

Condom uptake	Model 1			Model 2		
	B	*SE B*	*β*	*B*	*SE B*	*β*
intervention	18.23	14.19	0.11	-2.74	13.45	-0.01
post	-18.14	14.41	-0.11	-20.84	13.35	-0.13
intervention x post	-15.87	20.01	-0.08	-0.02	18.69	-0.00
pills				1.38**	0.47	0.27**
injectables				0.56*	0.28	0.13*
implants				1.03	0.56	0.13
IUDs				-0.32	2.93	-0.00
R^2	0.0359			0.2192		
F for change in R^2	2.92*			9.14**		

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

Uptake of pills

The coefficient on intervention X post (DD) variable was statistically significant for the uptake of pills per month as dependent variable at 0.05 level of significance, in the two models. At the baseline on average, the uptake of pills per month was higher at the intervention health facilities than comparison health facilities by 7.53. There was no statistically significant secular trend of change in the uptake of pills per month. The intervention predicted the uptake of pills per month, in Model 1 (R^2 = .0372, F(3, 236) = 3.04, p = .0297 and in Model 2 (R^2 = .6366, F(7, 228) = 57.05, p =0.0000). See Table 20.

Table 33: Summary of hierarchical regression analysis for variables predicting uptake of pills (N = 236)

Uptake of pills	Model 1			Model 2			Model 2 with cluster robust standard errors	
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*
intervention	7.53**	2.85	0.23**	1.88	1.85	0.05	1.88	2.52
post	1.53	2.90	0.04	2.84	1.84	0.08	2.84**	0.97
intervention x post	-8.31*	4.02	-0.22*	-5.67*	2.54	-0.15*	-5.67*	2.23
condoms				0.02**	0.00	0.12**	0.02	0.02
injectables				0.15**	0.03	0.18**	0.15**	0.03
implants				0.14	0.07	0.09	0.14	0.19
IUDs				4.09**	0.30	0.61**	4.09**	0.51
R^2	0.0372			0.6366			0.6366	
F for change in R^2	3.04*			57.05**			13.70**	

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

Uptake of injections

Model 1 does not fit. In model 1, F(3, 235) value is 1.99 and Prob(F) is 0.1168. The "F value" and "Prob(F)" statistics test the overall significance of the regression model. Specifically, they test the null hypothesis that all of the regression coefficients are equal to zero. With this p-value, we cannot reject the null hypothesis at 0.05 level of significance. The value of Prob(F) is the probability that the null

hypothesis for the full model is true (i.e., that all of the regression coefficients are zero). This high a value (p=0.1168) would imply that we cannot reject the null hypothesis, regression parameters may not be nonzero and that the regression equation may not have validity in fitting the data. It may be the case that the independent variables are purely random with respect to the dependent variable.

In model 2, the coefficient on intervention X post (DD) variable was not statistically significant for the uptake of injectables per month as dependent variable at 0.05 level of significance. There was no statistically significant difference in terms of the uptake of injectables per month at the baseline between the intervention health facilities and comparison health facilities. Similarly, there was no statistically significant secular trend of change in the uptake of injectables per month. The intervention did not predict the uptake of injectables per month in Model 2 (R^2 = .2978, F(7, 228) = 13.81, p =0.0000). See Table 21.

Table 34: Summary of hierarchical regression analysis- variables predicting uptake of injections (N=236)

Uptake of injections	Model 1			Model 2		
	B	*SE B*	*β*	*B*	*SE B*	*β*
intervention	8.04*	3.47	0.21*	2.01	3.09	0.05
post	1.96	3.55	0.05	1.22	3.09	0.03
intervention x post	-6.76	4.92	-0.15	-2.95	4.30	-0.06
condoms				0.03*	0.01	0.12*
pills				0.42**	0.10	0.35**
implants				0.59**	0.12	0.32**
IUDs				-1.45*	0.66	-0.18*
R^2	0.0247			0.2978		
F for change in R^2	1.99			13.81**		

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

Uptake of IUDs

Model 1 does not fit. F(3, 236) value is 2.27 and Prob(F) is 0.0816. In Model 2, the coefficient on DD variable was not statistically significant for the uptake of IUDs as dependent variable at 0.05 level of significance. There was no statistically significant difference in terms of the uptake of IUDs at the baseline between the intervention health facilities and comparison health facilities. Similarly, there was no statistically significant secular trend of change in the uptake of IUDs. The intervention did not predict the uptake of IUDs in Model 2 (R^2 = .5657, F(7, 228) = 42.43, p =0.0000).

Table 35: Summary of hierarchical regression analysis- variables predicting uptake of IUDs (N =236)

IUD uptake	Model 1			Model 2		
	B	*SE B*	*β*	*B*	*SE B*	*β*
intervention	0.78	0.42	0.16	-0.10	0.30	-0.02
post	-0.27	0.43	-0.05	-0.41	0.30	-0.08
intervention x post	-0.29	0.60	-0.05	0.54	0.42	0.10
condoms				-0.00	0.00	-0.00
pills				0.10**	0.00	0.73**
injectables				-0.01*	0.00	-0.11*
implants				0.02*	0.01	0.11*
R^2	0.0280			0.5657		
F for change in R^2	2.27			42.43**		

1250 23rd St, STE 475
Washington, DC 20037 USA

T 202.775.1988
F 202.775.1977

info@e2aproject.org

WWW.E2APROJECT.ORG

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